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ABSTRACT BOOK

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Abstracts from the EAHP 2013 Congress

POSTER AWARD NOMINEES

Presentations on Wednesday, March 13th, 14:00–15:30, Room 251

Time	Poster number	Poster nominee oral presentations	Author(s)
14:00	GRP-085	Identification of relevant drug interactions in Neonatal Intensive Care Units	A. Cransac, D. Semama, A. Lazzarotti, J. Hugueny, C. Sgro, C. Ferdynus, J.B. Gouyon, P. Fagnoni
14:15	GRP-187	The rates and types of prescribing errors in electronic chemotherapy prescriptions for ambulatory patients	M. Dobravc Verbic, K. Kantilal, N. Barber
14:30	CPC-040	Design and assessment of an E-learning course to train clinical pharmacists in Vitamin K Antagonist (VKA) consultations	E. Barbier, G. Launay-Vacher, M.C. Chaumais, A. Rieutord, R. Haddad, C. Courtin
14:45	PHC-015	Impact of MDR1 polymorphisms on the analgesic efficacy of tramadol in patients after a minor surgery	H. Bakhouche, O. Matouskova, O. Polanecky, J. Adamkova, S. Adamek, O. Slanar
15:00	GRP-051	Dispensing practise in Saudi community pharmacy	S. Alaqeel, N. Abanmy
15:15	PHC-004	Bayesian approach in the dosing of vancomycin in the treatment of Staphylococcal infections	R. Romero Domínguez, S. Santana Martínez, M. Moya Martín, J. Arenas Villafranca, E. Romero Carreño, M.E. Blanco Rivas, V. Faus Felipe, M. Beltrán García

Presentations on Thursday, March 14th, 08:30–10:00, Room 251

Time	Poster number	Poster nominee oral presentations	Author(s)
8:30	GRP-101	Insulin: improving prescribing safety	D.N. Wigg, V. Ruszala
8:45	CPC-050	Evaluation of a unified inhalation instructional system in cooperation with physicians, hospital pharmacists, and community pharmacists	A. Hosomi, R. Ono, T. Horie, T. Hashita, T. Araki, K. Iizuka, T. Nakamura, K. Dobashi, K. Yamamoto
9:00	GRP-059	Ethanol content in chemotherapy	M. Moreno, A. Gil, R. Diez, T. Molina
9:15	CPC-111	Pharmacy optimization of the medication process during admission to hospital: A multicentre, randomized, controlled trial	T.R.H. Nielsen, P.H. Honoré, S.E. Andersen, M. Rasmussen
9:30	GRP-032	Beneficial effect of hospital pharmacist participation in Intensive Care rounds: reduction in medicines errors and hospital costs	A.L. de Goede, P.M.L.A. van den Bemt, M.L. Becker, J. van Bommel, N.G.M. Hunfeld
9:45	PHC-014	Exploratory analysis of 1,936 SNPs in 225 ADME genes for association with busulfan clearance in adult hematopoietic stem cell recipients	M.H. ten Brink, J.J. Swen, J.A.M. Wessels, T. van der Straaten, J. Zwaveling, H.J. Guchelaar

General and risk management, patient safety

GRP-001 1ST ESNEE EXCIPIENT MONOGRAPH: INFORMATION NEEDED TO FORMULATE, PREPARE AND PRESCRIBE MEDICINES FOR NEONATES CONTAINING PROPYLENE GLYCOL AS AN EXCIPIENT

doi:10.1136/ejhpharm-2013-000276.001

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Background Neonates are particularly vulnerable to the adverse effects of medicines and excipients because their organs are immature. ESNEE (European Study of Neonatal Exposure to Excipients) is a European research consortium created in 2011 after the PRIOMED-CHILD call for proposals.
Purpose The aim of ESNEE workpackage 2 was to conduct a literature review of excipients used in medicines for neonates and to establish a monograph of information for each excipient.
Materials and Methods A systematic review of the literature was conducted with 6 key databases (i.e. Medline, Web of Science, Pascal, International Pharmaceutical Abstracts, Biosis previews, Embase). Hits were selected for their relevance according to criteria set by toxicology experts. Summaries of relevant papers were prepared with underlying critical information in a table. A face to face meeting was organised with experts to validate the data. Experts from European Medicines Agency Paediatric Committee (EMA PDCO) were involved.
Results The search strategy identified around 1500 papers of which 87 were relevant to our purpose. Among those papers, 17, 20, and 15 corresponded to non-clinical, case report, and epidemiological data respectively. The remaining 35 reported miscellaneous data observed in adults. The monograph includes some general information (chemical structure, pharmaceutical use), the list of all (propylene glycol) PG-containing medicines used in Europe for neonates collected by ESNEE workpackage 1 during a point prevalence study, the kinetic characteristics of PG, the first signs of toxicity (biological perturbation, clinical signs, etc.), the organ to target for monitoring and follow up for short or long term effects, some estimations of Acceptable Daily Intake (ADI), and Permitted Daily Exposure (PDE) and finally some recommendations to manage PG toxicity.
Conclusions This is the first monograph on PG that includes the most available and relevant information validated by a panel of European experts. This documented, accurate and practical information should help the pharmaceutical industry and hospital pharmacists when formulating/preparing medicines and neonatologists when prescribing such PG-containing medicines. It also provides a clear image of which information is lacking and warrants further experimental investigation.

No conflict of interest.

GRP-002 A CASE REPORT: MANAGEMENT OF PAIN AFTER SUBCUTANEOUS INJECTION OF TREPROSTINIL

doi:10.1136/ejhpharm-2013-000276.002

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Background Treprostinil is a prostacyclin analogue indicated for the treatment of Pulmonary Arterial Hypertension (PAH) for patients with functional NYHA class III. The administration is a continuous subcutaneous infusion. It is recommended that the treatment is initiated incrementally to reach a target dose, in intensive care. Injection site pain and local reactions (respectively 85% and 83% of patients) cause treatment cessation in 8% of cases [1].
Purpose To describe the role of multidisciplinary care in the management of pain due to treprostinil treatment.
Materials and Methods A descriptive study of a patient with pain due to subcutaneous injection of treprostinil. We collected information from the clinical and pharmacotherapeutic histories. A systematic literature search was performed about practical considerations for subcutaneous treprostinil in PAH. At Grenoble Hospital, the pain of treprostinil is managed by patient education [2] conducted by pharmacists, doctors and nurses belonging to different units.
Results Treprostinil treatment was initiated on 19 May 2011, on a 43 year-old patient with idiopathic pre-capillary NYHA III PAH (bosentan and tadalafil not effective; right-heart catheterization 80/30/50 mmHg PAP). The 6-minute-walk test was 544 metres. The initial dose is 1 ng/kg/min for a target dose of 40 ng/kg/min. The initial tolerance was good (Visual Analogue scale (VAS): 3; controlled by paracetamol). Doses were increased with an increment of 1 ng/kg/day. On May 30, 2011, with 10 ng/kg/min dose, the pain was intense (VAS: 8) despite analgesic treatment (paracetamol + tramadol), application of hot/cold packs and diclofenac gel. Mathier's work suggested changing the injection site (abdomen) and limiting the rotation. On July 08, 2011, the pain was controlled (VAS: 2) decreasing 4 days after changing the injection site [1]. The dose was 38 ng/kg/min, the NYHA stage was going down to II, while echocardiography showed persistent right dysfunction. By September 13 the desired dose had been reached (40 ng/kg/min), the pain had disappeared (VAS: 0), the patient was not taking analgesics and the injection site was being changed every 3 weeks. The effectiveness of the treprostinil treatment was demonstrable clinically and echographically.
Conclusions Intense pain due to treprostinil may require discontinuation of effective treatment. This case shows that multidisciplinary care with the use of simple measures allows this common side effect to be managed and cessation of treatment prevented.
References

1. Subcutaneous treprostinil in pulmonary arterial hypertension: Practical considerations – MA Mathier – *J Heart Lung Transplant*. 2010 Nov;29(11):1210–7. Epub 2010 Sep 19.
2. Bedouch *et al*, Pharmacists involved in patient education: a pharmacist collaborative care programme for pulmonary arterial hypertension. *Int J Clin Pharm* (*in press*).

No conflict of interest.

GRP-003 A MEDICINES RECONCILIATION PROCESS IN FRAIL ELDERLY PEOPLE

doi:10.1136/ejhpharm-2013-000276.003

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Background Medicines reconciliation may be effective in reducing clinically important medicines errors among high-risk patients such as elderly polymedicated people.
Purpose To standardise a home medicines reconciliation process in frail elderly people admitted to hospital.
Materials and Methods In this two-month pilot study in a 280-bed hospital, a reconciliation process was designed by a multidisciplinary team. Geriatricians obtained medical information to verify home medicines by interviewing patients with the help of nurses and also from other medical reports. Pharmacists were

informed of these patients by the electronic records thus made by geriatricians. Pharmacists checked their medical records with the currently prescribed medicines and identified all discrepancies revealed in reconciliation, and if appropriate, notified attending physicians.

Results A total of 45 patients were included in the study with a median age of 87.8 (SD 4.6) years and a median of 8 (SD 3) current home medicines. The pharmacist was consulted in 86.7% of patients. Pharmacists reviewed all these patients and discrepancies were detected in 41% patients: a) prescription of a drug not included in the hospital formulary (23.1% of patients). The substitution of these drugs proposed by pharmacists was accepted by physicians in 44.4% patients. b) Other kinds of discrepancies were detected in 5 patients (12.8%). The degree of acceptance of these pharmaceutical interventions was positive in just one patient. The rest was either negative or not assessed by physicians. 100% of discharged patients included in their medical report a list of active drugs and also, specific recommendations were made about interrupting former medicines.

Conclusions Medicines reconciliation developed by a multidisciplinary team has been found to be useful in detecting and reducing discrepancies with home medicines when frail elderly patients are admitted to hospital. It will be interesting to implement the same process, involving a pharmacist, when patients are discharged.

No conflict of interest.

GRP-004 A NEW STRATEGY FOR MONITORING AND IDENTIFICATION OF ADVERSE DRUG REACTIONS IN ONCOLOGY PATIENTS

doi:10.1136/ejhpharm-2013-000276.004

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Background Drug safety is an important issue in clinical practise because Adverse Drug Reactions (ADRs) are frequent and potentially life-threatening complications in patients undergoing cancer treatment.

Purpose This study had two main purposes: firstly, to monitor the safety of oncology patients in chemotherapy treatments and to identify and describe the toxicity of drugs; secondly, to compare the incidence and frequency of ADRs in approved experimental chemotherapy protocols compared to the ADRs in common clinical practise.

Materials and Methods From September to December 2012, all prescriptions reducing the normal dosage by at least 25% were examined to evaluate whether or not the reduction or withdrawal were related to ADRs. During these analyses pharmacists supported oncologists in completing ADR spontaneous report forms.

Results To date, eighty-two patients with dose reductions have been screened in the database. Seventeen patients (20.7%) experienced an ADR and the reports were recorded in the Italian Pharmacovigilance Database. Of the 17 patients, 12 were female and the median age was 62 years. All the observed ADRs are known and described in the summary of product characteristics. The drugs mainly responsible for the reactions were 5-fluorouracil, platinum-based agents, bevacizumab and cetuximab. Eight ADRs were graded as serious and required hospitalisation. Reducing the dose or withdrawing the drug after the onset of reactions led to a complete recovery in the majority of the patients. In 1 patient the ADRs caused treatment failure.

Conclusions Our exploratory survey demonstrates a clear and consistent underreporting in this patient setting. Management and understanding of ADRs in the course of drug treatment in cancer patients is important for improving the response to, and tolerability of, the treatment. Collaboration between different professionals is needed to improve the clinical efficacy and safety of care for patients.

No conflict of interest.

GRP-005 A NOVEL MODELLING APPROACH ADAPTING FUZZY REGRESSION FOR CAPTURING VAGUE DEFINITION OF ADMISSION OF A PATIENT

doi:10.1136/ejhpharm-2013-000276.005

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Background Unplanned admission of a patient which is a vague or fuzzy event has important financial implications for efficient use of hospital resources. Patients at high risk of admission are of major concern due to heavy use of hospital resources. Traditional approaches are not capable of accounting for the complex uncertainty and vague nature of hospital admissions. Methods adapting fuzzy regression methods could be an alternative method for decision-making experts to predict patient admission.

Purpose To deal with uncertainty in health system variables, identify the relationship between risk of admission and risk factors associated with the admission of a patient, and capture a vague definition of admission of a patient.

Materials and Methods A modelling approach adapting a fuzzy regression method was designed and developed using UK Hospital Episode Statistics (HES) data to capture the vague definition of admission of a patient. This model deals with uncertainty in health system variables which act as input variables in the model. The data collected is fuzzified, upper and lower bounds of the fuzzy membership function are evaluated using a JAVA programme that uses fuzzy regression methods.

Results

1. The fuzzy membership function was evaluated for about 10,000 patient records.
2. 404 inpatient variables were scanned using HES data sets.
3. Significant risk factors were admission source, admission method, reference conditions, age, length of stay, disease diagnosis.
4. The uncertain relationship between predictors and outcome associated with it is shown with the help of upper and lower bound regression equations.

Conclusions The fuzzy regression model was found to be capable of quantifying and estimating the unknown relationships between input predictors and predicted outcomes. The findings suggest that the fuzzy regression approach provides a good way of dealing with uncertainty in health system variables and vagueness in the admission of a patient.

No conflict of interest.

GRP-006 A POLICY REVIEW OF THE APPLICATION OF THE INTEGRATED MEDICINES MANAGEMENT SERVICE MODEL IN NORTHERN IRELAND

doi:10.1136/ejhpharm-2013-000276.006

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Background Since 2002, the Integrated Medicines Management Service (IMM) has strategically re-engineered clinical pharmacy services in the five acute Health and Social Care Trusts (HSCTs) in Northern Ireland. The Department of Health, Social Services and Public Safety (DHSSPS) supported the initial development of the IMM informed by evidence which demonstrated improvements in

patient care and efficiencies [1, 2]. These included reduced length of stay, readmission rates and drug costs with improved medicines appropriateness and communication with primary care. Against a background of the review of public administration, focus on efficiencies and future models for integrated health and social care, IMM remains a key policy initiative.

Purpose Within this context, a review of IMM service provision is being undertaken to assess the current application of the IMM model and its strategic alignment with plans for integrated health and social care.

Materials and Methods The first stage of the review involved a quantitative assessment of IMM practise within HSCTs to measure the application of the IMM model against a range of good practise indicators, relating to: use of funding for a dedicated IMM workforce; relevant staff roles and professional focus; workforce deployment across HSCT sites; availability and level of IMM service provision.

Results During 2011/12 66% of the total funding identified for IMM services in all HSCTs in Northern Ireland was used to employ pharmacists and 34% for pharmacy technicians. Within this workforce 96% of pharmacists and 98% of technicians had IMM roles included in their job descriptions with pharmacists spending 80% of their working time on clinical or IMM duties and pharmacy technicians 65%. The IMM workforce was deployed at 74% of HSCT sites (n = 17) with IMM services available for a range of bed types from Monday to Friday between 8am and 6pm. 40% of the total number of beds identified as suitable for IMM service provision across all HSCTs were reported as having active service provision during 2011/12 with activity levels ranging from 20% to 95% between HSCTs.

Conclusions IMM is regarded as a cornerstone of medicines policy in Northern Ireland and results indicate that the funding allocated for this service is being used to support the deployment of a cohort of pharmacists and pharmacy technicians with roles that are focused on clinical practise and medicines management. Results show the provision of IMM services within defined periods across HSCT sites in a range of bed types but with some variation in the active application of the IMM model between HSCTs.

References

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2. Scullin C. Scott MG, Hogg A, McElnay JC, (2007), An innovative approach to integrated medicines management.

No conflict of interest.

GRP-007 A RETROSPECTIVE SURVEY OF PATIENT OUTCOMES AFTER SWITCHING INTRAVENOUS IMMUNOGLOBULIN

doi:10.1136/ejhpharm-2013-000276.007

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Background The market place for human immunoglobulins is constantly evolving and reacting to instability of supply of the raw material. This has meant new products emerging as well as old products being replaced or withdrawn.

The NHS 'Demand Management Plan' has stabilised the UK market and helped to ensure adequate supplies. This plan also included a national contracting process and this has led to more cost-effective products becoming available.

These issues have led to two occasions when a complete product switch of the IVIg patient population was undertaken at Southend Hospital NHS Trust.

Purpose To assess the level of significant adverse effects, resulting in product discontinuation, seen during two IVIg switches in 2009 and 2011.

Materials and Methods The hospital pharmacy system was used to identify all IVIg patients.

Patient notes were requested for review.

Each patient's entry on the UK IVIg database was reviewed.

Results 68 patients completed a total of 98 switches.

2 patients were unable to continue with the alternative IVIg product. Both were receiving monthly IVIg infusions for multiple myeloma. Both experienced headaches and flu-like symptoms post-IVIg infusion after being switched to Octagam 10% and were subsequently returned to their previous product, Intratect.

Conclusions The switching of IVIg products is typically not encouraged. However there is a very little recently published literature that discusses the problems encountered when switching these products. The quality and relevance of what is available is variable and often relates to non-UK products.

This retrospective survey indicates that comprehensive IVIg switch programmes can be undertaken with a low level of patient disruption.

Abstract GRP-007 Table 1

IVIg switch	Patient numbers
Intratect to Octagam 10%	17
Octagam 5% to Intratect	1
Octagam 5% to Intratect to Octagam 10%	1
Vigam to Octagam 10%	1
Sandoglobulin to Octagam 10%	2
Sandoglobulin to Intratect to Octagam 10%	29
Sandoglobulin to Intratect	17

No conflict of interest.

GRP-008 A SOCIO ECONOMIC APPROACH TO MANAGEMENT (SEAM): AN ATTRACTIVE TOOL FOR MONITORING CHANGE IN A CLINICAL PHARMACY ENVIRONMENT

doi:10.1136/ejhpharm-2013-000276.008

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Background Organization has become more complex in hospitals. In the context of change, management is particularly critical.

Purpose The aim of our project was to develop and improve clinical pharmacy services between the Pharmacy and the cardiology departments using SEAM.

Materials and Methods Socio Economic Diagnosis (SED) was conducted through semi-directed interviews (SIDs) to identify dysfunctions (Ds) in 2009 (n = 30 SIDs i.e 62 collaborators) prior to the start of the project and in 2012 (n = 23 SIDs i.e 48 collaborators) when the action plan was completed. Ds were classified according to the ISEOR grid*. The action plan was undertaken from 2009 till 2012 as major Ds were identified. Feedback meetings with staff were undertaken after each SED.

Results SED generated 352 verbatim comments in 2009 and 508 in 2012, summarised in 55 and 73 'key ideas'. From the SED run in 2009, the action plan included three major projects: 'Improving the ward drug cabinet supply chain' to 'Lower emergency drug requests', 'Establishing a skills grid of Pharmacy collaborators' to 'Maintaining Pharmaceutical Care standards', and 'Optimizing clinical pathway of patients receiving chemo'. SED 2012 showed an improvement in all "Centre for research and expertise in socio-economic management" (ISEOR) items particularly within Work organisation, communication-coordination and strategy development domains. The so called 'Mirror effect' meetings to feedback to all professionals (whether they were managers or not) were very fruitful and gave consideration and recognition to the entire staff.

Conclusions SEAM enables hidden costs associated with dysfunction to be re-allocated to activities with much higher professional added value. It is an attractive approach to monitor the time needed to transform our low-quality clinical pharmacy services into a competitive environment of modern and reactive Pharmaceutical Care services.

No conflict of interest.

GRP-009 ADHERENCE AND NUMBER OF TABLETS IN ANTIRRETROVIRAL TREATMENT

doi:10.1136/ejhpharm-2013-000276.009

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Background Antiretroviral efficacy is closely related to the degree of adherence

Purpose To determine the adherence to highly active antiretroviral therapy (HAART) in HIV-infected patients with once-daily dosing regimens, depending on the number of tablets.

Materials and Methods Two-month observational study (May–June 2010 of selected patients on HAART who collected their medicines in the pharmacy with the following inclusion criteria: adult patients on HAART for more than a year, who were not included in any clinical trials, mentally competent and who obtained the medicines exclusively in our LEU.

The SMAQ survey was used to assess adherence. Adherence data, along with the number of tablets and demographic characteristics of the patients were tabulated and analysed using Excel.

Results 223 patients were included in the study. 39.5% (n = 88) had once-daily regimens. 72 were men and 16 women. The mean age was 44.3 years and 7.35 years on HAART. The mean adherence was 67.05%.

The study population was divided into two groups: one tablet (OT) (n = 49) and two or more tablets (MT) (n = 39). Baseline characteristics were homogeneous in the two groups. However adherence rates were 71.42% vs. 61.54% respectively (p = 0.3268).

Conclusions Simple dosing regimens facilitate adherence to HAART. In our study we found that OT patients were more adherent that MT patients. Although the difference in adherence was not statistically significant, we believe that this difference may have high clinical impact on controlling the disease.

No conflict of interest.

GRP-010 ADHERENCE TO ORAL CANCER TREATMENT: THE ROLE OF THE HOSPITAL PHARMACIST IN THERAPEUTIC SUCCESS

doi:10.1136/ejhpharm-2013-000276.010

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Background The management of cancer treatment has changed considerably in recent years with the entry into the market of novel oral cancer agents. Although treatment at home improves patient compliance, in practise it's difficult to assess the quality of treatment without the supervision of healthcare professionals.

Purpose To monitor patients at home and to assess the variables influencing adherence to treatment. We sought to educate, discuss and establish effective communication with patients in order to minimise the barriers between patients and physicians.

Materials and Methods From July 2012, hospital pharmacists have provided their haematology-oncology patients with a self-report medicines diary. Patients were asked to write the date, time, treatment dosage and concomitant treatments, as well as to describe their health status and report any side effects. Data were saved in a database created for the purpose. Treatment adherence was calculated as Medicines Possession Ratio according to the treatment indications in the patient diary.

Results From July 2012 to October 2012, a total of 261 patients were asked to participate in the study and to fill out a self-reported diary. 243 patients agreed to participate in the study, of these 86 completed and returned the self-report diaries (41%) to the hospital pharmacy. The percentage of adherence to treatment was significantly higher in those patients who completed the medicines diaries compared to those who did not use the medicines diary (0.99 vs. 0.88). The reported side effects indicated that medicines were well tolerated and did not cause discontinuation of treatment.

Conclusions The preliminary data of this patient-oriented research emphasises the importance of promoting dialogue in order to optimise home treatment. The hospital pharmacist plays a key role in promoting and improving adherence to treatment by analysing side effects and concomitant treatment and, in addition, by reinforcing patients' awareness of the importance of following the prescription schedule correctly.

No conflict of interest.

GRP-011 ADHERENCE TO TYROSINE KINASE INHIBITOR THERAPY IN CHRONIC MYELOID LEUKAEMIA

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Background Improved survival associated with tyrosine kinase inhibitor (TKI) treatment has transformed chronic myeloid leukaemia (CML) into a long-term disease, but therapeutic success is challenged with poor medicines adherence. Controlling side effects in combination with patient education that includes direct communication between the pharmacist and the patient are essential components for maximising the benefits of TKI treatment.

Purpose To estimate the adherence to oral chemotherapy and describe side effects with TKI treatment and their impact on adherence in patients with CML.

Materials and Methods An 18-month retrospective observational study (from January 2011 to June 2012) was made on patients diagnosed with CML in which patients were selected who collected medicines in the pharmacy and who were being treated with selected TKIs (imatinib, dasatinib, nilotinib).

The SMAQ interview was used to determinate adherence. Adherence data, side effects and demographic characteristics of the patients were tabulated using Excel. The x^2 test was used for categorical variables and the t-test was used for normally-distributed continuous variables using SPSS statistical software.

Results 25 patients were included in the study. 16 were men and 9 were women. The mean age was 60 years (25–88). Imatinib was the first line treatment for all patients. The average adherence was 62.5%.

Adherence for patients younger than 50 years was 83.3% and in older patients was 55.6% (P = 0.125). Relating to years of treatment: less than 4 years 70.0% but for longer treatment 57.1% (p = 0.521). Patients with side effects showed less adherence: gastrointestinal disorders (80.0% vs. 64.28%, p = 0.402), musculoskeletal pain (70.0% vs. 42.8% p = 0.188).

Conclusions Data suggest that more than one-third of patients are poorly adherent to TKI treatment. Identifying risk factors such as side effects, and educating patients on the need to take medicines

as prescribed is essential to help patients to achieve maximum benefit from their treatment.

No conflict of interest.

GRP-012 ADHERENCE, PERSISTENCE AND FINANCIAL EVALUATION IN THE TREATMENT OF PROSTATE CANCER

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Background The success of home treatment is strongly influenced by patient adherence to treatment. Non-adherence to treatment represents not only an important issue for the patient, affecting both the clinical efficacy and safety of the drug treatment, but also has financial and social implications for the community.
Purpose This study evaluated the adherence to treatment, persistence, and the daily cost of treatment in patients with prostate cancer treated with gonadotropin-releasing hormone agonists, comparing leuprorelin 3.75–11.25, leuprorelin 7.5–22.5 and triptorelin.
Materials and Methods Adherence to treatment was measured as the ratio between the Received Daily Dose (RDD) and the Prescribed Daily Dose (PDD), using software developed for this purpose by hospital pharmacists. The RDD was calculated as the sum of the number of days between two consecutive drug refills, whilst the PDD was determined based on the treatment regimen as prescribed by the physician. The persistence was calculated as the sum of the number of days the patient had stayed on treatment.

The cost of daily treatment was calculated on the basis of the RDD.
Results 126 patients were enrolled in this study for triptorelin, 143 for leuprorelin 3.75–11.25 and 31 for leuprorelin 7.5–22.5. The adherence values for all drugs ranged between 0.95 and 1.10, showing good quality management of domiciled treatment. The analysis of persistence conducted over three years showed a decrease by 20% for leuprorelin 3.75–11.25, 25% for triptorelin and 50% for leuprorelin 7.5–22.5. The cost per RDD was €.2.15, €.2.24 and €.2.84 for leuprorelin 7.5–22.5, leuprorelin 3.75–11.25 and triptorelin respectively.
Conclusions The excellent adherence values showed that all the drugs studied have a good safety profile and easy administration. In fact, patients complied with the dosage and medication regimens as recommended by prescribers. The persistence values were overlapping. The cost per RDD for triptorelin was 23% higher than leuprorelin.

No conflict of interest.

GRP-013 ADVERSE DRUG REACTIONS IN THALIDOMIDE TREATED PATIENTS

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Background Thalidomide is a chemotherapeutic agent approved by the EMA for multiple myeloma treatment. It is considered a high risk drug and should be prescribed and dispensed within a special pharmacovigilance programme.
Purpose To evaluate the incidence of adverse drug reactions (ADRs) to thalidomide; to analyse their type and severity.
Materials and Methods Retrospective cohort study, conducted between January 2008 and December 2011 in a university hospital. Patients treated with thalidomide were selected through the Pharmacy Department Outpatient Unit medicines records.

Patient clinical records were reviewed. Any doubts were checked with the attending physicians.

Data recorded: personal data (age, gender), main diagnosis, thalidomide ADRs, start and end dates of both thalidomide treatment and ADRs.

ADR incidence was calculated. Association between ADRs and thalidomide discontinuation was determined.

ADR causal relation was determined by the Karch Lasagna algorithm (definite, probable, possible, conditional). ADR type was classified according to the Rawlins and Thompson classification (type A: dose-dependent or type B: not dose-dependent) and ADR severity and outcome according to Spanish Pharmacovigilance System criteria.
Results Twelve patients were included (mean age 59 ± 12 years, 50% men).

Medical diagnosis: multiple myeloma 91.66% (11 patients) and cutaneous, vascular and digestive systemic sclerosis 8.3% (1).

The incidence of thalidomide ADRs was 83.3%. 8.3% (1) of treatment discontinuations were due to thalidomide ADR.

64.71% (11) of patients showed neurotoxicity, 17.64% (3) blood disorders, 11.76% (2) oedema and 5.88% of them (1) digestive disorders.

ADRs detected were type A (dose-dependent) in 100% of cases (17 patients), probable in 41.18% (7), and possible in 58.82% (10) of them.

Overall, 41.18% of ADRs were severe (7). ADR outcomes: 64.70% of ADRs (11 patients) were resolved, 17.65% (3) unresolved and 17.65% (3) were classified as 'death unrelated to the drug'.

Every ADR detected was notified to the Spanish Pharmacovigilance System.
Conclusions Although the incidence of thalidomide ADRs was high (83.3%), ADRs only caused treatment discontinuation in 8.3% of cases.

Neurotoxicity was the most frequent ADR.

Almost half of patients had severe ADRs and these did not resolve in 17.65% of cases.

No conflict of interest.

GRP-014 AN E-LEARNING PROGRAMME ON HIGH-RISK DRUGS – DOES IT ACTUALLY INCREASE USER KNOWLEDGE?

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Background High-risk drugs are involved in serious medicines errors. Studies have identified a range of contributory factors including lack of training. The MMU Hospital developed a E-learning programme 'A Guide to High-risk Drugs' to enable teaching; incorporating an inbuilt evaluation tool to assess the learning outcome.
Purpose To evaluate the learning from undertaking an e-learning programme on high-risk drugs.

To ascertain if the programme is suitable for different types of institutions.

To identify user knowledge deficits.
Materials and Methods The programme was trialled in two different hospitals. The MMUH, a 600 bed acute hospital and Peamount Hospital, a 380-bed rehabilitation and continuing care hospital. The participants were qualified Doctors, Nurses and Pharmacists. All 170 participants undertook 20 pre-assessment questions followed by the programme then the same questions in a post-assessment. Results from each institution and discipline were analysed.
Results 29 Interns completed the programme at the MMUH and 11 SHOs/Registrars in Peamount. A mean pre-assessment score of 58% (MMUH) and 56% (Peamount) increased to a post score of 83% in both hospitals. MMUH Nurses (n = 38) yielded an

improvement, 48% to 73%; and Peamount Nurses (n = 40), 39% to 65%. MMUH Pharmacists (n = 20) improved from 83% to 94%.

Individual questions were further analysed to ascertain if there were particular drugs causing difficulty. Analysis showed that a question on potassium chloride yielded low pre-assessment scores of 21% and 39% respectively for MMUH Doctors and Nurses and 45% and 20% for Peamount. Although both disciplines improved, this demonstrated a need for further training with this drug.

Conclusions The e-learning programme showed a significant increase in user knowledge, in both hospitals, for all disciplines. These results are very encouraging given the differences between the institutions, grades of staff and experience. The results do not stem from a 'specific teacher effect' and therefore are reproducible in multiple sites.

No conflict of interest.

GRP-015 AN OVERVIEW OF HOSPITAL PHARMACEUTICAL EXPENDITURE IN GREECE OVER THE LAST TWO YEARS

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Background Under the burden of the economic crisis in Greece, a series of cost containment measures for hospitals' operating costs have been implemented, with the emphasis put on limiting the money spent on medicines purchasing.

Purpose To review the extent to which the target of reducing hospital pharmaceutical expenses has been achieved along with reporting the changes, as far as the 'in hospital' use of generic medicine is concerned.

Materials and Methods Financial data from 136 Greek public hospitals, as officially reported in ESY.net database, were collected and compared for the years of interest. The financial data were selected with respect to the cost of purchasing medicines and non-pharmaceutical material, while other operational costs were omitted.

Results The cost of purchasing medicines constantly accounts for a high percentage of a hospital's budget for supplies (51%, 53% and 56% for 2010, 2011 and 2012 respectively). An overall decrease in pharmaceutical expenditures was achieved (23% reduction in 2011, along with a further reduction of 17% in 2012). Although rates of introducing generic drugs differ among different hospitals, an increase in use of generics was observed (26% in 2011 and 30% in 2012). Psychiatric hospitals seem to have better scores compared to paediatric and oncology departments.

Conclusions The 'in hospital' use of generic drugs score is significantly higher compared to that of the Greek market in general (18%) and has therefore contributed to the hospitals' attempt to reduce the amount of money spent on medicine supplies. The lower rates of generics' use observed in paediatric hospitals are consistent with the lower possibility for substitution in these cases. Last but not least, when selecting and implementing drug cost management strategies, it is essential that pharmacists remain mindful of patient safety and quality of patient care.

No conflict of interest.

GRP-016 ANALYSIS AND CONSUMPTION OF INNOVATIVE ANTIDIABETIC DRUGS IN PIEDMONT PATIENTS

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Background The increase in deaths due to diabetes records a trend in growth and the OSMED National Report of 2011 highlights a prescription shift towards the high-cost innovative drugs for the treatment of type II diabetes mellitus (DMII). This is subject to intensive monitoring by the health ministry.

In the management of diabetic patients, the guidelines suggest an early intensive therapeutic intervention and the pursuit of a personal glycaemic target for avoiding hypoglycaemic episodes, which are possibly responsible for the increased risk of developing cardiovascular episodes.

Purpose To analyse the population, consumption and type of innovative diabetic drugs used in the Piedmont region; this is to put a value on the type of treatment used for DMII, because the advantages of innovative therapy must be valued too.

Materials and Methods In the first step the incidence of DMII in Piedmont was valued by analysing data from the regional diabetic database during the period 2007–2012. Dipeptidyl peptidase 4 inhibitors (sitagliptin and vildagliptin alone or in association with metformin and saxagliptin), thiazolidinediones (pioglitazone alone or in association with metformin), glucagon-like peptide 1 (exenatide, liraglutide), insulin glargine and detemir were considered innovative drugs. Consumption and type of drugs were analysed in terms of the defined daily dose/1000 inhabitants/day (DDD) over a six-month period in 2012 using regional databases of prescriptions which enabled us to access population data. 2012 data were compared with 2011.

Results The first striking finding is the increase in the incidence of DMII, 1.70% in five years, which corresponds to 80,327 patients. Focusing on the population treated with innovative drugs revealed that 21% (61,679/294,590) of diabetic patients are 65 years old and far more males than females are affected (respectively 53.87% vs. 46.13%). The drug most used is insulin glargine with 43.84% of total consumption, another 25.08% use DPP4 inhibitors alone or in association, 20.05% use pioglitazone alone or in association, 9.02% use glucagon-like peptide 1 and 2.01% use insulin detemir. The comparison with the same period of 2011 highlights the increased consumption of innovative drugs in Piedmont, 23% (8.97 DDD in 2012 vs. 6.91 DDD in 2011) while Italian data record an increase of 5% (15.69 DDD vs. 14.87 in 2011).

Conclusions Increased consumption of these drugs suggests that medical prescriptions could maybe move on innovative therapeutic molecules. It is important that clinicians discuss and compare the data analysis shown above with medical management guidelines, with the aim of estimating the genuine advantages of innovative drugs in terms of compliance, reduction in adverse reactions and increased quality of life.

No conflict of interest.

GRP-017 ANALYSIS AND PREVENTION OF MUSCULOSKELETAL DISORDERS IN A HOSPITAL STERILISATION UNIT

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Background Musculoskeletal disorders (MSDs) are problems caused by the poor ergonomic design of work stations. The daily work of sterilisation, especially carrying heavy loads, carries a risk of developing MSDs.

Our sterilisation unit, certified ISO 9001, tries to improve the working environment including the ergonomics of work stations.

Purpose To establish an inventory of fixtures and to suggest preventive measures in order to limit the appearance of those disorders.

Materials and Methods The whole of the sterilisation unit workforce was interviewed about any pain, physical effort and non-ergonomic situations that they routinely face during their daily work.

Results The main pain reported by the staff was lumbar pain (70%).

Several factors explain that result:

- Repeatedly carrying heavy weights (>7 Kg), especially when loading the Instrument Washer-Disinfector trolleys and sterilisers.
- Making little use of helping fork-lift trucks (60% of the staff use them <2 hrs/day).
- Not asking colleagues for help when carrying heavy weights.
- 80% of people work in front of a computer screen for 1/3 or ½ the day without adopting an ergonomic position.
- Highly repetitive actions during packaging.

Preventive measures:

- Staff training on ergonomics suited to any post.
- Organization of packaging posts and data capture according to the "comfort zone" concept.
- Reduction of distances to be covered when carrying or moving heavy weights.

Conclusions This study demonstrates that MSDs often appeared in sterilisation. The implementation of suitable preventive measures – according to posts – should increase efficiency and reduce the physical demands made on members of staff.

No conflict of interest.

GRP-018 ANALYSIS OF ANTINEOPLASTIC MEDICATION ERRORS IN A 500-BED TEACHING HOSPITAL

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Background Medication errors with antineoplastic drugs may be catastrophic due to the drugs' high toxicity and narrow therapeutic index.

Purpose To assess antineoplastic medication errors in terms of frequency, type of error and severity for patients.

Materials and Methods A 1-year prospective study was conducted (2011) in order to identify the medication errors that occurred during cancer chemotherapy for patients in a 500-bed teaching hospital. Wards included both day care and inpatient units. All prescriptions and production forms were verified by pharmacists. The different types of error were defined in a data collection form. For each medication error intercepted, the potential severity was evaluated according to the Ruiz-Jarabo 2000 version2 classification system.

Results During the study period, the pharmacy unit prepared 17241 distinct anticancer drugs. In total, 136 medications errors were detected throughout the medicines use process. Prescriptions errors represented 82% of errors, followed by pharmaceutical validation (7%) transcription (7%), preparation (2%) and administration errors (2%).

The most common causal drug was carboplatin, which was involved in 25 cases, despite corresponding to only 2.8% of anticancer drugs prescribed at our institution. Overall, in 66 cases erroneous doses of the medicine were recorded (48.5%), 24 errors were linked to the choice of antineoplastic regimen (17.6%) while in 12 cases, erroneous duration of treatment was prescribed (8.8%).

Of the 136 medication errors, 124 were intercepted prior to administration while 12 reached the patients (9%). Overall 66% of non-intercepted medication errors had no impact on the patient and only 3 cases required enhanced monitoring.

Conclusions In our study pharmaceutical validation mainly allowed us to identify prescription errors (82%), almost all errors were intercepted prior to administration to the patient. Wrong dose represented the most common type of error. Few pharmaceutical errors (transcription, validation, preparation) were detected.

No conflict of interest.

GRP-019 ANALYSIS OF ANTIRETROVIRAL TREATMENT ADHERENCE IN OUTPATIENTS OVER A TWO-YEAR PERIOD OF STUDY

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Background The efficacy and safety of anti-retroviral treatment is affected by many factors and compliance is key in therapy success. A lack of adherence may lead to therapeutic failure and higher rates of drug resistance.

Purpose To describe collected data about outpatient antiretroviral treatment adherence and analyse characteristics and factors associated with the non-adherent population.

Materials and Methods A retrospective observational study was conducted over 27 months on all outpatients on antiretroviral therapy who attended our hospital for human immunodeficiency virus (HIV) monitoring between June 2010 and September 2012. Each patient's adherence was checked and recorded every 6 months. This was measured as '(Total no. of units dispensed/Total no. of units needed) × 100'. Those patient with adherence >95% were considered as 'adherent' and those with <95% as 'non-adherent'. All results were recorded in a database. For the 'non-adherent' population the following features were reviewed: Sex, age, drug use, presence of Hepatitis B (HBV) or Hepatitis C (HCV) and total number of tablets/day, including drugs for other diseases besides HIV.

Results During the period of study, 1841 adherence cheques were made on a total of 630 patients (2.9 tests/patient). 24.6% of the HIV patients in treatment were non-adherent in at least one cheque. Their average age was 45.5 ± 8.6 years, 74% men, mean treatment duration of 8 ± 4.4 years, and a median consumption per day of 4 doses (range 1 to 16). 35.5% of these patients took drugs, 7.1% were co-infected with HBV and 45.2% were co-infected with HCV (5.2% was co-infected with both viruses). The Chi-square test showed a significant relationship ($p < 0.05$) between substance abuse, HCV infection and male gender in non-adherent patients.

Conclusions The study revealed a large percentage of non-adherent patients who compromised the effectiveness of their antiretroviral treatment. The intervention of hospital pharmacists, checking on compliance and following up with patients, could play an important role in reducing this negative factor, especially in those with HCV and/or substance abuse.

No conflict of interest.

GRP-020 ANALYSIS OF ITALIAN HOSPITAL PHARMACIST ACTIVITIES TO PREVENT LASA DRUG ERRORS IN TREATMENT: FIRST RESULTS

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Background Errors caused by the use of Look-Alike/Sound-Alike (LASA) drugs occur with high frequency in hospital departments. In August 2010 the Italian Ministry of Health passed a Recommendation to help health operators to reduce LASA errors, through

special procedures of clinical management. After two years, an independent study seeking to explore the awareness of this Recommendation and its implementation by Italian hospital pharmacists has started. It is designed in two steps that differ for methodology of enrolment: in step 1 only Directors of pharmacy departments are enrolled; in step 2 all hospital pharmacists working in Health National System hospitals will be enrolled.

Purpose To describe the results of step 1.

Materials and Methods In the period 01/08/2012–30/09/2012, 250 Directors of Italian pharmacy departments were enrolled. They received a questionnaire composed of 11 questions on the following topics: knowledge of LASA drugs and the ministerial Recommendation; any LASA drug errors and causes detected in their hospital in the period August 2010–August 2012; activation of risk management procedures to prevent LASA and implement the Recommendation in their hospital.

Results 52.5% of Pharmacists answered: 100% were familiar with LASA drugs and the ministry Recommendation. 73% had detected LASA drug errors in their hospital, caused by the following similarities: 66% packaging; 14% trade name, 6% active substance name, 6% association brand name and packaging; 8% association active substance name and packaging. 58% had publicised the Recommendation in their hospital but only 22% had adopted specific measures of risk management.

Conclusions The results could reflect little interest in preventing LASA errors by enrolled pharmacists. It is an alarming situation. If step 2 confirms this trend, it will be necessary to implement a new Ministerial Intervention against LASA drug errors in Italy.

No conflict of interest.

GRP-021 ANALYSIS OF PHARMACIST INTERVENTIONS DURING THE VALIDATION OF THE ELECTRONIC PRESCRIPTIONS IN A SPANISH HOSPITAL

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Background Computerized provider-order-entry (CPOE) system is known to improve quality, increase efficiency, and reduce medication errors.

The pharmacist, through the electronic validation, can provide improvements to the patient pharmacotherapy. However, not all hospitals follow the same method to make such proposals.

Purpose To analyse the type of interventions made in our hospital.

To validate process intervention.

Materials and Methods Pharmacists interventions were studied over a period of one year (June 2011–May 2012). Both prescription and validation are performed in the computer programme Farmatools®. The pharmacist used to write a warning on the patient treatment. Alerts were reviewed the following day and we checked if the recommendation was accepted or not by the physician. Interventions were classified according to the type of recommendation, the drug and whether it was accepted.

Results A total of 788 interventions were analysed (2.2 per day). The most frequent (27%) was dose adjustment for renal failure, followed by switching from intravenous to oral route (16%), change of dose (13%) and indication (12%). Other interventions were medication reconciliation, duplicity, therapeutic equivalent and adverse reaction.

The most frequent drugs were enoxaparin (24%), pantoprazole (12%), paracetamol (5%), insulin (5%), digoxin (4%), amoxicilin-clavulanic (4%) and levofloxacin (4%).

Only 72% of the recommendations were reviewed. From this, 54% were accepted.

Conclusions Although 788 interventions have been studied, there are many who have not been registered in the programme, so it could not be analysed. We observed that the dose adjustment for renal failure, especially enoxaparin, is recorded systematically, but this does not occur with other types of interventions.

Acceptance is lower than those reported in literature, so we can conclude that the method of communication with the clinician is inadequate and should be strengthened with verbal communication.

No conflict of interest.

GRP-022 ANALYSIS OF THE MEDICINES RECONCILIATION PROCESS IN DIFFERENT CLINICAL SERVICES

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Background Medication errors, specifically the lack of continuity of the patient's usual treatment, are a major cause of adverse effects in hospitalised patients, most of them preventable. Medicines reconciliation is the process of comparing a patient's prescriptions for medicines to all the medicines the patient has been taking.

Purpose To analyse the impact of reconciliation in different clinical services depending on discrepancies identified and severity of medicines errors (MEs).

Materials and Methods Retrospective, descriptive study conducted at a general hospital over 6 months. Daily, we identified newly-hospitalised patients aged over 75. To determine that a discrepancy existed, we compared the patient's usual medicines with the prescribed medicines and interviewed patient and/or carers. For each service, we collected: number of patients reconciled, number of drugs evaluated, kinds of discrepancies according to Documento de consenso sobre terminología, clasificación y evaluación de los programas de Conciliación de la Medicación, and severity of MEs identified according to National Coordinating Council for Medication Error Reporting and Prevention.

Results Reconciliation was conducted in 13 clinical services. 558 patients were reconciled (mean age: 83.86). 56% belonged to Internal Medicine (IM), followed by General Surgery (GS) (18%) and Traumatology (13%). 9.33 drugs were evaluated per patient, higher than average numbers of prescribed drugs being found in Ophthalmology (18), Cardiology (17.48), IM (11.62), Pneumology (11.29) and Oncology (10.38). We detected 1140 discrepancies. The services with more discrepancies requiring clarification (n = 412) were: IM (51%), GS (16%) and Traumatology (12%). The services with the highest rates of MEs were Traumatology (60%), Otolaryngology (60%), Pneumology (59%), Urology (57%) and Haematology (50%), while unresolved discrepancies were noted in Gynaecology (78%), Oncology (64%), GS (51%) and Ophthalmology (50%). Most MEs fell into category C (errors that reached patient but did not cause damage) severity but 1% were category E (error that resulted in temporary harm and required an intervention). The omission of a medicine was the most common unjustified discrepancy.

Conclusions Medicines reconciliation is important in IM, GS and Traumatology because of numerous discrepancies requiring clarification, the proportion of patients and, mainly in IM, the amount of drugs for chronic treatment. The role of reconciliation was judged essential in clinical services with more MEs (Traumatology, Otolaryngology). Unresolved discrepancies pose a potential cause of ME, so in Gynaecology and Oncology we should improve communication with clinical teams to encourage patient safety.

No conflict of interest.

GRP-023 ANTI-FACTOR Xa ACTIVITY AFTER PROPHYLACTIC DOSES OF ENOXAPARIN (40 mg) IN HOSPITALISED PATIENTS WEIGHING LESS THAN 55 KILOGRAMMES

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Background Enoxaparin is commonly used for thromboembolic disease prophylaxis probably because of its safety profile and once-daily administration. In contrast to therapeutic doses, the prophylactic recommended dose is fixed (40 mg once a day for enoxaparin). There is little evidence for suitable dosing in extreme body weights, especially in low-weight patients.
Purpose To establish whether the recommended dose of Enoxaparin (40 mg/day) in patients weighing less than 55 kilogrammes produces anti-factor Xa activity over the desired ranges for thromboembolic prophylaxis.
Materials and Methods Cross sectional study. Sample size estimated in 53 patients. Inclusion criteria: over 18 years, body weight equal or less than 55 kilogrammes, hospitalised in medical wards and with an indication of thromboembolic prophylaxis with enoxaparin 40 mg/day by the treating physician. Exclusion criteria: renal failure and concomitant use of oral anticoagulants. Anti-factor Xa activity was measured 3 hours after the third dose of enoxaparin. We estimated the proportion of patients with anti-factor Xa activity over 0.5 u/ml and the average anti-factor Xa activity.
Results Average age was 65.4 ± 20.3 years and average weight 47.7 kilogrammes (26 to 54). The average anti-factor Xa activity was 0.54 ± 0.18 u/ml and the proportion of patients with values over 0.5 u/ml was 60%. Weight and anti-factor Xa activity were inversely correlated, with a Pearson coefficient of −0.497. In subgroup analysis, patients weighing less than 50 kilogrammes had anti-factor Xa activity of 0.61 u/ml, while those with weight over 50 kilogrammes had an anti-factor Xa activity of 0.47 u/ml ($p = 0.019$).
Conclusions Anti-factor Xa activity rises significantly when body weight decreases. Patients with low weight had an anti-factor Xa activity over the desired range for thromboembolic prophylaxis, especially in those under 50 Kilograms. Further study is needed to determine if these data are clinically significant and whether prophylactic doses should be adjusted for body weight.

No conflict of interest.

GRP-024 ANTITHROMBOTIC PROPHYLAXIS IN PATIENTS WITH MULTIPLE MYELOMA BEING TREATED WITH LENALIDOMIDE

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Background The diagnosis of multiple myeloma (MM) has been associated with a greater risk of thromboembolic events. At the same time, the treatment with lenalidomide, an immunomodulator authorised in 2007 by the EMA, causes a significant increase in the risk of deep vein and arterial thrombosis, and pulmonary embolism in patients with MM.
Purpose To find whether patients diagnosed with MM being treated with lenalidomide have prophylactic antithrombotic treatment with low molecular weight heparin or with acenocoumarol, as recommended in the ASCO (American Society of Clinical Oncology) guidelines.
Materials and Methods A retrospective observational study was carried out in a 700-bed secondary hospital from January 2011 to February 2012. The patients included had MM and lenalidomide and dexamethasone treatment and picked up their medicines in our hospital. The data were obtained from a Diraya computer system of the Andalusian health system. The following data were obtained: sex, age, whether they had anticoagulant treatment or not and if they had, what type of anticoagulation they received.
Results The total number of patients was 31, 16 males and 15 females, with an average age of 61.7 years. Of these 31 patients treated with lenalidomide plus dexamethasone, only 9 patients received antithrombotic prophylactic treatment. Of the 22 who did not receive it, there were two cases of episodes of deep arterial thrombosis.
Conclusions Most of the patients with multiple myeloma who come to our pharmacy service are without antithrombotic prophylactic treatment with the risk that this situation entails. As pharmacists we consider it necessary to remind haematologists of the necessity both of prescribing such treatment in order to avoid future complications, and of monitoring that these recommendations are observed, in order to guarantee the safe use of lenalidomide.

No conflict of interest.

GRP-025 APPLICATION OF A PRESSURE ULCER PREVENTION AND TREATMENT PROTOCOL IN THE FATEBENEFRATELLI AND OPHTHALMIC HOSPITAL IN MILAN

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Background Pressure ulcers are very common in hospitalised patients and if not prevented or properly treated may increase the length of hospitalisation, infections due to complications, and patient suffering. Prevention is thus relevant for high quality care. To improve the quality of care and to monitor the incidence of pressure ulcers, a multidisciplinary team was created in our hospital in 2009, and a diagnostic and therapeutic pressure ulcers protocol was defined ('Percorso Diagnostico Terapeutico Assistenziale Lesioni da Pressione').
Purpose To describe the verification, performed by the multidisciplinary team, of the correct use of the protocol, using the indicators specified in the protocol itself.
Materials and Methods The protocol, created from the guidelines already in use in the hospital, was implemented with the definition of operational tools for the verification of its application. Adherence to the protocol is intended to prevent and provide the best treatment for pressure ulcers. Two analyses (one in 2010 and one in 2011) of the clinical charts were performed in order to cheque the adherence of the health care professionals to the use of the procedure: this was evaluated using a cheque list composed of nine criteria, each of which was assigned 1 point if 'correct' and 0 if 'incorrect'.
Results In 2010 a total of 214 clinical charts were analysed: in general, data was collected correctly (57% of cases). Pressure ulcers were properly identified and prevented in 37% of cases: only some nurses follow the guidelines in the detection and treatment of injuries. Of patients with pressure ulcers, 36% were properly treated. The departments that mainly detected a risk of pressure skin damage and prevented it following the procedure for the treatment of lesions were Neurosurgery, Medicine, and Cardiology. A further analysis of 62 clinical charts in 2011 showed that in 52% of cases, pressure ulcers were correctly identified, but in only 5% of cases were they then properly treated. A third analysis is ongoing, with the aim of identifying and correcting errors in the treatment of the ulcers. A poster will also be distributed to departments, for quick reference to the treatment protocol.
Conclusions The protocol is a practical tool applicable in the various departments. Verification of its correct use showed a low

adherence to the guidelines: it is fundamental continuing the training of the staff to achieve the required standard. Among the objectives for 2013, another audit with a modified cheque list will be performed, involving a greater number of health care professionals.

No conflict of interest.

GRP-026 APPLICATION OF FAILURE MODE AND EFFECT ANALYSIS ON THE PRESCRIBING AND TRANSCRIBING PROCESSES IN THE DISTRIBUTION UNIT DOSE SYSTEM

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Background Failure Mode and Effect Analysis (FMEA) is a tool to identify, assess and prevent possible failures that could occur in a process.

Purpose

1. To describe FMEA as a method to identify weaknesses in the process of prescription and transcription of medical orders.
2. To isolate the key steps according to their risk priority number (Rpn).
3. To report the steps taken.

Materials and Methods A multidisciplinary study group was assembled. Possible errors in the prescription/transcription workflow were identified and classified according to their RPN score (calculated by multiplying the severity, occurrence, and detection). Strategies for improvement were established.

Results Errors in the prescription were classified as follows: (1) Patient-and-history identification, (2) Clinical and laboratory data checkout, (3) Treatment conciliation, (4) Allergies, (5) Verbal prescription, (6) Handwritten prescription. Errors in transcription: (7) Patient identification (nurse), (8) Internally mailed prescriptions, (9) Paper transcription, (10) Check in pharmacy, (11) Patient identification (pharmacist), (12) Prescription validation, (13) Prescription printing, and (14) Acknowledgement of errors by the pharmacist. Top-ranked item (number), suggested solution, and indicator, respectively were: (5) Verbal prescription (288), storage of verbal prescriptions in pharmacy, % of verbal prescriptions; (9) Failure in paper transcription (288), computerised physician order entry (CPOE), % of electronic prescriptions; (14) Error report to the pharmacist (288), implementation of a two-way communication protocol, number of reports; (8) Paper-based prescriptions sent to pharmacy (243), CPOE, % of electronic prescriptions; (10) Check in pharmacy (216), CPOE, % of electronic prescriptions. The pharmacy, medical director, and Quality Unit were responsible for the changes undertaken in all cases.

Conclusions Verbal prescription, failure in paper transcription, error report and mailed prescriptions to pharmacy were the steps with the highest risk of error. For most cases, CPOE was implemented, whereas the percentage of electronic prescriptions was the key indicator to measure the overall improvement in these processes. In conclusion, further efforts and pharmacy policies should focus on the implementation of CPOE in all inpatient areas, thus preventing failure of prescription/transcription and validation loops.

No conflict of interest.

GRP-027 ASSESSMENT OF BLOOD PRESSURE CONTROL AND ANTIHYPERTENSIVE MEDICATION ADHERENCE IN A PORTUGUESE HYPERTENSIVE POPULATION

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Background Hypertension is one of the major causes of worldwide morbidity and mortality. Despite the wide variety and availability of powerful antihypertensive agents, the blood pressure (BP) of fewer than a third of adult hypertensive patients is under control. Non-adherence to medicines is one of the major causes of treatment failure.

Purpose To evaluate BP control and antihypertensive medicines adherence in a Portuguese hypertensive population.

Materials and Methods A cross-sectional observational study was conducted in adult (aged 18 or over) hypertensive patients attending the hypertension/dyslipidaemia clinic for at least 6 months at the university teaching hospital of Cova da Beira Hospital Centre, Covilhã, Portugal, from March to August 2012. Patients were asked to participate in a structured interview which included socio-demographic characteristics, antihypertensive medicines adherence and target BP values. Medicines adherence was measured using a validated five-item adherence scale, [1] derived from the four-item scale developed by Morisky *et al*, [2] Detailed clinical information was obtained from medical records.

Results A total of 94 patients met the inclusion criteria and completed the structured interview. Of these, the BP of 47% was under control according to the European Society of Hypertension. Antihypertensive medicines adherence was 40%. Patients with controlled BP had a significantly higher rate of medicines adherence than patients with uncontrolled BP (52% vs. 30%, P = 0.028). Likewise, it was observed that patients whose BP was controlled were significantly more aware of their target BP figures (75% vs. 46%, P = 0.034).

Conclusions Many hypertensive patients prescribed antihypertensive treatment fail to achieve BP control in clinical practise. Poor medicines adherence and poor patient knowledge of target BP values should be considered as possible underlying causes of inadequately controlled BP and must be addressed in any intervention aimed to improve BP control.

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No conflict of interest.

GRP-028 ASSESSMENT OF COMPLIANCE AND AVOIDED COSTS AFTER IMPLEMENTATION OF GUIDELINES FOR CANDIDA INFECTION TREATMENT AND INVASIVE FUNGAL INFECTIONS IN NON-HAEMATOLOGY PATIENTS

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Background The recent marketing of new high-cost antifungal agents (echinocandins and azoles) requires the design of cost-effective treatment protocols.

Purpose A new treatment guide for candidaemia and other invasive fungal infections for non-haematology adult patients was approved in June 2011. The main objective was to evaluate the cost reduction by introducing this protocol in a 737-bed University Hospital serving a population of more than 400,000 inhabitants.

Materials and Methods Retrospective observational study between June and December 2011. We reviewed the medical records of patients whom were prescribed antifungal treatment during that time and we assessed the adjustment to the approved treatment guidelines. To quantify the avoided costs we extracted consumption data and costs of antifungals from the pharmacy service

management system (SAP®) and compared them with the same period the previous year.

Results During the study 43 non-haematology patients were treated with antifungal agents. In 38 patients (88.4%) the approved treatment guidelines were followed and in 5 patients (11.6%) they were breached.The most significant breaches occurred in internal medicine (22.2%) and in critical care (3.7%).

Regarding avoided costs for the six months of the study, antifungal costs were reduced by 240,616 euros. We observed a 61.9% and 48% increase in use in fluconazole and anidulafungin, and a 42.8% and 41.7% decrease in caspofungin and liposomal amphotericin B use. These results are consistent with the recommendations contained in the guide (first line use of fluconazole in non-immunosuppressed patients and in azole resistance use anidulafungin). Micafungin use was restricted to the paediatric population with consumption equal to that in the previous period.

Conclusions The treatment guideline compliance was excellent at our hospital, resulting in a significant decrease in antifungal expenses. Implementation of these guidelines in the management of high-cost drugs resulted in significant cost reductions and therefore in a more rational use of healthcare budgets.

No conflict of interest.

GRP-029 ASSESSMENT OF THE THERAPEUTIC MANAGEMENT OF PATIENTS ON WEEKEND LEAVE

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Background A patient's suicide attempt with benzodiazepines was reported to our quality department. The patient ingested a bottle of drops given for his weekend leave. According to French regulations, patients are allowed to leave hospital for at most 48 hours but administratively they are still hospitalised and under the director's responsibility. Their medicines must be provided for this period.

Purpose To assess the therapeutic management of patients on weekend leave in order to highlight opportunities for improvement.

Materials and Methods We performed an audit of the medical management of patients on weekend leave. The audit was performed using a form containing open questions. One nurse from each department was audited.

Results Although nurses can't refer to any procedures on this topic, all care units provide medicines by strictly following the prescription. Multidose vials (drops, syrups, etc.) are not unpacked and are given in their entirety. One care unit out of nine mentioned that patients are stated to be on leave in the patient's medical record. Only 22% of audited nurses systematically put the treatment in a pillbox. Several nurses reported that pillboxes weren't available which resulted in treatments being bulk packed in a bag by 66% of wards or in a plastic pot by 11%. 56% of treatments were delivered with the care plan coming from the patient record.

Conclusions The audit highlighted the need to standardise practises (traceability, packaging of treatment and the presence of a care plan) and improve safety, to purchase daily pillboxes for all wards and to solve technical problems for delivering multidose medicines.

The pharmacy, in cooperation with the quality department, wrote a procedure in order to refocus the medical management of patients going on leave. The pharmacy is now responsible for delivering oral syringes for drinkable solutions in order to prevent such an accident from happening again, by delivering the exact amount prescribed.

No conflict of interest.

GRP-030 AUDIT OF PHARMACISTS' INTERVENTIONS WHEN SCREENING ADULT CHEMOTHERAPY PRESCRIPTIONS ON AN ELECTRONIC PRESCRIBING SYSTEM

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Background The UK Cancer Standards require there to be protocols for chemotherapy treatment. The Thames Valley Cancer Network (TVCN) has developed and maintained network-wide protocols, which are continually updated for each tumour site-specific group. Clinical verification of chemotherapy prescriptions by pharmacists is an essential step to ensure patient safety and compliance with protocols, in line with national standards.

Purpose To audit pharmacists' interventions when clinically screening adult chemotherapy, clinical trial and supportive care prescriptions for oncology and haematology patients in the Oxford University Hospitals NHS Trust (OUH), and to ascertain the level of compliance of these prescriptions with relevant protocols and guidelines. To compare results with the audit undertaken in OUH in 2010.

Materials and Methods Pharmacists clinically screening the prescriptions completed an intervention form at the time of screening to enable prospective data collection over a three-week period. The screening pharmacists graded the intervention at the time of data collection, and interventions were subsequently independently graded by the investigator. The results of this audit are compared to a previous audit carried out for OUH, and the aim was to compare interventions during the two audit years.

Results The OUH had a decrease in the number of interventions made by 24% compared to the audit in 2010. The number of moderate and major interventions made also decreased by 5% and 23% respectively. Time spent on making interventions also decreased. Incorrect frequency/duration/date of treatment, inappropriate dose, confirmation of dose/regimen/prescriptions were prescribed according to guidelines compared to just 68% in 2010.

Conclusions The changes implemented after the OUH audit in 2010 were successful and this is seen in the results. To improve further this audit should be conducted across TVCN hospitals every year so that each hospital can monitor their progress. Having regular training days for clinicians would be beneficial.

No conflict of interest.

GRP-031 BARCODE TECHNOLOGY ON THE SAFETY OF CYTOSTATIC DRUGS ADMINISTRATION, ONE YEAR EVALUATION

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Background Technology has been developed to verify medicines by incorporating barcode verification technology within an electronic medicines-administration system (eMAR barcode) to prevent serious medicines errors during administration of medicines.

Purpose To evaluate the implementation of an electronic system of validation and control of cytostatic drug administration using barcodes and an electronic medicines-administration system (eMAR).

Materials and Methods To identify patients we used barcoded wristbands and we acquired PDAs as eMAR, which were connected to the e-prescribing programme by the hospital WIFI.

After having received the medicine sent from the Pharmacy Department, the nurse scans the barcodes printed on the patient's wristband, then drug information about the medicines to be administered appears on the screen of the PDA (patient data, route, speed and time of administration, sequence order, components, and number of administrations). After scanning the barcode on the patient's

wristband the nurse scans the barcode on the medicine labels of cytostatic drugs. If the dose being scanned corresponds to a pharmacist-approved medicines order and the patient is due for this dose, administration is automatically documented. However, if the dose does not correspond to a valid order, the application issues a warning. Every action performed with PDAs is recorded in the database.

Results During the first year since its introduction, this system has been used in 709 oncology-haematological and rheumatologic patients (24.8% haematology, 49.1% oncology, 22.6% rheumatology patients), 3995 medicine orders have been scanned (22.2% haematology, 60.2% oncology, 17.6% rheumatology) and 11435 doses identified (12.3% haematology, 80.8% oncology, 6.9% rheumatology).

99.7% of the doses identified with this system were administered while the remaining 0.3% were not administered to patients due to the occurrence of several adverse reactions.

Variables validated by the scan were: patient, drug administration sequence, start and end times. Possible errors detected: incorrect order of administration, drug already administered and drug selected that does not belong to the scanned patient. During the study period we detected 2 cases of selected drug that did not belongs to scanned patient. The system issued a warning that prevented the wrong drug being administered to the patient, probably the worst error with cytostatic drugs administration.

Conclusions The implementation of barcode medicines verification technology embedded in an eMAR in a day hospital acted as an additional safety net in medicines administration and patient safety. This system also improved treatment efficiency and achieved greater interdisciplinary collaboration.

No conflict of interest.

GRP-032 BENEFICIAL EFFECT OF HOSPITAL PHARMACIST PARTICIPATION IN INTENSIVE CARE ROUNDS: REDUCTION IN MEDICINES ERRORS AND HOSPITAL COSTS

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Background Medicines errors may result in patient harm. Especially in intensive care patients, adverse drug events caused by medicines errors are common. Interventions by hospital pharmacists have been shown to reduce adverse drug events and costs in intensive care units (ICUs).

Purpose To evaluate the effect of active participation of a hospital pharmacist in the ICU on medicines errors and hospital costs.

Materials and Methods A three-month pilot study was performed at the adult 32-bed ICU of the academic hospital Erasmus MC. Four hospital pharmacists were trained in specific aspects and protocols of intensive care. From July to September 2011, each patient's medicines profile was reviewed weekly using a standardised written form and a pharmacist was present on rounds. Potential medicines errors requiring intervention were documented and discussed during the round. In addition, the amount of time spent performing clinical activities at the ICU was recorded.

Results 267 medicines reviews were performed for a total of 169 patients in 51 rounds. 288 interventions for a total of 120 drugs were made. About 60% of the medicines reviews resulted in at least one intervention with an acceptance rate of 56%. Non-acceptance was mainly due to a lack of information at the time the medicines review was performed. 30% of interventions were relating to unnecessary drug use, 24% to drug omission and 17% to a wrong dose. Time spent on medicines reviews and visiting rounds was 7.3 hour per week. Based on these results we developed a business case for structural participation of a hospital pharmacist at the ICU.

Conclusions Participation of a hospital pharmacist in ICU rounds improves medicines safety and can be cost-effective. The pilot study and business case have resulted in the appointment of 0.5 FTE hospital pharmacist in the ICU.

No conflict of interest.

GRP-033 BENZODIAZEPINE DRUG ABUSE AMONG INTRAVENOUS DRUG USERS

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Background Benzodiazepine drug abuse is frequent in the general population. The reasons for this could be very diverse.

Purpose To review the role of benzodiazepine in intravenous drug users.

To find out which benzodiazepines are most used in this group and sought after on the black market.

Materials and Methods We interviewed five intravenous drug users of heroin or cocaine in Barcelona about their associated use of benzodiazepine. They were trained to interview other intravenous drug users with the same questionnaire that they had answered. All of them had looked for benzodiazepines on the illegal market at least once.

Results The analysis of the first 25 questionnaires answered showed that the most used benzodiazepine was clonazepam, used by 72% and the drugs used differed in half life and effects.

Conclusions Benzodiazepines selected by this sample of patients did not meet criteria for half-life or the main indications. They may simply be a reflection of which benzodiazepines are most prescribed nowadays by psychiatrists in the community.

Abstract GRP-033 Table 1

	N: 25	%
Clonazepam	18	72
Alprazolam	17	68
Clorazepate dipotassium	5	20
Lorazepam	4	16
Diazepam	4	16
Midazolam	2	8
Lormetazepam	2	8
Zolpidem	1	4

No conflict of interest.

GRP-034 BLOOD PRESSURE CONTROL AND ANTIHYPERTENSIVE PHARMACOTHERAPY PATTERNS IN A HYPERTENSIVE PORTUGUESE POPULATION

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Background Interventions to improve blood pressure (BP) control in hypertension have had limited success in clinical practise despite evidence of cardiovascular disease prevention in randomised controlled trials.

Purpose To evaluate BP control and patterns of antihypertensive pharmacotherapy in a population in the Central Region of Portugal, attending a hospital outpatient clinic for routine follow-up.

Materials and Methods Medical data of adult (age range, 18 to 85 years) hypertensive patients attending the hypertension clinic of Hospital Centre of Cova da Beira, Covilhã, Portugal, from March to August 2012, were prospectively obtained from medical records and analysed. Demographic variables, clinical data and BP values of hypertensive patients included in the study, as well as prescribing metrics, were examined on a descriptive basis and expressed as the mean±SD, frequency and percentages. Student's test and Mann-Whitney rank sum test were used to compare continuous variables and the χ^2 test and Fisher exact probability test were used to test for differences between variables in different categories.
Results In all, 47% of hypertensive patients (n = 44) had their BP controlled according to international guidelines. About 54% of patients with a target BP < 140/90 mmHg (n = 74) were controlled, whereas in patients with diabetes and/or chronic kidney disease (n = 20) the corresponding figure was only 20% (P = 0.007). The angiotensin II-receptor antagonists were the most prescribed drugs (57.5%), followed by calcium channel blockers (55.3%) and β-blockers (42.5%). About 82.4% hypertensive patients with comorbid diabetes were treated with an angiotensin-converting enzyme inhibitor or an angiotensin II-receptor antagonist.
Conclusions Many hypertensive patients prescribed antihypertensive treatment fail to achieve BP control in clinical practise; this control being worse among patients with diabetes or chronic kidney disease. As prescribing patterns seem to conform to international guidelines, further research is needed to identify the causes of poor BP control.

No conflict of interest.

GRP-035 BOCEPREVIR AND TELAPREVIR: SAFETY

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Background Protease inhibitors boceprevir and telaprevir were approved by the European Medicines Agency in July and September 2011 respectively for the treatment of hepatitis C genotype-1 in combination with peginterferon and ribavirin (triple therapy).
Purpose To describe the safety of boceprevir and telaprevir in clinical practise.
Materials and Methods All patients who received triple therapy prior to commercialization (compassionate use) with boceprevir or telaprevir to September 2012 were included. Data collected were: drugs administered for triple therapy, analytical parameters (haemoglobin, neutrophils and platelets) and subjective adverse effects. Patients were educated by the pharmacist about the medicines at the start of triple therapy and interviewed about adverse effects monthly with each refill of triple therapy.
Results Of the 36 patients with chronic hepatitis C included, 16 were treated with telaprevir and 20 with boceprevir. The most frequent adverse reactions were anaemia, neutropenia and thrombocytopenia. Anaemia was managed by reducing the dose of ribavirin (7 patients), erythropoiesis-stimulating agents (11 patients) and packed cells (7 patients). Neutropenia and thrombocytopenia were controlled with peginterferon dose reduction (2 patients) and granulocyte colony-stimulating factor (4 patients). Other adverse effects were fatigue or discomfort (16 patients), insomnia (5 patients), fever (5 patients), pruritus, dysgeusia, headache, nausea, diarrhoea and irritability. Eight patients had to discontinue treatment due to adverse reactions which were not controlled with dose adjustment or supportive drugs.
Conclusions All adverse events observed were reported in the EMA studies. Protease inhibitors have shown improve sustained virological response in clinical trials but these drugs are associated with a lot of adverse reactions. It is very important to have close collaboration between the physician and the pharmacist for medicines management, so that adverse reactions not described in the drug information will be reported to health agencies.

Abstract GRP-035 Table 1

Protease inhibitor	No. of patients	Anaemia	Neutropenia	Thrombocytopenia
		n (%)		
Boceprevir	20	17 (85)	14 (70)	15 (75)
Telaprevir	16	11 (69)	6 (38)	13 (81)

No conflict of interest.

GRP-036 CARDIOVASCULAR RISK IN HIV PATIENTS AND HCV CO-INFECTED PATIENTS TREATED WITH LOPINAVIR/RITONAVIR OR ABACAVIR

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Background An estimate of the risk of suffering a cardiovascular event guides the development of preventive strategies and treatment optimization. In HIV and co-infected HIV/HCV patients the state of chronic inflammation, altered endothelial function, a higher prevalence of smoking and antiretroviral treatment toxicity tend to increase the risk compared to the non-infected population.
Purpose To estimate the cardiovascular risk of HIV infected patients, HCV/HIV patients, and those treated with lopinavir/ritonavir or abacavir in a hospital. To describe the population and their main risk factors.
Materials and Methods This was a 6-month retrospective and observational study. Demographic and clinical data, such as lipid profile, immunological state or current treatments, were collected. Three different tools were used to estimate the 10-year cardiovascular risk: Framingham, SCORE and Regicor, in order to minimise the possible under-estimation for the infected Spanish population.
Results 56 patients matched the inclusion criteria. The average age was 48 (78.6% men). All patients had a good immunological state. The first modifiable risk factor was smoking (66.1%) dyslipidaemia the second (50%) and hypertension the third (37.5%). The co-infected population presented the main risk factors in higher percentages than the mono-infected group (81.3% smoked and 90% had dyslipidaemia). The number of patients identified as having a high cardiovascular risk with the estimation methods used was low. Framingham was the tool that classified more patients into this group (18.5% versus 12.73% SCORE and 1.85% Regicor).
Conclusions The results of this study, which accorded with previous publications, show the high prevalence of cardiovascular risk factors in this population, especially smoking and dyslipidaemia, showing the importance of identifying high-risk patients in order to prevent cardiovascular events. It also evidences the lack of a specific way of identifying these patients, which would help direct preventative efforts.

No conflict of interest.

GRP-037 CATHETER RELATED INFECTION TREATMENT PROTOCOL COMPLIANCE IN THE INTENSIVE CARE UNIT

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Background *The Hospital Infections and Antibiotic Policy Committee* guidelines recommend antibiotics to cover coagulase-negative staphylococcus and Gram-negative bacilli with vancomycin + aminoglycoside or aztreonam if Catheter-Related Bacteraemia (CRB) is suspected. Fungal coverage has to be evaluated.
Purpose To assess compliance with the antibiotic treatment protocol in the CRB in the Intensive Care Unit (ICU).
Materials and Methods Observational prospective 6-month study in a 32-bed ICU in a tertiary hospital in patients hospitalised ≥48 hours carrying a Central Venous Catheter (CVC).

Demographic and antibiotic treatment were recorded and compared with the empirical treatment recommended.
Results From 8 September 2011 to 8 March 2012, 596 patients were admitted to ICU; 571 patients used CVC; 390 (68.3%) males, mean age 61.0 ± 15.6 years; the number of CVC used was 844, equivalent to 5578 CVC days.

During this period 114 CVCs were removed in patients with fever and 11 cases of CRB were confirmed (10 patients); incidence 1.97 CRB/1000 CVC days.

Microbiology: 1 *Morganella morganii* (treatment levofloxacin + piperacillin/tazobactam); 2 methicillin-sensitive *Staphylococcus aureus* (one treated with meropenem, another levofloxacin + teicoplanin); 3 *Staphylococcus epidermidis* (one treated with linezolid, the second with piperacillin/tazobactam + teicoplanin, and the last with linezolid + meropenem + caspofungin); 1 *Escherichia coli* (treatment piperacillin/tazobactam); 1 *Pseudomonas aeruginosa* (treatment piperacillin/tazobactam); 2 carbapenemase-positive *Klebsiella pneumoniae* (treated with piperacillin/tazobactam + voriconazole) and 1 *Candida glabrata* (patient received fluconazole + levofloxacin).

Empiric antibiotic treatment wasn't correct in 8 cases of CRB, lacking empirical Gram-positive coverage in 7 cases and Gram-negative in 1 case. However, according to microbiological results, bacteraemia coverage was correct in 90%.
Conclusions Protocol compliance is low in the ICU for empirical treatment of CRB. A large number of CVCs were removed for fever with no clear correlation with CRB. Patients with fever of unknown origin receive broad-spectrum antibiotic treatment including antibiotic coverage of a wider spectrum than is strictly necessary for CVC infection. Yet 72.72% of patients would not receive appropriate empirical treatment if CRB was suspected.

No conflict of interest.

GRP-038 CHEMOTHERAPY-INDUCED NAUSEA AND VOMITING IN BREAST CANCER PATIENTS: EFFECTIVENESS AND SAFETY OF ANTIEMETIC TREATMENT

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Background Chemotherapy-induced nausea and vomiting are two of the most frequent manifestations that appear in cancer patients that significantly affect the course of their disease.
Purpose The objectives of this study are:

- to describe the antiemetic treatment used in patients with breast cancer treated with chemotherapy,
- to determine the degree of adaptation to the good clinical practise guides for the management of this type of complication, in other words how closely treatment followed the ASCO, MASCC and NCCN guideline recommendations,
- to analyse the effectiveness of those treatments and known adverse reactions that patients may suffer because of antiemetic or chemotherapy drugs.

Materials and Methods A descriptive, transversal and observational study of one month. The study included breast cancer patients from the day hospital who had received at least one previous chemotherapy cycle. Variables were collected using a questionnaire completed by the patient and pharmacy service software.
Results Of 47 patients, 32 agreed to participate in the study, with a mean age of 50.7 years (SD = 9.8). On day 1 post-chemotherapy, 34.4% of treatments did not follow the guidelines and on days 2, 3 and 4 this increased to 46.9%. 31.3% of patients experienced acute nausea and 15.6% acute emesis, 43.8% developed late nausea and 18.75% late vomiting. The number of patients with anticipatory nausea and vomiting was lower. The complete response to antiemetic treatment (absence of nausea, vomiting and need for antiemetic rescue medication) was achieved in 50% of patients. The most common averse events suffered by patients were fatigue, weakness (75.0%) and insomnia (56.3%).
Conclusions The lack of compliance with guidelines together with the results obtained of inefficiency of the treatment mean that we require new therapeutic strategies to allow us to obtain better control of emesis.

No conflict of interest.

GRP-039 CLASSIFICATION OF THE PHARMACEUTICAL INTERVENTIONS MADE USING THE ISOFAR PROGRAMME

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Background A variety of errors in the medication process means reduced safety for the patient and less effective treatment.
Purpose To analyse from the Unidosis area the types of intervention, medicines-related problems (MRPs), impact and savings recorded in the ISOFAR programme.
Materials and Methods A retrospective analysis was performed of the interventions made by the Pharmacy service since the establishment of the ISOFAR programme (from March 2007 to April 2011). Each intervention was recorded and a note made in the patient data: type of intervention, MRPs, impact and savings of the intervention.
Results In the period of the study a total of 6116 interventions covering: change of drug (52%), maintenance of treatments not included in the Hospital Pharmacotherapeutic Guide (23%), incomplete medical orders (15%), discontinued drugs (4%) and other reasons (6%) were recorded. The MRPs detected with the interventions were classified as: change by Therapeutic Exchange Protocol (TEP) (26.8%), necessary drug but not included in the TEP (22.9%), no adjustment to protocols (14.6%), change discussed (10.1%) and incomplete order (2.1%). In 53% the impact of the intervention was on effectiveness and in 24% on safety. The total savings in the evaluated period reached 184,153.47 euros.
Conclusions The most frequent intervention was a change of medicine probably due to the physician's ignorance of the Hospital Pharmacotherapeutic Guide and the Therapeutic Exchange Protocol; therefore it would be appropriate to consider the inclusion of new drugs in the HPG. A high percentage of medical orders were badly written, so the patient did not receive the medicine. The interventions were intended to improve the efficacy and safety of the prescribed drugs and moreover provide an important financial saving.

No conflict of interest.

GRP-040 CLINICAL SIGNIFICANCE OF RECOMMENDATIONS MADE BY PHARMACISTS ABOUT DRUG-RELATED PROBLEMS (DRP)

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Background The Ministry of Health in Norway has requested an expanded contribution from clinical pharmacy in healthcare delivery because of serious medication-related issues. Examples of this are participation in treatment teams in hospital wards and review of the patient's total use of medicine in cooperation with a medical practitioner. The concept of integrated medicines management (IMM) has been approved as a model to enhance medication effectiveness and safety.
Purpose The objective of this study was to evaluate the clinical significance of recommendations made by pharmacists in drug-related problems (DRP).
Materials and Methods The study was conducted on a respiratory ward and a rheumatology ward at the University Hospital of St. Olav, Trondheim, Norway. Patients admitted to hospital in the period of June to October 2011 were included. All patients using one or more drugs at admission, having DRPs identified by the pharmacist according to the IMM (Integrated Medicine Management) model, were included. DRPs were identified through medicines reconciliation and medication reviews. All recommendations made by the pharmacists were independently assessed and scored by a physician with a special interest in pulmonary diseases, or respectively rheumatology, a clinical pharmacologist and a clinical pharmacist. A Hatoum six-point scoring system [1] for assessing the quality of pharmacists' interventions was used, with rankings between 1. Adverse significance – (the recommendation supplied by the pharmacist may lead to adverse outcome and 6. Extremely significant – information qualified by life and death situation.).
Results A total of 112 recommendations in 46 patients (average age 66 years), were assessed. On average 4 DRPs per patient were found. 85% of the recommendations were assessed as somewhat significant or more (≥ rank 3). The physicians accepted 71% of the pharmacists' recommendations.
Conclusions Recommendations made by pharmacists were assessed as clinically significant to a large extent. The fact that the physicians followed the pharmacists recommendations in most cases, demonstrates the effectiveness and value of the IMM model in improving patient drug treatment.
Reference

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No conflict of interest.

GRP-041 COLLECTION AND ANALYSIS OF ADVERSE EFFECTS AND CO-MEDICATIONS FOR OUTPATIENTS RECEIVING BOCEPREVIR- OR TELAPREVIR-BASED TREATMENT FOR CHRONIC HEPATITIS C

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Background The current treatment of chronic genotype 1 hepatitis C virus infection is the triple combination of peginterferon, ribavirin and a new direct-acting antiviral (DAA), either telaprevir (TVR) or boceprevir (BOC). Potential adverse drug reactions (ADRs) represent an important problem in patient safety. In addition, the DAAs increase the risk of drug-drug interactions (DDIs).
Purpose Guided pharmaceutical interviews were conducted (i) to invite patients to provide feedback on the ADRs, to follow known DDIs, (ii) to encourage patients to communicate potential problems and to adapt pharmaceutical advice.
Materials and Methods The study was conducted between January and April 2012. Patient interviews on ADRs and DDIs were performed every month, during drug dispensing for outpatients by hospital pharmacists. They collected data based on questionnaires which included the documented adverse effects [1, 2] and co-medications [3].
Results 56 questionnaires were completed with TVR patients and 65 with BOC patients. A total of 41 TVR and 62 BOC patients were examined for ADRs (data from the first month were excluded). All patients had ADRs like those reported in the SPC (1,2). The most common ADRs were anaemia (52%) and cutaneous manifestations (65%), especially dry skin (44%). Anaemia was more frequent in patients on BOC (56% BOC/45% TVR) but could be more severe with TVR: 55% of BOC patients and 29% of TVR patients were given erythropoietin and no BOC, but 3 TVR patients were transfused. Fatigue, rash, and pruritus were more frequent with TVR patients. Some ADRs were reported only by BOC patients: dysgeusia, alopecia and weight and appetite loss. Since DAAs are CYP 3A4 substrates and inhibitors, 58 potential interactions were identified and sometimes required close monitoring.
Conclusions Interviews enabled patients to talk about their ADRs and to express feelings on difficulties faced during their treatment. Hospital pharmacists gave them, in response, moral support and modified the advice they gave. They put patients' mind at rest about ADRs and raised patients' awareness of potential DDIs. Finally, the results on ADRs were reported to the health authorities in order to contribute to monitoring the risks related to these new drugs.
References

1. Summary of product characteristics (SPC) of telaprevir (Incivo). Available on the European Medicines Agency website: http://www.ema.europa.eu
2. Summary of product characteristics (SPC) of boceprevir (Victrelis). Available on the European Medicines Agency website: http://www.ema.europa.eu
3. The hepatitis drug interactions website available at: http://www.hep-druginteractions.org

No conflict of interest.

GRP-042 COMPUTERIZED PHYSICIAN ORDER ENTRY IN THE GERIATRIC CENTER: COLLECTION AND ANALYSIS OF PRESCRIBING ERRORS MADE OVER A 5-MONTH PERIOD

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Background Following the total computerization of prescriptions in the Geriatric Center over the past two years, the pharmaceutical team performs a pharmaceutical analysis for all the beds in the centre every day. Computerization is capable of reducing prescribing errors but it can generate some risks.
Purpose To collect, analyse and code the prescribing errors detected over a 5-month period, and to deduce the necessary actions to be taken in order to reduce the number and occurrence of errors.
Materials and Methods Research was carried out over the entire Geriatric Center: 314 beds (short, medium and long stays). Prescribing errors were collated daily and analysed via the computerised prescription software Disporao©. The proposed pharmaceutical interventions were communicated daily to the medical and care teams. The analysis and coding of the errors were carried out with

an Excel© spreadsheet which logs a range of criteria, such as the patient's sociodemographic background, the drug(s) involved, the type of error, the associated pharmaceutical intervention and many others.

Results 60 errors for 1000 patient days, that is 0.5 error per stay and 90 errors per 1000 prescriptions were detected for short stays. 1393 errors of all types were detected over 5 months, which is 0.9 error per month and per bed. The errors were spread over 3 categories: errors defined by the French Clinical Pharmacy Society criteria (67.3%), errors linked to the computerised tool (14.3%) and other types of error (18.4%). 5 drug classes were heavily involved. 59% of patients were affected by an error despite a prior pharmaceutical intervention. Errors rarely have drastic consequences on the patient: 4‰ prescriptions. Weaknesses in knowledge and malpractice represent nearly 85% of the total of errors. Errors due to computer parameters represent an increasing risk (14%).

Conclusions Most prescribing errors are avoidable. Although computerised physician order entry is a way of making the medication process safer, it also generates comments and has limitations. The prescription tool determines the type and frequency of errors. All these errors justify the analysis of all the prescriptions by a pharmacist, as s/he has a rounded knowledge of the patient beyond the medical prescription. The booming certification of various software packages dedicated to helping hospital prescription writing in a way acceptable to the High Authority for Health contributes to this step of making care safer and will hopefully lead to a decrease in errors.

No conflict of interest.

GRP-043 CONCURRENT USE OF DIFFERENT BENZODIAZEPINES IN DIFFERENT HEALTHCARE LEVELS

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Background Benzodiazepines are the most commonly-used anxiolytics and hypnotics. Concern has been expressed regarding their potential over-prescription. Different benzodiazepines have fundamentally the same mechanism of action and differ from each other mainly by differences in pharmacokinetics. There is no pharmacological basis for using more than one benzodiazepine in the same patient.

Purpose The purpose of this study was to study the prevalence of concurrent use of different benzodiazepines in different healthcare levels in the same area: primary care, tertiary level hospital discharge and ambulatory mental health centre.

Materials and Methods Data were obtained from the pharmacy claims database between 1st and 31st January 2012.

Patients who had been dispensed at least one benzodiazepine during January 2012 were included (n = 1707 in primary care, n = 273 at tertiary level hospital discharge and n = 128 in an ambulatory mental health centre). The proportion of benzodiazepine users was calculated and broken down by gender and age.

Results The number of patients who were dispensed two or more different benzodiazepines simultaneously was 124 (7.3%) in primary care, 11 (4.0%) in hospital discharge and 1 (0.8%) in the ambulatory mental health centre. Most patients who were prescribed benzodiazepines were women (between 60% and 70% depending on the health care setting). Women benzodiazepines users were younger in the ambulatory mental health centre (mean age 51 years) than at hospital discharge (mean age 64 years) or in primary care (mean age 68 years).

Conclusions There was more detrimental prescribing of different benzodiazepines simultaneously in primary care than at hospital discharge or in an ambulatory mental health centre. In patients who used benzodiazepines simultaneously, they were mainly prescribed by the same physician.

No conflict of interest.

GRP-044 CONFORMITY OF THE BATCH FILE IN PREPARATION: AN INTERNAL AUDIT

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Background Around 3000 batches of medicinal products are prepared each year in Lapeyronie Hospital.

For each batch, a batch file (BF) is created. This contains the prescription, a manufacturing and labelling sheet (MLS) and a control and batch release sheet (CBRS).

Purpose Since the publication of the French Good Manufacturing Practice in 2007, a process of quality improvement has been implemented. An internal audit of all 2011 BFs has been conducted to evaluate the non-conformity (NC) rate.

Materials and Methods An internal control questionnaire (ICQ) evaluating various criteria was written by the pharmacist and completed by students and residents for each BF. The results were compared with a previous 2010 study.

Results 42% of 2,858 BFs were not acceptable. There were 1691 non-conformities (a BF can be unacceptable on several criteria): 32% of the unacceptable BFs had a problem with the prescription, 59% had inaccuracies with the MLS and 9% with the CBRS.

Of those with prescription problems, pharmaceutical validation traceability was lacking for 49% and 31% had not been signed by the MD.

The absence of checking the sheet before preparation was the major NC factor (79%) regarding the MLS. The volume of raw materials was not checked during preparation in 8.6% of MLS.

NC regarding CBRS was due to incomplete checking of the preparation before it was released (36%).

Results in these 2 studies showed that the MLS was not checked before preparation in 28% of BFs in 2011 against 71% in 2010. The volume cheque before preparation was not performed in 41% of BF in 2011 against 85% in 2010.

Conclusions Following this audit, corrective actions were instituted: pharmacists were trained on the importance of the pharmaceutical validation of prescriptions, and the assistants were reminded of the importance of getting their work checked before and during preparation.

Nevertheless, there has been progress in the conformity rate between these two audits, pointing out the impact of corrective actions.

No conflict of interest.

GRP-045 CONTRADICTIONS IN THE INTERPRETATION OF DRUG/SUPPLEMENT INTERACTIONS AND DIFFICULTIES OF THEIR MANAGEMENT IN EVERYDAY CLINICAL PRACTISE

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Background The growing use of supplementary products (herbal remedies, food supplements, etc.) poses an unignorable and poorly explored risk to hospital patients. The results of our previous study [1] show that 85.5% of hospital patients took at least one supplementary product; and with one patient out of four we have identified potential interactions. However, several questions arise about their clinical relevance: (1) Might the interaction harm the patient?

(2) Is treatment modification or close monitoring necessary? (3) Is it reasonable to prohibit the use of any supplement?
Purpose To explore and study those determinants that need to be taken into account when managing drug/supplement interactions.
Materials and Methods Taking the results of our previous study as a basis we have systematically evaluated the literature and the available authentic databases.
Results There are significant differences between the databases we have looked at, as to which interactions are present in the system, and how broad a spectrum of active ingredients is included when a known case of interaction occurs.
We identified the following factors, which have to be taken into account when evaluating a potential interaction:

- type of underlying evidence (in vitro studies, case reports, clinical trials, etc.)
- which form of a given interacting substance has been reported on (species, plant-part, type of extract, etc.) and whether this component is present in the product
- mechanism and dose dependence of the interaction
- which patient groups are more likely to develop symptoms due to the interaction

We evaluated 155 components found in supplementary products by the listed criteria, then assessed the relevance and classification of interactions.
Conclusions Special software, that contains all the recommended criteria we have set up, could become an effective tool for preventive screening of interactions on hospital admission.
Reference

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No conflict of interest.

GRP-046 CORONARY PATIENTS: WHICH THERAPEUTIC APPROACH ON DISCHARGE FROM HOSPITAL?

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Background Coronary artery disease is one of the main causes of death in industrialised countries. The recommended treatment is 'BASI' (B for beta-blockers, A for antiplatelet agent, S for statin and I for ACE inhibitors or sartans) together with appropriate treatment of major cardiovascular risk factors (CVRFs).
Purpose To study compliance with the standard care of coronary patients, choosing to focus on hospital discharge in the context of improving professional practise.
Materials and Methods This study was conducted in two cardiology units, over 2 years. It focused on all inpatients with a positive coronary angiography. An evaluation of professional practise was conducted in 2010. Improvement actions were then taken: the results were presented to cardiologists and a booklet was written summarising good professional practise recommendations. In 2012, practise was re-evaluated through a second study. We collected and analysed information on treatment after hospitalisation, CVRFs and information in the discharge letter.
Results The study included 179 patients in 2010 and 111 in 2012.

Concerning drug treatment, the recommended 'BASI' treatment was prescribed in 72% of cases in 2010 versus 70% in 2012. For non-compliant treatments (i.e. other than BASI), 17% were justified in the discharge letter (BASI not indicated or contraindicated), against 16% previously.

Concerning the management of CVRF, lipid analysis was performed for 94% of patients in both groups, and recorded in the discharge letter in 82% (2010) versus 77% (2012). 30% of patients with diabetes and/or obesity consulted a dietician or diabetologist in 2010 versus 44% in 2012. Last, 68% of smokers received a nicotine substitute in 2010 and 35% in 2012.
Conclusions Our work shows that the recommendations are generally well respected. This may explain why, despite successive changes of junior doctors, practise has changed little during this study. However, further action will be required concerning management of CVRFs, which is still less satisfactory.

No conflict of interest.

GRP-047 CREx AND ORIONÆ ANALYSIS IN AN HOSPITAL PHARMACY: A SIX-MONTH REVIEW

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Background Prevention of medication errors has led to improved safety of the drug use system. Experience feedback committees (Comités de Retour d'Expérience, CREx), in particular, can help health professionals to improve the quality and safety of drugs management.
Purpose To set up a CREx in our pharmacy, in order to record, analyse and correct precursor events.
Materials and Methods Medication errors are collected on a report form. Once a month, these errors are reported to CREx and the staff select the event that will be discussed in the next CREx meeting. The ORION method, based on experience acquired in aeronautics, was selected to analyse how the CREx should operate. The systemic analysis is divided into 5 steps, performed by a pilot trained in the method and presented during CREx. The five steps are: collect the data, rebuild a chronology of facts, identify any gaps, contributing and influential factors, propose corrective measures and write the analysis report.
Results From April to September 2012, 61 dysfunctions were reported. 19 were actual and 42 were potential errors. Among these errors, 47.5% related to prescription, 21% to dispensing, 21% to inventory management, 7% to administration, 1.7% to validation and 1.7% to preparation. Five of these errors were analysed in CREx (ORION method). Ten corrective measures were proposed, 6 of which were actually implemented. We noted an increase in the number of dysfunctions reported, from 4 dysfunctions reported in April to 22 in September.
Conclusions CREx is well established in our pharmacy, taking place once a month, with representatives of all pharmacy staff. After six months, CREx has enabled 6 corrective measures to be implemented (creation or modification of procedures, modification of medicines management, etc.). It has also enabled pharmacy staff to understand the importance of reporting and analysing medication errors.

CREx is thus an approach to sustain in order to improve the safety of the drugs use system.

No conflict of interest.

GRP-048 CYTOTOXIC DRUGS WITH THE POTENTIAL TO PROLONG THE QT INTERVAL

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Background Regulation No. 173/CD/8.1.7. from the Portuguese Authority of Medicines and Health Products (INFARMED), issued on 2 August 2012 and titled 'Ondansetron – dose constraint for

injectable drugs', recommends that 'care must be taken when administering this antiemetic associated with other drugs that prolong the QT interval, namely several cytotoxic agents'. To effectively implement this recommendation, it was thought advisable to point out, in the computerised hospital drug database, all cytotoxic drugs that prolong the QT interval.

Purpose To review all cytotoxic drugs available in the Portuguese pharmaceutical market to identify those with the potential to prolong the QT interval, in order to allow hospital pharmacists to quickly and efficiently implement the above-mentioned recommendation.

Materials and Methods Literature review based upon all summaries of product characteristics (SPCs) of cytotoxic drugs available in Portugal and 48 literature sources from PubMed, found by intersecting the terms 'cytotoxic-induced prolongation of the QT interval', 'antineoplastic-induced prolongation of the QT interval' and 'drug-induced prolongation of the QT interval' and using the time limit interval from January/2003 to September/2012.

Results A total of 58 cytotoxic agents currently available in Portugal were investigated. Agents with the potential to prolong the QT interval are: arsenic trioxide, capecitabine, dasatinib, doxorubicin, epirubicin, eribulin, gefitinib, lapatinib, nilotinib, sorafenib, sunitinib and vandetanib. Substantial evidence supports the conclusion that arsenic trioxide and vandetanib have a risk of torsades de pointes (TdP) when used as directed in SPC. Regarding eribulin, lapatinib, nilotinib and sunitinib, there is insufficient evidence that they may cause TdP when used as directed in the SPC. Note that the hormone antagonists bicalutamide and tamoxifen also have the potential to prolong the QT interval.

Conclusions The database produced is a valuable tool to Portuguese hospital pharmacists who dispense cytotoxic drugs, contributing to the implementation of one of the recommendations of the above-mentioned regulation.

No conflict of interest.

GRP-049 DESIGN AND DEVELOPMENT OF A PRESCRIPTION MODULE OF ENTERAL DIETS FOR A NEONATAL UNIT

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Background A safety problem occurred in requesting enteral diets (EDs) in the neonatal unit. So we decided to develop a special prescription module for requesting EDs.

Purpose To describe the design and development of a prescription and request module for EDs in a neonatal unit.

Materials and Methods The first step was to assemble all the EDs, such as milks, supplements or fortifiers and described the composition of these products, indicating total kilocalories, macronutrients (grammes of protein, lipids and carbohydrates), micronutrients (mg and mEq of Na, K, Cl, Ca and Mg, mg and mMol of P, mg of elemental iron, IU of vitamin D3) and osmolarity (mOsm/L).

Many of these data weren't in the product's package leaflet, so it was necessary to contact the manufacturer to request this information.

We decided to include the name of the diet, frequency, administration route and type and unit of administration in the ED prescription module.

Results The neonatal computer physician order entry (CPOE) now has another option, the ED module. The prescriptions also include the weight of the patient. When the physicians select ED, they can view the qualitative and quantitative composition of the formula. The prescription module calculates macronutrients provided for that prescription (g/kg/day), micronutrients (mg/kg/day, mEq/kg/day or mMol/kg/day), total kilocalories (kcal/kg/day) and osmolarity (mOsm/L).

The prescribed diet is checked against nutritional requirements obtained from the European Society of Paediatric Gastroenterology and Nutrition guidelines.

Finally, the software can generate the request for the diets without the necessity of handwritten requests.

Conclusions ED can cause medication errors, such as transcription problems, excessive or miscalculated macro and micronutrients or errors in route of administration. These errors may have clinical impact on children and can be more serious in preterm infants. The ED prescription module is an excellent tool to prevent errors and facilitate the nutritional calculations.

No conflict of interest.

GRP-050 DETECTION AND ANALYSIS OF ADVERSE DRUG REACTIONS IN CANCER PATIENTS IN A TERTIARY HOSPITAL

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Background Adverse drug reactions (ADRs) are especially important with antineoplastic drugs because of their implications on patients' health and quality of life.

Purpose To study the epidemiology, clinical features, diagnosis and pharmacology of ADRs detected in hospitalised patients treated with antineoplastic drugs.

Materials and Methods Analytical observational study (2011). We included all patients receiving cancer treatment. Study variables were: sociodemographic characteristics (age, sex), clinical (diagnostic, stage) and ADRs. The analysis was epidemiological: ADRs conducted (cumulative incidence, CI), clinical: (physiological system affected, type, duration, production mechanism, frequency, severity), pharmacological: (drug, administration, cycle) and diagnostic: (causality, chronological sequence).

Results 125 patients (mean age 51 years), 68% male, 32% female, 90% comorbidities. The most common diagnoses were lymphoma (28%), specifically non-Hodgkin's Lymphoma (11%), acute lymphoblastic leukaemia (9%), acute myeloid leukaemia (6%) mainly in advanced stages (68%). We detected a total of 170 ADRs with antineoplastic agents (28% CI). Physiological systems primarily affected were: blood (89%), digestive system (23%). The most common ADR was cytopenia (49%) specifically febrile neutropenia (37%). The duration was <7 days (75%) and >7 days (25%). ADRs were mostly produced in a dose-dependent way (85%), were very common (94%) and according to severity were: lethal (2%), severe (5%), moderate (73%), mild (19%). The drugs involved were: cytarabine, methotrexate, idarubicin, carmustine, cisplatin by intravenous administration (97%) and during first treatment cycles: cycle 1 (53%), cycle 2 (23%). 92% of the ADRs are tested and produced after drug administration (99%). In 60% and 19% of cases the measure was the continuation and discontinuation of antineoplastic therapy, respectively. In cases of re-exposure, the emergence of drug ADRs was positive in 45% of patients and in the disappearance of ADRs discontinuation was positive in 92%.

Conclusions The incidence of ADRs was high, the majority of ADRs were well known, moderate and positive outcome according to the measurements. It would be better to understand the ADRs as it can help develop other strategies to reduce their impact on the safety of cancer treatments in the first cycles.

No conflict of interest.

GRP-051 DISPENSING PRACTISE IN SAUDI COMMUNITY PHARMACY

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Background Community pharmacies are the first point of contact in the healthcare system. Thus, community pharmacists have a crucial role in optimising the medicines use process and promoting patient outcomes.
Purpose The study aimed to examine counselling and dispensing practise in community pharmacy in Riyadh city, the capital of Saudi Arabia.
Materials and Methods The simulated patient (SP) method was used to measure how pharmacists provided patient counselling. There were four scenarios. Scenarios 1 and 2 concerned drug-drug and drug-food interactions, scenario 3 concerned the proper time of administration, and scenario 4 concerned side effects. Each pharmacy was visited twice with different scenarios. The simulated visits were conducted between April and May, 2012. A questionnaire to test the attitude of community pharmacists regarding counselling and dispensing practise was distributed in the same period.
Results There were 161 simulated visits. Community pharmacists did not ask SPs any questions during 144 (90%) visits. Pharmacists did not provide any information to SPs during 152 (95%) visits. When the SPs asked specific questions about their medicines, pharmacists provided no information during 30 (19%) visits. 350 questionnaires were distributed. Of the respondents, 232 (64%) reported that they usually or always tell the patient about the purpose of medicines or the diagnosis, 302 (98%) reported that they usually or always give patient information on how to use or apply the medicine. 299 (85%) said they were satisfied with their counselling practise.
Conclusions Dispensing practise in the community in Saudi Arabia seems inadequate. There is a strong need to improve medicines counselling and dispensing practise in community pharmacies.

No conflict of interest.

GRP-052 DOES AN INCREASE IN THE USE OF LOW MOLECULAR WEIGHT HEPARIN THROMBOPROPHYLAXIS CORRESPOND TO A DECREASE IN THE INCIDENCE OF HOSPITAL-ACQUIRED VENOUS THROMBOEMBOLISM?

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Background Venous thromboembolism (VTE) is a common complication of hospital admission. Pulmonary Embolism (PE) accounts for 5–10% of deaths in hospitalised patients and is the most common cause of preventable hospital mortality. Prophylactic Low-Molecular-Weight heparin (LMWH) reduces the risk of VTE but is widely under-prescribed. Although LMWH prophylaxis in SVUH has been cyclically audited since 2007, the use of thromboprophylactic LMWH has not been studied in comparison to the incidence of hospital-acquired VTE.
Purpose To measure the use of LMWH thromboprophylaxis and to compare this to the rate of confirmed hospital-acquired VTE.
Materials and Methods The pharmacy dispensing and stock management system provided data on the use of thromboprophylactic LMWH from 2007 onwards. Data on the incidence of hospital-acquired VTE was collected from the Hospital Information System. These figures were compared with one another.
Results The rate of use of thromboprophylactic LMWH in SVUH rose by 26% over the study period. The average incidence of hospital-acquired VTE was 8.3 (range 6.8–9.3) per 1,000 inpatient admissions over the same period. This average is consistent with published rates, but the incidence in SVUH increased over the study period.
Conclusions Hospital-acquired VTE is a major public health issue and is associated with substantial morbidity and mortality. Appropriate thromboprophylaxis is considered to be the most effective strategy for preventing VTE. Although the use of LMWH thromboprophylaxis in SVUH increased steadily over the study period, the incidence of VTE also increased over the same period, suggesting that there are other factors (e.g. patient complexity, inappropriate LMWH dosing etc.) influencing the rate of hospital-acquired VTE. Audit of LMWH thromboprophylaxis is a useful tool to assess awareness and compliance with in-hospital VTE prophylaxis guidelines. Trends in the incidence of hospital-acquired VTE may be helpful in assessing the effectiveness of in-hospital thromboprophylaxis, when other factors are taken into consideration.

No conflict of interest.

GRP-053 DRUG DISTRIBUTION SYSTEMS: EFFECT ON MEDICATION ERROR RATES AND COST OF SAFETY IN A GERIATRIC SHORT STAY UNIT

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Background Medication management of older peoples is of special importance regarding to their sensitivity to adverse drugs effects.
Purpose This study compared the medication error rates and the operating costs before and after implementation of an automated unit dose distribution system:

- before: ward stock system (WSS): prescriptions in paper record, medications prepared by nurses in the ward,
- after: computerised physician order entry including electronic medication administration record (eMAR), pharmacist interventions, unit dose delivering system robot, automated medications delivering systems.

Materials and Methods Medication errors were identified using an observation-based method. Pharmacist attended drugs administration rounds in a randomly selected ward section. Administrations were compared to prescriptions. Error rates and error types were compared according to a chi square method. Clinical severity of errors was assessed.

Drug consumptions, costs of pharmaceutical and nursing staffs and equipment were calculated for each period.
Results During the WSS period, 28 rounds were attended (148 patients, 615 drugs administrations) versus 31 rounds (166 patients, 783 drugs administrations) during the UDDS period. The rate of medication errors significantly decreased between the WSS period and the UDDS period (12.6% vs 5.2%). During the WSS period, a medication error occurred by 30.4% of the patients (45 patients) compared to 19.9% (32 patients) during the UDDS period ($p < 0.05$). Most reduced errors during the UDDS period were wrong dose (16 vs 4) and wrong drug (19 vs 1).

Drugs consumptions decreased of 11,527€ a year (11.5%) and cost of nurses time saved was assessed at 24,642€ a year. One dose delivered by robot cost 0.56€, 0.41€ excluding robot loan. Safety brought by the automated unit dose distribution system cost 90.4€ for one bed a month, including, staff and equipment.
Conclusions Drug safety showed her necessity, this has an additional cost witch must be compared with consequences of medication errors and medicine-related illness.

No conflict of interest.

GRP-054 DRUG SAFETY PROFILE: ANALGESICS AND ANAESTHETICS USED IN PAEDIATRIC ORTHOPAEDICS

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Background Pharmacological treatment of paediatric patients is a clinical area not deeply investigated because of the health, legal and financial implications. The multidisciplinary team for clinical management of drugs in Rizzoli Orthopedic Institute wanted to meet the clinical demand for standardisation of off-label use.
Purpose To develop a list of safe medicines for use in paediatrics.
Materials and Methods The analysis was conducted considering the data sheets of 169 analgesics and anaesthetic medicines extracted from ATC M-N (60 drugs) and the following sources: TripDataBase, GUF for children 2003, BNF for Children 2011–2012, Who Model Formulary for Children 2010. The information stored in a DB enabled us to classify the medicines as: authorised in paediatrics; licenced with restrictions on use by age/weight/pathology; contraindicated or not recommended in childhood; with no references for use in children.
Results 30 anti-inflammatory/antirheumatic medicines (9 drugs) and 42 analgesics (10 drugs): ibuprofen, paracetamol and pethidine are reference drugs, ketorolac and nimesulide are contraindicated and there is no documentation for age <16 or <12 years; morphine has age limitations, but its use is strongly recommended; 12 muscle relaxants (9 drugs): suxamethonium, vecuronium, atracurium, baclofen, rocuronium are for reference; 31 anaesthetics (14 drugs): bupivacaine, isoflurane, remifentanil, ropivacaine and sevoflurane are authorised, thiopental and ketamine have no indications in childhood but their use is documented; 54 anticonvulsants (18 drugs), gabapentin and pregabalin are contraindicated for neuropathic pain although authorised over 6 years in epilepsy.
Conclusions The results confirmed the limited information contained in the data sheets and the need to apply scientific evidence in paediatrics. Therefore, the resulting list was a tool for clinicians to increase awareness of the off-label use as an aid in the acquisition of informed consent.

No conflict of interest.

GRP-055 EFFECT OF ANTIVIRAL TREATMENT, VIRAL LOAD AND STAGE OF FIBROSIS IN QUALITY OF LIFE OF HEPATITIS C-INFECTED PATIENTS

doi:10.1136/ejhpharm-2013-000276.055

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Background Some authors have reported reductions in health-related quality of life (HRQOL) of hepatitis C (HCV)-infected patients, but studies fail to discriminate between the effect of factors such as the antiviral regimen, the viral load (VL) or the degree of fibrosis.
Purpose To evaluate HRQOL in chronically-ill HCV patients prior to, and after, treatment initiation
Materials and Methods Inclusion criteria: patients >18-years old, HCV antibodies+ and HCV-RNA+, no other relevant comorbidities. Recruitment period: 9 months. Patients were stratified according to the previous VL and their degree of fibrosis, and started on antiviral treatment based on ribavirin + peginterferon. On their follow-up visits (weeks 0, 4 and 12), subjects were given a validated questionnaire (SF36) to be completed at home and delivered on their next visit to the outpatient pharmacy. SPSS v17 was used for the statistical analysis.
Results 18 subjects recruited (n = 18), percentage of males 67%, mean age 47.3. 10 patients had genotype 2 or 3, and 8 patients had genotype 1 or 4. Low-grade (stage 1–2) and high-grade (3–4) fibrosis was found in 11 and 7 patients respectively. 9 patients had >800,000 RNA copies/mL at presentation. With regard to the antiviral therapy, statistically significant differences in the following items were found between week 0 and week 4: physical functioning (P = 0.046), physical role (P = 0.001), pain (P = 0.001), health (0.046), energy/fatigue (P = 0.001), and emotional wellbeing (P = 0.001). Additionally, we found statistically significant differences in the emotional component with regard to the VL (P = 0.005) and the degree of fibrosis (P = 0.03).
Conclusions Antiviral therapy was associated with deterioration in HRQOL. Items involving physical health exhibited the greatest differences. Conversely, those subjects with higher VL and an advanced degree of fibrosis had worse scores in the items involving emotional wellbeing. Long-term studies are currently being conducted to determine whether the existing differences are emphasised over time, as well as the implications of these findings.

No conflict of interest.

GRP-056 EFFECT OF PHARMACEUTICAL FOLLOW-UP IN PATIENTS WITH SECONDARY HYPERPARATHYROIDISM TREATED WITH CINACALCET

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Background Adherence in patients with hyperparathyroidism (sHPT) secondary to serious kidney disease treated with cinacalcet is very important for their health status.
Purpose To assess the adherence (percentage of days of treatment covered with medicine compared with the total days) observed in patients treated with cinacalcet and to evaluate the effect of the adherence reinforcement measures used with patients when medicine is dispensed in our Pharmacy Service (PS).
Materials and Methods Observational descriptive study (January 2012) of all patients treated with cinacalcet and selection of those with recorded lack of adherence. Tools: medical history, dispensing medicine record. To reinforce adherence the PS produced a brochure with recommendations, supplied pill boxes and designed a patient delay record to report to the medical doctor (MD). The results of adherence reinforcement were recorded in April, 2012.
Results From 66 patients treated with cinacalcet, we selected 13 (19.7%) with a record of at least of 3 delays in collecting the prescription, 6 women and 7 men with a mean age of 65.3. Posology: 120 mg/24 h 7.7% (1), 90 mg/24 h 15.4% (2), 60 mg/24 h 23% (3), 30 mg/24 h 38.5% (5), 30 mg/48 h 7.7% (1) and 30 mg/72 h 7.7% (1). The delay was between 4 and 70 days (15.5 on average). After adherence reinforcement measures, 6 patients collected their medicine punctually when it was next dispensed. After the second intervention, only 1 of the non-adherent patients came on time. All delays were communicated to the MD.
Conclusions Although the doses are simple and the adherence support strategies applied are theoretically adequate, the results aren't satisfactory. Patients need to be informed of the repercussions of bad adherence and follow-up is needed with a combined strategy between the PS and the MD.

No conflict of interest.

GRP-057 ERRORS IN MEDICINES PREPARATION AND ADMINISTRATION IN VIETNAMESE HOSPITALS

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Background Errors in the medication use process are common. Little is known about preparation and administration errors in resource-restricted settings, including Vietnam.
Purpose To determine the frequency, type and severity of medicines preparation errors and administration errors in two Vietnamese hospitals and identify associated factors.
Materials and Methods This is a prospective study using an observation-based approach, carried out in two urban public hospitals. Four trained pharmacy students observed all drugs prepared and administered on six wards, 12 hours per day on 7 consecutive days. Severity of errors was judged by experts using a validated method. Multivariable logistic regression was performed to explore error-associated factors.
Results In total, 2122 out of 5635 preparations or administrations of medicines were erroneous. The error rate was 37.7% (95% confidence interval 36.4–38.9%). The most frequent errors involved administration technique, preparation technique, omission, and dose (53.1%, 32.6%, 5.0%, and 2.6%, respectively). Severity was judged to be moderate in 87.8% of the cases, followed by severe (8.8%), and minor errors (3.4%). Slightly lower medication error rates were observed during afternoon drug rounds than at other times of the day (32.1% vs. 39.7%, $p = 0.00$). Much higher error rates were observed for anti-infective drugs than for any other class of drugs (77.8% vs. 28.9%, $p = 0.00$). Medicines with complex preparation procedures were more likely to generate errors than simple ones (58.1% vs. 24.7%, $p = 0.00$), and the error rate of intravenous medicines was much higher than that of other medicines (73.2% vs. 12.4%, $p = 0.00$).
Conclusions This is one of the first large studies investigating medication errors in resource-restricted settings. In around a third of all medicines potentially clinically-relevant errors occurred, which is higher than in most other studies. Administration technique, preparation technique and omission errors were most commonly encountered. Drug round, drug class, complexity of preparation and administration route were error-related factors. Interventions focusing on intravenous medicines with complex preparation procedures are needed to improve patient safety.

No conflict of interest.

GRP-058 ESTABLISHMENT OF A PROGRAMME TO DETECT DRUG INTERACTIONS COMPLEMENTARY TO ELECTRONIC PRESCRIPTIONS

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Background Ours is a 110-bed regional hospital with electronic prescribing throughout. The electronic prescription programme offers allergy alert systems and the need for dosage adjustment in renal and hepatic impairment. However, no warning of potential drug interactions is included.
Purpose To establish a drug interaction screening system to complement the electronic prescribing programme.
Materials and Methods Prospective one-year study (Sept 2011–Sept 2012). Computerized drug interaction alerts can improve the safety, quality and efficiency of care processes and reduce the rate of medicines errors, but sending mass alerts can generate what is known as 'alert fatigue'. For this reason we selected those drugs categorised in Micromedex® 2.0 as contraindicated for simultaneous and significant interactions (the interaction can cause death and/or require medical intervention to minimise or avoid serious side effects); drugs classified as D in Lexi-Comp OnlineTM (consider modifying the treatment and X (avoid combination); those classified as clinically important by the Arizona CERT. The interaction was detected by crossing data in Access 2003 with the pharmacotherapeutic profile of patients obtained in the electronic prescribing programme (eOsabide) and a proprietary database which contains a total of 3,133 pairs of interactions.

The report was written in the patient's medical history (Osabide-Global) and acceptance was verified in 24–48 hours.
Results We detected a total of 1996 interactions and 25% of them were reported, 27% of which led to changes in medical treatment. The main cause of non-notification (36%) was that one drug was prescribed if needed.
Conclusions The project was very well accepted among medical professionals and has improved the quality of prescribing. The biggest drawback is the delay in detecting the interaction; it would be helpful if the system generated the warning at the time of prescription.

No conflict of interest.

GRP-059 ETHANOL CONTENT IN CHEMOTHERAPY

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Background Ethanol is used as an excipient to enhance the solubility of substances partially soluble in water. For this reason, gemcitabine and paclitaxel, when supplied as an injection concentrate instead of lyophilized powder for reconstitution, contain large amounts of ethanol.

The Spanish Pharmaceutical Association warns that quantities above 3 g/dose could affect the ability to drive and use machines and interfere with the effects of other drugs.

Chemotherapy Compounding Units pharmacists consider already diluted vials easier to handle and are more willing to use them than vials with lyophilized powder.
Purpose To calculate the average ethanol dose given to oncology patients on gemcitabine and paclitaxel treatment.
Materials and Methods 6-month retrospective study (March–September 2012) of all patients who had received gemcitabine or paclitaxel.

According to the summary of product characteristics, the ethanol content is:

- Gemcitabine (Actavis® 2,000 mg/50 ml): 9.875 mg ethanol/mg drug.
- Paclitaxel (Gp-pharm® 300 mg/50 ml): 65.83 mg ethanol/mg drug.

Total ethanol dose was then calculated for each patient depending on the chemotherapy dose administered, as shown on clinical records.
Results View table.
Conclusions Ethanol given to these patients may be compared to moderate alcohol consumption. This, together with direct infusion into the blood and the short infusion time, makes it more likely

that the ethanol will affect the patient and, thus, deserves attention.

Special caution should be taken with those patients at higher risk (alcoholism, liver disease, epilepsy). Special care should also focus on others drugs the patient may take that might interact with ethanol.

Patients should be advised not to drive or use machines soon after the chemotherapy treatment has been given and to inform the staff of any ethanol-related effect.

When assessing new formulations, pharmacists should also consider the ethanol content apart from the convenience of dilution.

Abstract GRP-059 Table 1

Drug	Patients	Dose (mg)[1]	Administrations[2]	g Ethanol/dose
Gemcitabine	69	1553.8	6.4	15.34(6.91–22.71)
Paclitaxel	63	149.78	6.02	9.86(4.74–28.83)
TOTAL	132			

[1] Medium dose.
[2] Number of administrations/patient.
10 g of ethanol = 1 glass of wine or beer.

No conflict of interest.

GRP-060 EVALUATION OF A PHARMACEUTICAL CARE PROGRAM TO PATIENTS WITH IMPAIRED RENAL FUNCTION

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Background According to EPIRCE study results (Epidemiology of Chronic Kidney Disease in Spain), approximately 11% of the adult Spanish population suffers from some degree of Cronic Kidney Disease (CKD).

Purpose Evaluate a Pharmaceutical Care Program to hospitalised patients with impaired renal function and determine the degree of acceptance.

Materials and Methods Prospective intervention study of 9 months (January–September 2012) at a regional 110 beds hospital. Patients with creatinine clearance (CRCL) < 50 ml/min/1.73 m^2 and a prescribed medication where is needed a CKD adjustment were selected. CRCL was estimated using the Cockroft-Gault equation (60 kg for women and 70 kg for males).

The patients identification was performed using the electronic prescription programme (eOsabide) and the laboratory INFOMEGA application. The data collected in the study were: age, sex, serum creatinine, pharmacotherapy and clinical service profile. The crossing data has been made in Access 2003.

The dose adjustment report's was made in writing in the patient's medical record (Osabide global). At 24–48 hours, the acceptance was evaluated.

Results A total of 618 hospitalised patients were included in the study (16 had a CRCL < 10 ml/min, 342 a CRCL between 10 and 30 ml/min and 309 a CRCL between 30 and 50 ml/min).

899 (14%) of 6.248 prescriptions were considered non-adjusted and were informed (27 were advices and 113 not evaluated because patient's discharge).

Fifty one per cent of the interventions were accepted.

Antibiotics were 26% of the interventions, anticoagulants in 39%, benzodiazepines in 18%, antiemetics in 6% and digitalis in 5%.

Conclusions Pharmaceutical care plays an important role in the drug treatment of patients in renal failure.

The implementation of the project has been well received among clinicians.

No conflict of interest.

GRP-061 EVALUATION OF DOSE RECOVERY FROM TABLET MANIPULATION FOR ENTERAL TUBE ADMINISTRATION

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Background Liquid formulations of medicines are required for administration through enteral feeding tubes (EFTs). Due to the limited availability of liquid medicines, crushing or dispersing tablets is frequently undertaken by nurses, carers and patients using a variety of different methods. The most accurate method of tablet manipulation has not been determined.

Purpose To determine the best method of tablet manipulation through comparison of dose recovery.

Materials and Methods Naproxen was selected as the model drug as no liquid formulations are available. The tablet was prepared using one of 6 methods identified from a previous survey: Dispersion in a syringe, dispersion in a medicine pot, crushed and dispersed using a crushing syringe, crushed and dispersed using a crushing device, crushed and dispersed in a pestle and mortar or crushed using two spoons. The resulting dispersion was flushed via an 8Fr polyurethane EFT (Corpak) into a receiving flask; repeated 6 times for each method. Dose recovery was determined using HPLC. Excel and statistical software was used for data analysis.

Results Tablet dispersion in the barrel of a syringe produced the highest dose recovery. All other methods delivered a dose outside the BP acceptable range of 95–105%. Full results in table 1.

Conclusions Dispersal in the barrel of a syringe did not significantly affect dose recovery. This study demonstrates that methods currently in use may deliver an insufficient dose; further research is required using different medicines and the effect of dispersion particle size on tube blockage.

Abstract GRP-061 Table 1

Method	% dose recovered	SEM	p
Control	100%	0.9	
Dispersal in syringe	98.0%	0.5	0.1493 NS
Crushing syringe	94.5%	1.2	0.0178
Dispersal in medicine pot	90.5%	3.4	0.0982 NS
Pestle and mortar	90.1%	1.5	0.0037
Crushing device	90.1%	2.7	0.0433
Crushing between 2 spoons	88.8%	1.1	0.0003

No conflict of interest.

GRP-062 EVALUATION OF GENTAMICIN THERAPY FOR ELDERLY HOSPITALISED PATIENTS

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Background New guidelines for the use of aminoglycosides were published by French National Health Authority in March 2011 [1]. They recommended 3–5 mg/kg/d for 48–72 h. Before, aminoglycosides doses were reduced in line with the creatinine clearance, which is frequently reduced in elderly patients.

Purpose To determine whether aminoglycoside treatment conformed to the guidelines. If not, the risks are a reduction in antibiotic effectiveness and the development of bacterial resistance among a vulnerable population.

Materials and Methods Elderly patients hospitalised in an acute geriatric unit or in a follow-up and rehabilitative care ward were included in a retrospective study with 2 inclusion periods: 3 months

before and 3 months after the guidelines were issued. Student's t test was used to compare the mean dose and average duration of gentamicin with the guidelines and compare gentamicin treatment before and after the guidelines.

Results 88 patients were included in the study period. Both groups (before/after) were similar in terms of age, weight and creatinine clearance (Cockroft and Gault formula). The main aminoglycoside used was gentamicin (97.7%) (mostly with ceftriaxone). Before the recommendations, the mean gentamicin dose was 2.0 ± 0.7 mg and mean gentamicin duration was 2.4 ± 0.6 days. After the recommendations, the mean dose was 2.2 ± 0.9 mg and mean gentamicin duration was 2.4 ± 1.1 days. After the recommendations: 78% of gentamicin prescriptions were consistent with the recommended duration; 30% of prescriptions followed the recommended dose; the average dose of gentamicin differed significantly from the recommended dose ($p < 0.001$); 24% of gentamicin treatments were consistent with recommendations. Average dose and duration of gentamicin did not significantly differ before and after the publication of the recommendation ($p > 0.05$).

Conclusions Only 24% of geriatric patients have consistent gentamicin treatment. Guidelines did not change doctor's habits about gentamicin. We should now implement a new strategy for informing the medical staff, communication inside the institution and question their knowledge and make representations about kidney damage due to gentamicin. Clinical pharmacy should also be developed in order to help to improve the use of medicines.

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No conflict of interest.

GRP-063 EVALUATION OF INTRAVENOUS IMMUNOGLOBULIN (IVIG) PRESCRIPTIONS IN AN ITALIAN PAEDIATRIC HOSPITAL: AN OVERVIEW OF OFF-LABEL USES

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Background Our paediatric hospital 'G. Salesi' officially follows regional guidelines on the proper use of IVIG. Guidelines aim to improve the management of drug requests during times of shortage and to ensure IVIG supplies for critical situations.

Purpose To evaluate the suitability of IVIG prescriptions for children, to identify 'off-label' uses, to cheque the amounts of drug used.

Materials and Methods Retrospective analysis of prescriptions delivered to the hospital pharmacy from July 2011 to June 2012. IVIG requests were paper forms with 7 licenced directions according to regional guidelines: primary immune-deficiency disorder (PID), myeloma/chronic lymphocytic leukaemia (CLL), idiopathic thrombocytopenic purpura (ITP), Kawasaki disease (KD), Guillain–Barré syndrome (GBS), bone marrow allograft (BMAG) and severe bacterial infectious disease (BID).

Results We examined 154 drug requests for 67 patients admitted to one or more of the following wards: Onco-haematology, Paediatrics, Infectious Diseases Unit, Neonatology, Intensive Care Unit, Paediatric Neuropsychiatry. One patient was also affected by cystic fibrosis (CF).

Onco-haematology was the most demanding ward with 98 prescriptions, 46 patients and 58% (2430 g/4160 g) of dispensed IVIG. The CF patient with ITP received 580 g with 14 prescriptions over 6 months.

Most of the requests had licenced indications (131) classified as follows: BID (68), ITP (26), PID (23), KD (11), GBS (1) and BMAG (1).

Eighteen patients had 23 off-label requests. The main unlicensed uses were thrombocytopenia (6), hypogammaglobulinaemia in acute lymphoblastic leukaemia (5), autoimmune haemolytic anaemia (3), neonatal hyperbilirubinaemia (2) and Rh iso-immunisation (1). Seventeen off-label prescriptions didn't have written clinical certification to support the request. However the request form declared the physician's responsibility and the absolute necessity of IVIG treatment.

Conclusions Despite regional guidelines, off-label use of IVIG is constant in our hospital. Hospital pharmacists should work more closely with clinicians to identify off-label prescriptions without evidence/directions because this drug can be life-saving and it is necessary to keep it available for critical situations.

No conflict of interest.

GRP-064 EVALUATION OF MEDICAL ACCEPTANCE OF PHARMACEUTICAL INTERVENTIONS IN LAVERAN MILITARY HOSPITAL

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Background Laveran Military Hospital (Marseille, France) contains 18 clinical units (300-bed capacity). Every day, pharmacists analyse computerised prescriptions and formulate pharmaceutical interventions (PIs) defined by the French Society of Clinical Pharmacy as "a change in drug treatment initiated by the pharmacist".

Purpose To determine the most common medicines errors and to evaluate the clinical impact of pharmaceutical validation.

Materials and Methods A prospective study included all patients hospitalised in four medical units (internal medicine, pneumology-oncology, tropical and infectious diseases and orthopaedic surgery) from 14 May to 31 August 2012. Doctors were either notified of PIs by phone and/or by clinical staff interventions and/or by electronic notification (by Pharma software). Medical acceptance was defined as changing the prescription. Drug switches or drug discontinuations in case of unavailability in the hospital pharmacy were not included so as not to overestimate the acceptance rate.

Results In 16 weeks, pharmacists analysed 3334 prescriptions, which led to 247 PIs The main problems were overdose (34.4%), inappropriate administration (19.4%), non-conformity or contra-indication (11.7%). The solutions most often suggested by pharmacists were dose adjustment (36.4%), optimization of administration (28.4%) and drug discontinuation (21.6%). The drugs most frequently involved were: antithrombotics (12.1%), antibacterials for systemic use (7.7%) and analgesics (6.1%). During the study period, 58.7% of PIs were accepted by the prescribers. This result depended on the different means of interventions: 81.3% and 72.2% of staff interventions or phone calls were accepted respectively, versus 48.7% for electronic notification. The acceptance rates were comparable to the studies reported in the literature [1].

Conclusions This study shows the superiority of oral notification and encourages a pharmaceutical presence in care units. Later, it would be interesting to identify the causes of non-acceptance, in particular for electronic notification.

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No conflict of interest.

GRP-065 EVALUATION OF OCCUPATIONAL EXPOSURE TO ANTINEOPLASTIC DRUGS IN PHARMACY AND ONCOLOGY DEPARTMENT

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Background Several studies have shown evidence of adverse health effects associated with exposure to antineoplastic drugs. Hospital personnel involved in preparation and administration of antineoplastic drugs may be at risk if exposed to these hazardous pharmaceuticals.
Purpose The purpose of the study was to evaluate the potential exposure to antineoplastic drugs in the pharmacy and oncology departments in a Polish hospital under normal working conditions. The exposure was measured by determining cyclophosphamide (CP) in the urine of pharmacists, physicians and nurses.
Materials and Methods Eight hospital workers were included in the study. Urine samples were collected from 2 pharmacists, 2 physicians and 4 nurses. One pharmacist prepared antineoplastic drugs while the other pharmacist assisted. All four nurses in the oncology department were engaged in the administration of the drugs. The two physicians did not handle the drugs but they came in contact with treated patients. Total 24 h urine was collected in fractions and from each fraction the volume was recorded and used to calculate the total amount of CP excreted over the 24 hr period. Samples were collected with Cyto Urine Kits from Exposure Control Sweden AB. Samples were stored frozen until analysis with GC-MSMS.
Results Over the 24 hr periods, 62 urine samples from 8 hospital workers were collected. CP was detected in 31 urine samples (50%) involving all pharmacists, all physicians and 3 nurses. The total amount of CP excreted per worker ranged from 106 to 500 ng/24 hr. The mean amount of CP excreted per worker on group basis was 234 ng/24 hr (physicians: 343 ng/24 hr, pharmacists: 239 ng/24 hr, nurses: 177 ng/24 hr). The highest amount of CP excreted was found for one physician (500 ng/24 hr) and for one nurse (492 ng/24 hr). The amount of CP excreted in urine from the pharmacist who assisted in preparation (358 ng/24 hr) was higher than from the pharmacist who prepared the chemotherapy infusions (120 ng/24 hr). CP was not detected in the urine samples of one nurse indicating no measurable exposure to CP.
Conclusions The results show that almost all hospital workers tested were exposed to CP. In addition, the study demonstrates the highest exposure of personnel not directly involved in the preparation and administration of antineoplastic drugs. Clearly, more research is needed, but this is sufficient evidence that nurses and physicians involved in the area of cytotoxic administration on the ward can also be exposed to these hazardous drugs.

No conflict of interest.

GRP-066 EVALUATION OF PHARMACEUTICAL CARE ISSUES IN THE ASEPTIC PREPARATION UNIT AT A TERTIARY CARE HOSPITAL: A FOCUS ON CHEMOTHERAPY PRESCRIBING AND PREPARATION

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Background Medicines errors associated with high-risk agents such as chemotherapy drugs may have significant outcomes. At Sultan Qaboos University Hospital (SQUH), the aseptic preparation unit (APU) is responsible for preparing chemotherapy and Total Parenteral Nutrition (TPN) preparations. The number of total chemotherapy orders has doubled over the past two years. Due to increased consumption, cost and complexity of regimes, it is important to for a chemotherapy-verifying pharmacist (CVP) to cheque all chemotherapy prescriptions prior to preparation.
Purpose The aim of the study was to describe and evaluate pharmaceutical care interventions, focusing on chemotherapy prescribing and preparation at SQUH.
Materials and Methods This retrospective descriptive study was based in the APU of SQUH. It covered a total time frame of February 2011 to March 2012, which was divided into two periods of 7 months of pre- and post-CVP involvement. The interventions were evaluated for type and cost.
Results During the study, 159 interventions were documented. Monthly interventions increased from 3 to 16 after the involvement of a CVP. Drug dosing (75%) was the most frequent intervention in the drug regimen category (59.7%). Interventions in drug selection (34.6%) included addition (25%) and deletion (27%) of drugs. Around 50% of the interventions avoided toxicity and 35% improved efficacy. The financial impact of CVP interventions was evaluated in 59 interventions (37%). The total cost saved from the 59 interventions was Omani R.O. 18,114 (€36,478). Methotrexate (12.5%) was the drug with most frequent interventions. The expensive drug with most frequent interventions was pegylated asparaginase (4.5%).
Conclusions Chemotherapy verification prior to preparation has been demonstrated to improve safety and efficacy and decrease health care costs. A clinical pharmacist's participation in chemotherapy preparation and prescribing is essential, in order to provide quality care.

No conflict of interest.

GRP-067 EVALUATION OF PROFESSIONAL PRACTISE ON DRUGS PRESCRIPTIONS IN A GERIATRIC UNIT: HOW TO IMPROVE THEM?

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Background Elderly patients suffering from many diseases and disorders are more likely to have multiple prescriptions. These multiple prescriptions could result in drug toxicity, reduce compliance and cost a lot.
Purpose Following the French health agency recommendations, we evaluated professional practise on drug prescriptions for very old inpatients of a university hospital.
Materials and Methods All prescriptions of 60 consecutive patients aged over 80 years admitted between November and December 2010 to the geriatric unit (35 beds) were evaluated following a grid. This grid contained 18 items divided into 4 themes:

- organisation of the prescriptions, drug schedule and dosage
- patients' weight
- number and type of drugs (psychotropic drugs for instance), presence of contra-indications
- biological adaptations

Results Median age was about 88 years (range: 80–96) and 70% of patients were women. The median number of drugs on the 60 prescriptions was 8 (range = 1–12). All prescriptions presented data on dosage and the drug schedule. Drugs were classified by therapeutic category on only one prescription. Half of the prescriptions specified the patients' weight. More than 80% of prescriptions had more than 5 drugs without redundancy concerning psychotropic drugs and non-steroidal anti-inflammatory agents. Four contra-indications were noticed among all prescriptions evaluated. All biological adaptations were followed.

Conclusions In conclusion, we notice a good level of quality concerning prescriptions in this geriatric unit where software-assisted prescribing with pharmaceutical analysis has been effective since 2009. This software does not allow physicians to organise prescriptions by disease area. Concerning the patients' weight, senior clinicians will inform junior clinicians of its importance in the patients' file and prescription. Another evaluation will be scheduled to analyse the link between the number of drugs and the number of diseases. The final aim is to reduce the number of drugs in order to avoid drug-related adverse events.

No conflict of interest.

GRP-068 EVALUATION OF SPECTRAL SPECIFICITY OF TAXANES FOR THE ON-LINE ANALYTICAL CONTROL OF HOSPITAL CHEMOTHERAPY PRODUCTION

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Background On-line control of chemotherapy production is used for 27 molecules at European Georges Pompidou Hospital which corresponds to 70% of the production. Flow injection analysis (FIA) constitutes the optimal method under ultra-violet spectral data identification. If the spectra are similar, the retention time after chromatographic separation has to be used for identification. The FIA spectral differences of taxanes (docetaxel, paclitaxel, cabazitaxel) are too poor for identification.
Purpose The aim of this study was to develop an ultra-fast high performance liquid chromatographic technique for on-line analytical checking of taxane preparations.
Materials and Methods Docetaxel (Sanofi-Aventis), paclitaxel (Hospira) and cabazitaxel (Sanofi-Aventis) were prepared in sodium chloride 0.9% solution. Chromatography was performed using Prostar Varian chromatographic equipment with a Photodiode Array Detector. All the separation was done with a Polaris C18 precolumn (3 µm, 10 mm × 2 mm). The mobile phase was ultra-pure water/acetonitrile (60–40 v/v). Taxanes were eluted at the flow rate of 1.2 $mL.min^{-1}$.
Results Paclitaxel spectra obtained after chromatographic separation differ significantly from those of cabazitaxel and docetaxel, which are very similar. So the latter have to be identified by their retention time: 0.7 min for cabazitaxel and 0.4 min for docetaxel with a resolution of 1.7. Paclitaxel retention time was 0.39 with a resolution of 0.11 with docetaxel. The linear range corresponds to the therapeutic concentrations. The 3 methods were linear ($R > 0.995$) with intra-day precision from 0.27% to 2.68% and inter-day precision from 0.95% to 3.7%.
Conclusions Ultra-fast chromatographic separation methods have been successfully developed for the identification and quantification of 3 different taxane molecules. Less than 1 min is needed when spectral and retention data are combined as the main parameters.

No conflict of interest.

GRP-069 EVALUATION OF THE CLINICAL IMPACT OF MEDICINES RECONCILIATION IN THE COMPIËGNE HOSPITAL CENTRE AFTER ONE YEAR OF EXPERIENCE

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Background The literature shows that there are errors in the drug treatment in 30% of patients at hospital admission. These medicines errors (MEs) may be continued throughout hospitalisation and can cause the patient adverse effects.

To reduce MEs and thus improve patient safety, the Compiègne Hospital Centre (HCC) has established a practise of medicines reconciliation (MR) since July 2011. Any unintentional discrepancies (UIDs) detected between the home treatment and the hospital treatment during MR are discussed and corrected with physicians to ensure continuity of the patient's medicines.
Purpose After one year of experience, the objective was to evaluate the clinical impact of our interventions on patient safety.
Materials and Methods Patients older than 65 years, hospitalised in Geriatrics and Cardiology after admission by the emergency department, were eligible for MR.

To evaluate the clinical impact of MR, we assessed the potential aftermath of uncorrected UIDs on patient safety. To do this, any UIDs detected and corrected were classified into two groups:

- those with a high potential clinical impact: potentially life-threatening, that increase the length of hospitalisation and/or decompensation/aggravation of an existing disease.
- those with a low potential clinical impact.

Results 485 patients have benefited from MR, 30% of whom had a ME in their hospital prescription. Average age of patients: 84.6 years ±7.8. Sex ratio M/F: 0.67.

259 UIDs were detected of which 101 (39%) were classified as having a high potential clinical impact. This demonstrates the importance of MR for the safety of patients at their admission.
Conclusions After one year of MR in HCC, the results were positive.

The results on the clinical impact of our intervention were very encouraging and demonstrated the importance of continuing and developing medicines reconciliation. Our experience confirms the benefit of a pharmaceutical presence in the care units to improve patient safety.

No conflict of interest.

GRP-070 EVALUATION OF THE EFFECT ON PATIENT SAFETY OF A NEW LABEL DESIGN FOR MEDICINAL PRODUCTS

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Background In Denmark some of the medicinal products for hospitals are produced by the hospital pharmacies and registered by Amgros (SAD products). In 2007 the Danish Society for Patient Safety, Amgros, and the private foundation TrygFonden organised a design competition with the purpose of improving patient safety in label design. The winner "Medilabel Safety System" was designed by e-Types and incorporated 9 design features. The new labels were implemented in 2008.
Purpose To evaluate the effects of the new label design on patient safety.
Materials and Methods Reports of medication errors related to SAD products before and after the introduction of the new design (2007 and 2010) were compared. Medication errors were obtained from the Danish Patient Safety Database (DPSD).

In another study patient simulation and a sorting exercise were used to evaluate the effects of the new design. 11 physicians and 9 nurses participated.
Results In 2007 and 2010 a total of 6781 and 10188 medication errors were reported to DPSD. Of these, 85 (2007) and 80 (2010) dispensing errors could be related to misinterpretation of the SAD label. Thus, while no overall effect on the number of errors related

to SAD products could be observed, the relative decrease could indicate a positive effect.

The simulation study indicated that specific design features such as yellow background colour, Tall Man lettering and consistent design improved safety in the medication process. However, the new label design is complex implying a potential for misinterpretation of the features if the users are not familiar with the design.

Conclusions The effect of the new design depends on several factors such as the user's knowledge of the design, the complexity of the design and the context of use. Errors related to misinterpretation of labels remains a problem and research into good label design remains a relevant topic.

No conflict of interest.

GRP-071 EVALUATION OF THE PRESCRIPTION OF INTRAVENOUS NON-STEROIDAL ANTI-INFLAMMATORY DRUGS COMPARED TO THE RECOMMENDATIONS OF THE SUMMARY OF PRODUCT CHARACTERISTICS

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Background Acute renal failure is a side effect of NSAIDs.

Purpose To assess the appropriateness of the intravenous prescription of dexketoprofen according to the dosage specifications depending on renal function following the recommendations of the Summary of Product Characteristics.

Materials and Methods An observational, retrospective study that analysed dexketoprofen prescriptions in surgical patients admitted to a tertiary hospital from January-September 2011. The estimated glomerular filtration rate (eGF) was calculated by the CKD-EPI formula, of reference in the hospital.

The Summary of Product Characteristics advises using the following posology for dexketoprofen:

- 150 mg maximum daily dose for a maximum duration of 48 hours.
- In patients with renal impairment:
  - GF < 50 mL/min: administration contraindicated
  - GF 50–80 mL/min: 25 mg/12 h. Maximum: 50 mg daily.
  - GF > 80 mL/min: No dosage adjustment required.

Results Prescriptions from 1946 patients were analysed. Of the patients, 54.3% were male and 45.7% female, with a mean age of 59.8 years (17–103). The mean serum creatinine levels were 0.84 mg/dL ± 0.43 and the mean eGF from the CKD-EPI calculation was 83.05 ± 26.17 mL/min/1.73m^2.

In 58% of the admissions the drug was not prescribed correctly. Of these:

- 270 patients were prescribed dexketoprofen when the eFG was less than 50 mL/min/1.73m^2;
- 550 of them had an unadjusted prescription with an eFG 50–80 mL/min/1.73m^2.
- 370 patients with an eGF > 80 mL/min/1.73 m^2 were prescribed NSAIDs for longer than 48 h.

Conclusions 58% of the intravenous NSAID prescriptions did not conform to the SPC recommendations. Due to this fact and in order to prevent renal toxicity it is recommended:

1. To establish protocols for pain management during hospitalisation to limit the duration of these drugs to 48 hours and adjust the dose to the patient's renal function.
2. To enhance the proactive role of the pharmacist in individualised patient monitoring.

No conflict of interest.

GRP-072 EXPOSURE TO ANTINEOPLASTIC AGENTS IN ONCOLOGY DEPARTMENTS: PRACTISE SURVEY AND INFORMATION TO THE PERSONNEL OF THREE ONCOLOGY DEPARTMENTS

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Background The exposure of pharmacy technicians to antineoplastic agents (AAs) has been widely studied, but less is known about risks of exposure and awareness of nurses, nursing auxiliaries and cleaning personnel.

Purpose To evaluate the practise and the awareness of oncology nurses (ONs), nursing auxiliaries (NAs) and cleaning personnel (CP) concerning exposure to AA.

Materials and Methods Three questionnaires were distributed to ONs, NAs and CP in three oncology wards including one paediatric ward. Participants were asked 10, 11 and 12 questions respectively about their practises and awareness of exposure to AAs.

Results For ONs (n = 38), gloves are more often worn when manipulating syringes than when manipulating infusion bags (60.5% vs. 36.8%, $p < 0.05$). 26.3% considered themselves well informed but 97.4% thought information could be improved. 81.6% of ONs suspected that AAs had teratogenic effects and 10.5% of them thought that AAs did not have mid- or long-term toxic effects. For NAs (n = 14), wearing gloves while washing patients or eliminating excreta was more frequent than mask wearing (64.3% vs. 5.3%). 28.6% considered themselves well informed but 92.9% thought information could be improved. 85.7% of NAs suspected that AAs had teratogenic effects and 14.3% of them thought that AAs did not have mid- or long-term toxic effects. For CP (n = 10), 62.5% wore gloves for bed making and 80.0% for sanitation cleaning. All of them considered themselves not sufficiently informed and 90.0% thought that AAs had teratogenic effects whereas 10% of them thought that AAs did not have mid- or long-term toxic effects. All (n = 62) reported routine use of water and soap (46.8%) or hydro-alcoholic solution (25.8%) after a potential exposure to AAs.

Conclusions Lack of information suggested the necessity of informing the nursing and cleaning personnel on the oncology ward in some fields. A teaching session was arranged by department.

No conflict of interest.

GRP-073 FAILURE MODE AND EFFECT ANALYSIS IN IMPROVING THE SAFETY OF THE CHEMOTHERAPY PROCESS

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Background Medication errors in chemotherapy have a high potential to cause harm. Errors may occur during different steps of the medication process.

Failure Mode and Effect Analysis (FMEA) is a proactive risk assessment method that enables potential risks to be identified and prioritises actions to improve safety.

Purpose To apply FMEA methodology to the chemotherapy process: prescribing, pharmaceutical validation, compounding and dispensing.

Materials and Methods Prospective study, in a tertiary level hospital, using the FMEA technique developed by the Veterans Affairs Healthcare System for the chemotherapy process. An interdisciplinary working group was created and meetings held over three months. Processes and subprocesses were described; potential failure modes and possible causes were identified. Main sources used were brainstorming and cause-effect-diagramming. For each failure

mode, a Hazard Score (HS) was calculated by multiplying the probability of occurrence (Remote = 1, Uncommon = 2, Occasional = 3, Frequent = 4) and severity of effect (Minor = 1, Moderate = 2, Major = 3, Catastrophic = 4).If HS>=8, corrective actions were proposed. If HS < 8, failure mode was evaluated based on: lack of detection, criticality and absence of effective control measures. All data were collected in a validated worksheet.

Results A flow diagram was obtained. Twenty-seven failure modes were identified, and twenty had a HS>=8. Failure modes with the highest HS were: wrong dose calculation and wrong protocol (Prescribing); incorrect production protocol in the computer system and non-detection of wrong dose calculation (Pharmaceutical validation); wrong medicine is chosen, incorrect volume of drug added to diluent and labelling error (Compounding); Delivered to wrong nursing unit or patient (Dispensing). Corrective actions proposed were: policy of weighing patient for proper dose calculation, chemotherapy database updated, double checking, gravimetric control on prepared chemotherapy, procedures for proper patient identification (barcode identification system or radiofrequency dispensing system).

Conclusions FMEA contributes to the development of a very clear and shared vision of the chemotherapy process, taking into account different perspectives: oncologist, pharmacist, technician and nurse.

FMEA is a useful tool for identifying critical parts of the chemotherapy process, prioritising corrective actions, minimising potential risks and improving the quality and safety of patient care.

No conflict of interest.

GRP-074 FREQUENCY OF VALPROIC ACID-INDUCED HYPERAMMONEMIA IN ADULT PSYCHIATRIC SETTINGS

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Background Valproic acid (VPA) is widely prescribed by paediatric neurologists as an antiepileptic drug. VPA-induced hyperammonaemia can lead to encephalopathy and coma; it is well documented among the paediatric population. Severe urea cycle enzyme deficiencies are often revealed in early youth when VPA is administered. Such mild genetic deficiencies can remain unnoticed until adulthood and be discovered if VPA is taken for bipolar disorder.

Purpose To evaluate the frequency of VPA-induced hyperammonaemia in adult psychiatric settings and to sensitise the medical community to a potentially severe adverse effect of a widely-prescribed drug.

Materials and Methods The study was carried out a two-week period in a psychiatric hospital. It included every full-time hospitalised patient treated with VPA for at least 4 days (corresponding to 5 drug half-lives). Ammonia and VPA blood measurements were performed once and an electroencephalogram when ammonia exceeded 70 µM (normal range: 10 to 35 µM). Ethics committee approval was obtained before starting the study.

Results 122 patients were included in this study. 68 patients (55.8%) presented ammonia blood levels exceeding 35 µM and 4 of them (3.3%) exceeded 70 µM. One patient reached 118 µM one week after VPA initiation. No encephalographic abnormalities were observed. No correlation was found between ammonia and total VPA levels. Different oral forms of VPA were used and this study showed that they affected VPA blood levels.

Conclusions VPA-induced hyperammonaemia is a frequent, generally well-tolerated, adverse effect. Ammonia blood level monitoring combined with clinical monitoring are essential to avoid hyperammaonemic encephalopathy. Communication within the hospital led to the medical community becoming aware of the problem and new monitoring recommendations were defined including initial ammonia level measurement after VPA initiation and biannual monitoring of this biological parameter. Total VPA level determination doesn't seem to be useful for predicting hyperammonaemia whereas the importance of measuring the free VPA has recently been highlighted.

No conflict of interest.

GRP-075 GASTROPROTECTION WITH NON-STEROIDAL ANTI-INFLAMMATORY DRUGS AT HOSPITAL DISCHARGE: DO WE FOLLOW LOCAL GUIDELINES?

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Background Studies have shown overuse of proton pump inhibitors (PPIs) that does not meet accepted criteria.

Purpose The aim of this study was to determine the prevalence and appropriateness of gastroprotection with PPIs in patients who were prescribed non-steroidal anti-inflammatory drugs (NSAIDs) at tertiary level hospital discharge.

Materials and Methods Data for this retrospective study were obtained from the pharmacy claims database 1–31 January 2012.

We identified patients under 65 years with a concomitant PPI and NSAID and who were not taking antiplatelet drugs, anticoagulants or steroids and revised the discharge report; we considered gastroprotection appropriate if it contained a history of ulcer disease, bleeding or gastroduodenal perforation or comorbidity or treatment indicated at the time of admission.

Results During January 2012 a total of 1776 patients were dispensed at least one prescription medicine at discharge.

388 patients were dispensed an NSAID and PPI, of whom 144 also received antiplatelet treatment, anticoagulants or steroids and for whom therefore gastroprotection was recommended. We analysed the age of the 244 remaining patients. 76 of them were ≥65 years and then we also considered PPI gastroprotection appropriate. We reviewed the discharge report of the remaining 168 patients who were under 65. The result of this analysis showed that 133 patients did not fit criteria for PPI use (34.3% of patients receiving NSAIDs and PPIs); gastroprotection was correct in 27 patients and the discharge report was not recovered in 8 patients (2.1%).

Conclusions In this retrospective study, 63.6% of patients who were dispensed NSAIDs at discharge received appropriate PPI gastroprotection and 34.3% of patients received an unnecessary PPI prescription (79.2% of patients under 65).

Patient prescription at hospital discharge should be reviewed to prevent overuse of proton pump inhibitors, especially in patients under 65 years of age.

No conflict of interest.

GRP-076 GASTROPROTECTIVE AGENTS IN THE EMERGENCY ROOM OF A TERTIARY-LEVEL HOSPITAL

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Background Gastroprotective agents are widely used in both hospital and community settings, and they are generally perceived as safe drugs.

Purpose To find out whether the prescription of anti-ulcer drugs in the Emergency Room (ER) accords with their approved indications, and the financial impact of their inappropriate use.

Materials and Methods Indications for use of proton pump inhibitors (PPIs) and H2 antagonists (via the Spanish Medicines

Agency): gastro-duodenal ulcers (including NSAIDs and steroid-related ulcers), reflux oesophagitis, Zollinger-Ellison's syndrome, and Helicobacter pylori eradication. Inclusion criteria: patients >65 years old on at least four home medicines and an anti-ulcer prescription in the ER. Pharmaceutical interventions were recorded and their degree of acceptance calculated. The cost resulting from drug misuse was calculated considering a mean stay in the unit of one day.

Results 111 patients, 70.2% male, median age 78.9 years-old [65–94]. 94.6% of patients (92.9% PPI, 1.7% H2 antagonists) received one of these agents upon presentation (95.5% of them were prescribed de novo), with intravenous pantoprazole the agent mainly involved (82% of cases). 29.7% of prescriptions did not meet the indications, while this percentage decreased to 12.5% upon ward admission. The pharmaceutical interventions were accepted in 16.2% of cases. Monthly, the estimated cost of the off-label use was €1850.

Conclusions Gastro-protection in the ER did not meet the criteria in nearly 1/3 of patients. This contrasted with the poor acceptance of the pharmaceutical recommendations of discontinuation. The rationale might be the so-perceived harmless profile of these drugs with the short-term use. The rate of off-label prescriptions dropped to half upon ward admission, likely due to thorough revision by the prescriber. Since only patients at a higher risk of suffering from a medicines-related problem were included, the cost resulting from the misuse of anti-ulcer drugs was probably underestimated. In conclusion, forthcoming pharmacy policies should focus on improving the adherence to the indications of both widely-used and expensive drugs, given their financial and health-care impact.

No conflict of interest.

GRP-077 GENERIC MYCOPHENOLATE MOFETIL IN HEART TRANSPLANT RECIPIENTS: IMPLEMENTATION OF ACTIVE PHARMACOVIGILANCE

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Background Immunossupressant drugs have an important role in the prophylaxis of transplant rejection, so they are considered 'critical dose drugs'. Use of a generic immunosuppressant represents a significant cost savings to the medical system. Since safety data for new medicines are always limited, post-marketing surveillance is essential to determine medicines' safety in real life use. With the introduction of generic mycophenolate mofetil (MMF) in CHLO, EPE–HSC, the pharmaceutical services (PHS) have implemented an MMF active pharmacovigilance programme (APP) for HT recipients.

Purpose To describe and quantify suspected adverse drug reactions (ADRs) identified with an APP implemented by the PHS.

Materials and Methods Between 11/2011 and 09/2012, all adult HT recipients who switched from innovator to the generic MMF were included in the MMF APP. This substitution was made under medical supervision and the pharmacist provided the patients with all necessary explanations. Subsequent pharmaceutical assessment was done with a questionnaire (in person or telephone), which identified demographic data, concomitant treatment and suspected ADRs.

Results 55 patients were included in the MMF APP, 78% male, average age 55 ± 13 [22–76] years. 14 patients (25%) reported ADRs at MMF switch. These patients had not experienced ADRs with the innovator drug. The most common ADRs identified were diarrhoea (25%), stomach ache (12.5%) and asthenia (12.5%). All ADRs notifications were reported to the Portuguese National Pharmacovigilance Unit.

Conclusions Most suspected ADRs identified corresponded to MMF's profile ADRs described in the summary of product characteristics. The switch to generic from innovator drug should have a surveillance strategy that includes medical monitoring, patient education and the contribution of all health professionals involved in the patient immunosuppressant regimen in order to create a system that allows adverse reactions to be detected, with the ultimate goal of maximising benefit and minimising risk by promoting safer use of medicines.

No conflict of interest.

GRP-078 GUIDELINE FOR ALBUMIN USE: EFFECT ON COST SAVING

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Background Albumin has been widely used in clinical practise. While some of these indications are supported by the results of randomised studies, others are based only on clinical experience and have not been proved in prospective studies. Efforts should be made to define the indications for albumin use, so that patients gain the maximum benefit from its administration.

Purpose To evaluate the cost saving obtained by the implementation of a guideline for albumin use in a 737-bed hospital.

Materials and Methods Retrospective study that compared albumin use in two periods: July–September 2012 vs. July–September 2011. In June 2012 the guideline for albumin use was distributed to the medical staff. Physicians were requested to complete a form for each albumin order indicating the type and amount of albumin, the clinical service, and the indication for use. Albumin use data and costs were obtained from pharmacy service management system (SAP®) and were tabulated using the Excel® software.

Results The total amount of albumin ordered during the study period was 29.360 g (€63,246) vs. 53.195 g (€108,617) for the same period during 2011, which means a reduction of 45%. In terms of cost, the saving obtained amounted to €45,371 (58%). The albumin use by specialty had also changed; a major decrease in use of albumin was observed for Anaesthesiology 4,000 g (75%), General Surgery 3,080 g (65%), Nephrology 4,900 g (64%), Internal Medicine 3,860 g (56%), Haematology 1,410 g (53%) and Digestive 1,400 g (30%). On the other hand, Haemodialysis significantly increased its use of albumin to 2,805 g (65%), although within the approved indication of plasmapheresis.

Conclusions An albumin use guideline with restrictions focused on albumin prescriptions had suficient efficacy to reduce consumption and save cost. In our hospital guideline the cost of implementation decreased a 58% (€181,484 per year).

No conflict of interest.

GRP-079 GUIDELINES FOR CHEMOTHERAPY EXTRAVASATION

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Background The administration of intravenous cytotoxic drugs plays a key role in cancer treatment and due to the overall increase in intravenous chemotherapy there has been an increasing incidence of chemotherapy extravasation. Therefore, it is advisable to have updated guidelines that direct the treatment of intravenous cytotoxics extravasation.

Purpose To develop guidelines for the treatment of cytotoxic extravasation, which contained the management algorithms,

antidotes and treatments that should be performed, as well as risk factors and strategies to prevent extravasation.
Materials and Methods A literature review was performed, through research and analysis of guidelines and articles obtained from PubMed since January/2000 to September/2012, intersecting the terms 'cytotoxic extravasation', 'chemotherapy extravasation' and 'extravasation treatment'. The summary of product characteristics of all of intravenous cytotoxics available in Portugal was also reviewed. Some holders of market authorization were also contacted whenever we considered additional information was required.
Results A total of 42 intravenous antineoplastics available in Portugal were analysed, distributed as follows based on tissue injury after extravasation: 16 vesicant products, 16 irritants and 10 neutral products. A summary table was created with the risk factors (e.g., vesicant drugs, higher drug concentrations, previous vinca alkaloids, elderly, impaired sensory perception, generalised vascular disease) and measures that prevent extravasation (e.g. ensure that the IV site can be clearly visualised, do not use a butterfly needle with a vesicant drug). Nine individual algorithms were developed, according to the latest guidelines, which guide the work of healthcare professionals in case of extravasation (e.g., measures for immediate treatment, applying heat/cold, recommended antidote and instructions for its use). A list was drawn up with all cytotoxics, each being identified with a colour, which corresponded to the colour of the separator with the algorithm to treat its extravasation. An extravasation kit was also designed and a model for document the appropriate recording of extravasation and clinical monitoring of the patient.
Conclusions The guidelines developed are a valuable tool for all hospital services that prepare and administer injectable chemotherapy, contributing to responding quickly and effectively to episodes of extravasation.

No conflict of interest.

GRP-080 HAEMATOLOGICAL TOXICITY SECONDARY TO TREATMENT WITH DIAZOXIDE: A CASE REPORT

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Background Hyperinsulinism is a rare cause of persistent hypoglycaemia in the neonatal period. Tolerance of diazoxide is usually excellent.
Purpose To describe a case of normocytic anaemia secondary to treatment with diazoxide in an infant diagnosed with congenital hyperinsulinism.
Materials and Methods A retrospective review of medical records from admission in February 2012 to the current situation and a PubMed search of possible cases of this adverse effect.

The patient was a 17-day-old infant who was treated with diazoxide (maximum dose 25 mg/kg/day) with good response, allowing the progressive discontinuation of the IV glucose and glycaemia control. The patient was started at a dose of 45 mg/day which has been increased to the current dose of 140 mg/day to encourage weight gain.
Results Normocytic and normochromic anaemia gradually because established with tachycardia (decrease in Hb from 14 mg/dl to 8.7 mg/dL in 15 days), which was thought to be associated with diazoxide, as the other parameters were within normal ranges (echocardiography, thyroid function, iron deficiency study).

The haematological toxicity of diazoxide to be usually thought to be neutropenia and thrombocytopenia although anaemia is rarely described. This reaction was notified by the yellow card scheme to the regional pharmacovigilance system. An evolutionary anaemia study was carried out and monitored by transfusions of packed erythrocytes.
Results Hematologic toxicity is thought to be dose dependent and indicates withdrawal of the drug. After a benefit/risk review, the patient is currently still on diazoxide, although other possible treatment options were raised.

After a search in PubMed, we found a single case of anaemia and febrile neutropenia secondary to treatment with diazoxide in an adolescent with hyperinsulinism which was resolved after withdrawal of the drug. This adverse effect may be considered odd.

The importance of Pharmacy Services and other health professionals in reporting adverse reactions is appreciated for the safe use of drugs.

No conflict of interest.

GRP-081 HEALTH INFORMATION TECHNOLOGY AND STRESSORS: HOW TO MEASURE AND ELIMINATE THEM

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Background The daily tasks of hospital personnel are regularly interrupted. Unexpected breaks in work patterns act as supplementary cognitive burdens on health workers (hence the term stressors) and can lead to errors because they break up the logical flow of clinical tasks.
Purpose To examine whether the introduction of Health Information Technology (HIT) (CytoAdmin – a scanning system for matching patients to their chemotherapy treatment protocols) to a cancer outpatient unit had any immediate effect on stressors, with the broader aim of then reducing their types and frequency.
Materials and Methods Based on techniques drawn from the field of Human Factors and Ergonomics (HF&E) [1], we established a protocol for carrying out ergonomic evaluation and measuring stressors. The System Engineering Initiative for Patient Safety model was our guiding principle [2]. The protocol covered all tasks in the unit and included field observations, listing stressors (number, type) observed during the introduction of the HIT, and suggesting process redesign methodologies.
Results During the first 6 days of CytoAdmin's introduction, we carried out 31½ hours of observation of stressors and identified 89 different types (2.7 stressors/hour). The HIT itself generated 21 new stressors (24% of the total). Amongst these were the insufficient number of computers needed to complete tasks, technical hardware problems and the inclusion of scanning in a well-established daily care routine. Ergonomic redesign of workflows allowed us to neutralise all new stressors. Other major stressors were telephone calls (13 types of stressors, 15%), followed by consulting a physician (9 types, 10%).
Conclusions The introduction of this HIT increased the number of stressors by creating new ones. The HF&E system developed was efficient at detecting new stressors, redesigning the process and eliminating them. Although these methodologies are time-consuming, ergonomic evaluations are essential for the satisfactory and safe use of newly-introduced HIT.
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No conflict of interest.

GRP-082 HOSPITAL PHARMACIST INTERVENTIONS IN PATIENTS WITH ENTERAL NUTRITION FEEDING TUBES

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Background Patients receiving enteral nutrition (EN) suffer several kinds of complications such as gastrointestinal disorders, lung aspiration, tube dislodgement, tube clogging, hyperglycaemia and electrolytic alterations. The pharmacist's key role is to ensure the best nutrition and to solve and prevent problems related to drug administration by this route.
Purpose To analyse hospital pharmacist interventions (HPIs) in patients fed with EN through feeding tubes.
Materials and Methods Prospective study from 1 July 2011 to 30 June 2012 in a 350-bed hospital. Twice a week a hospital pharmacist monitored patients fed through feeding tubes. HPIs were classified in four types: Type 1: EN formula recommendation (to increase nutritional support, to recommend another kind of formula, to modify the regimen); Type 2: to recommend flushing feeding tubes with water; Type 3: to suggest replacing PVC nasogastric tubes (NTs) with silicone NTs; Type 4: to adjust pharmacotherapy (EN-drug interactions and drug incompatibilities). The pharmacist reported all HPIs to physicians.
Results A total of 132 patients were monitored, with 94 HPIs: Type 1: 45 (47.9%) (37 (82.3%) to increase nutritional input, 2 (4.4%) regimen modification and 6 (13.3%) new formula recommendations), Type 2: 11 (11.7%); Type 3: 3 (3.2%); Type 4: 35 (37.2%) (12 (34.3%) substitutions of omeprazole capsules for omeprazole oral solution, 10 (28.6%) lactulose for lactitol, 9 (25.7%) delayed-release tablets for immediate-release tablets, 4 (11.4%) others).
Conclusions HPIs contributed to improved pharmacotherapy and suitability of the EN formula in most of the patients with feeding tubes. Designing an EN multidisciplinary care plan improves patients' treatment and health outcomes.

No conflict of interest.

GRP-083 HOSPITAL PHARMACISTS CAN IMPROVE PHARMACOVIGILANCE IN THE EMERGENCY ROOM

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Background Hospital pharmacists can play an important role in reporting adverse drug reaction (ADRs). Several publications underscore the fact that adverse drug events account for a substantial percentage of all hospital admissions. In the literature, several ways are mentioned in which the pharmacist can contribute to the safe use of drugs.
Purpose To establish ADRs in the Emergency Room (ER).
Materials and Methods This study was conducted from April 2010 to December 2011 in Salerno University Hospital. ADR report forms completed in the first 20 months of the project were analysed. Some of their key principles were collected: sex; suspected drug that caused the reaction and other drugs taken in association; description of ADRs and their classification as non-severe, severe or life-threatening. They were compared with ADR data for 2009.
Results 158 forms were analysed, each related to one different patient: 98 patients were women (68%). 50% of the events were connected with antibiotics, e.g. amoxicillin/clavulanic acid (28 cases), penicillin (19 cases), cephalosporins (17 cases); 35% concerned anti-inflammatories such as nimesulide (21%), propionic acid derivatives (21%), acetylsalicylic acid (14%), ketorolac (11%), steroidal anti-inflammatories (7%). 103 patients didn't take other drugs, but 55 had taken another one. Skin reactions were 52% of events, while 14% were cardiovascular events, 13% gastrointestinal problems, and 8% were respiratory reactions. Non-severe ADRs were 75%; 25% were severe and 1 case life-threatening. Before the project, in 2009 only one ADR had been reported; zero reports in the period January–March 2010.
Conclusions It is evident that the presence of a hospital pharmacist in ER increases the number of ADR reports: data confirms that a pharmacist who supports medical staff in reporting ADRs should be operative in all hospital departments.

No conflict of interest.

GRP-084 HOW HAS THE INTRODUCTION OF NEW DRUG CHARTS AFFECTED PRESCRIBING DOCUMENTATION?

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Background University Hospitals Bristol (UHBristol) have standards for safe and professional prescribing [1]. The standards include prescriber accountability and informed clinical decision making by awareness of drug chart(s) in use and any medicine(s) not given. In 2011 the Medical, Pharmaceutical and Nursing Colleges produced standards for hospital in-patient prescription charts aimed to help eliminate prescribing errors and improve patient outcomes [2]. The standards correlate with the UHBristol standards.
Timeline Initial audit *February 2010*. New prescription chart was released in July 2010 and re-audited in *September 2010*. Revised chart was released July 2011 and re-audited in *January 2012*.
Directing Change The audit results and the NHS Institute for Innovation and Improvement Plan, Do, Study, Act (PDSA) [3] tool informed each chart change. The strategy was co-ordinated by pharmacy, with input from the healthcare team.
Purpose To establish achievement of the prescribing standards below within in-patient medical wards at UHBristol.

Prescriber identity: 100% of prescribers should print their name
Prescriber contact: 100% of prescribers should print their bleep number
Additional chart(s): 100% of additional prescription charts(s) will be documented on main prescription chart
Missed doses: 100% of medicines that are not given will have a documented reason

Materials and Methods Data collection proforma was designed, piloted and used for each audit cycle. Ten in-patient prescription charts from each ward were reviewed.
Results The table states the achievement of the standards with each cycle. The last column indicates the change between the first and last audit.
Conclusions Each revision of the prescription chart produced improvements in achievement of the standards. The audit cycle, PDSA and multidisciplinary approach informed changes and enhanced the charts' fitness for purpose.
References

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Abstract GRP-084 Table 1

Prescriptions reviewed		Initial audit February 2010 384	Re-audit September 2010 387	Re-audit January 2012 387	Change
Standard	**Target**				
Prescriber identity	100%	18.4%	95.2%	98%	***+76.6%***
Prescriber contact	100%	7.8%	77.9%	84%	***+76.2%***
Additional chart(s)	100%	38.3%	81.3%	90%	***+51.7%***
Missed doses	100%	5.9%	80.2%	100%	***+94.1%***

No conflict of interest.

GRP-085 IDENTIFICATION OF RELEVANT DRUG INTERACTIONS IN NEONATAL INTENSIVE CARE UNITS

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Background Among the different types of medication errors, drug interactions may have serious consequences in Neonatal Intensive Care Units (NICU). However, they can be easily detected with appropriate tools, particularly in the context of a computerised prescribing system with pharmaceutical analysis.
Purpose The objective of this study was to calculate a theoretical criticality index, using a method inspired by the Failure Modes, Effects and Criticality Analysis (FMECA) method for each drug interactions identified in NICU in order to prioritise them to pharmacists and physicians.
Materials and Methods The study was a retrospective review of prescriptions in a French NICU. The study included prescriptions for preterm infants with gestational age below 33 weeks and hospitalised between January 2006 and December 2009. For each prescription, drug interactions were evaluated with the French Theriaque® medication database. The criticality index of each drug interaction was calculated by multiplying occurrence, severity and detection scores. The scales of each score had been built by a multidisciplinary group. Severity and detection scores were assessed by pharmacists and physicians. Intraclass Correlation Coefficients (ICCs) were used to compare pharmacists' and physicians' scores, and a synthesis was realised.
Results Among the 907 prescriptions with at least 2 prescribed drugs (4605 prescriptions written, with 109 different drugs), 47 different drug interactions were identified with Theriaque®. The 10 most critical drug interactions for pharmacists and physicians were detailed, and then a common medical and pharmaceutical synthesis was established. The ICC of detection was 0.75 (95% CI: 0.63–0.88), and the severity was 0.32 (95% CI: 0.08–0.56).
Conclusions This work highlights the importance of multidisciplinary collaboration in safe medication practise. This method can be used as a basis for future cooperation between medical teams and the pharmaceutical teams that make interventions. It is easily transferable to other medical specialties with the same objectives.

No conflict of interest.

GRP-086 IDENTIFYING NEW TUBERCULOSIS CASES THROUGH PHARMACY DISPENSING RECORDS IN PROF DR FERNANDO FONSECA HOSPITAL, PORTUGAL

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Background Controlling and preventing tuberculosis (TB) continues to be a major public healthcare challenge. Pharmacy and clinical records can thus contribute with important information concerning newly-diagnosed inpatients, treatment regimens and resistant strains.
Purpose To identify new tuberculosis (TB) cases through prescription records in a Portuguese General Hospital.
Materials and Methods This study took place in 2012, in Hospital Prof Dr Fernando Fonseca EPE (HFF), an 800-bed hospital. Patients were identified from Pharmacy dispensing records (Hosix v7.1; SIVSA) and clinical information was collected from the electronic medical records (Soarian Clinicals 3.1; Siemens). This data covered: age, sex, signs and symptoms, risk factors, outcomes of chest X-ray, diagnosis, respiratory isolates, therapeutic and microbiology results.
Results To the end of September 2012 75 new cases of TB were identified. 38 diagnoses were made up to 24 h after hospital admission. The most frequent symptoms were non-productive cough 65.8%, weight loss 55.3% and fever 50%. There were 26 cases of pulmonary TB and 12 of extrapulmonary TB. 23 patients tested positive to the Ziehl Neelsen stain. 2 of the patients had resistant TB. 37 patients were diagnosed up to a maximum period of 10 weeks after hospital admission. The most frequent symptoms were non-productive cough 40.5%, weight loss 40.5% and fever 37.8%. There were 16 cases of pulmonary TB, 13 extrapulmonary and 8 strictly clinical and imaging diagnoses. 3 patients tested positive to Ziehl Neelsen. 2 of the patients had resistant TB. By the time of the congress data will be updated for the year 2012.
Conclusions The high rate of delayed-diagnosis TB contributes to an increase risk for the health care workers and other patients exposed to it. The hospital OHD used this study to demonstrate the importance of early diagnosis in the Emergency Department and faster microbiology results and of putting suitable isolation measures in place.

No conflict of interest.

GRP-087 IMPACT OF AN ELECTRONIC MEDICINES RECONCILIATION PROGRAMME USED IN A GENERAL SURGERY UNIT

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Background Medicines reconciliation is a key tool in the prevention of adverse drug events.
Purpose To assess the impact of a medicines reconciliation programme for hospital admission into a general surgery unit, including an electronic tool, in the number and type of unintended discrepancies between chronic medicines and medicines prescribed upon admission.

Materials and Methods A quasi-experimental/retrospective study was carried out, analysing discrepancies between chronic medicines and drugs prescribed in the hospital, before and after a medicines reconciliation programme was implemented.

Patients admitted into a general surgery unit for more than 24 h who were taking ≥3 drugs chronically at home were included.

A standardised interview was conducted to record chronic medicines. Pharmacists detected and investigated discrepancies. The severity of unintended discrepancies was assessed by consensus with medical staff using the National Coordinating Council for Medication Error Reporting and Prevention 2001 classification. A computerised reconciliation tool, integrated into the electronic prescription, was implemented during the intervention phase.

Results A total of 191 patients were included (52.9% male, 47.1% female), 107 patients in the phase before intervention and 84 in the phase after intervention.

1,951 drugs were investigated, and 1,678 discrepancies were detected. There were 167 unintended discrepancies, 102 (10.6% of drugs investigated) in the first phase and 65 in the second phase (6.6%), $p = 0.0021$. Omission of drugs was the most common unintended discrepancy, being 89 (9.2%) in the phase before and 55 (5.6%) in the phase after intervention, $p = 0.0027$.

Unintended discrepancies were grade C severity in 79.2% of those detected, decreasing in the second phase (3.95% of total drugs investigated) compared to the first one (8.61%), $p < 0.05$.

Conclusions The implementation of the medicines reconciliation programme has shown a reduction of the rate of unintended discrepancies detected during admission into a general surgery unit. Omission of drugs was the most common type of discrepancy detected in both phases and decreased after intervention.

No conflict of interest.

GRP-088 IMPACT OF THE PHARMACEUTICAL VALIDATION OF PRESCRIPTIONS FOR INPATIENTS WITH RENAL IMPAIRMENT

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Background The use of drugs in patients with nephropathy carries certain risks. Therefore, dosages must be adjusted.

Purpose To describe pharmaceutical interventions (PIs) on electronic prescriptions for patients with renal impairment (RI = creatinine clearance <50 ml/min) admitted from emergencies.

Materials and Methods Nine-month observational study performed with patients with RI admitted from emergencies to wards with electronic prescribing. Glomerular filtration rate was calculated with MDRD-4 IDMS. Treatments were reviewed to evaluate the suitability of doses using the data sheets Medimecum, Micromedex and Lexicomp. If the dose was not correct, a PI was written in the 'Alerts' section of the prescribing programme which was subsequently seen by the physician. Demographics, date of the PI, serum creatinine, creatinine clearance, drug, PI, acceptance or rejection and why and evolution of renal function on the seventh day of the acceptance were recorded in the database.

Results 5311 patients were included, 221 PIs were made for 181 patients (3.41%). Patients for whom interventions were made had a mean age of 78 (29–102) and 49.2% were male. The drug with most interventions was levofloxacin (29.9%). The PIs were: dose-related (65.6%), increase of therapeutic range (26.7%) and contraindication (7.2%). 65.6% were accepted. The clinical consequences after acceptance of the PI were: improved renal function (54.5%), deteriorated (12.4%), unchanged (11.0%) or not evaluable (22.1%). In patients whose PI was rejected, renal function improved in 57.63%, deteriorated in 16.95%, was unchanged in 6.78 and not evaluable in 18.64%. A Chi-square test was applied to study whether the evolution of renal function depended on acceptance (p value 0.634).

Conclusions Electronic prescribing is a useful tool for identifying opportunities for PI in patients with RI. Differences in renal function progression between the group in which the PI were accepted and the group in which these were rejected were not statistically significant.

No conflict of interest.

GRP-089 IMPLEMENTATION OF A "MEDICATION SAFETY" CURRICULUM AS PART OF THE CONTINUING EDUCATION PROGRAMME FOR PHARMACISTS

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Background The 'action plan for the improvement of medication safety' issued by the German ministry of health demands a culture of safety awareness. To achieve this goal, an emphasis on medication safety should be placed in the education of health care professionals. In this context the German Society of Hospital Pharmacists (ADKA) has developed a curriculum on medication safety.

Purpose A workshop has been developed to improve the awareness of health care professionals regarding medication errors and the risks involved. The tools allow the pharmacist to perform a self-contained failure analysis as a basis for a goal-oriented prevention strategy.

Materials and Methods The curriculum consists of three parts. After a brief introduction, the tools to develop strategies for error prevention are explained. These tools are then applied to real life examples of medication errors in the clinical routine or in the community pharmacy respectively. The curriculum has been presented to the local boards of pharmacy and the association of statutory health insurance physicians.

Results After approval by the board of pharmacy of Lower Saxony, a pilot course was conducted. Within four days of the first invitation being sent, almost 30 participants had enrolled. Finally more than 50 participants, the majority of whom were community pharmacists successfully completed the curriculum, which was evaluated by the local board of pharmacists.

Conclusions The rapid and strong response to the invitation is a sign that the subjects 'medication safety and medication errors' are of particular interest to community pharmacists. It also tells us that medication safety is not a substantial part of continuing education. An evaluation has shown that the time allotted for the curriculum (90 min.) is apparently too short and should be extended to at least 150 min. The participants appreciated the opportunity to develop their own strategies to prevent medication errors. The experience accumulated so far demonstrates that the basic concept of the curriculum, now available to all interested boards of pharmacists, is a promising strategy.

No conflict of interest.

GRP-090 IMPLEMENTATION OF GRAVIMETRIC ANALYSIS IN THE PHARMACY DEPARTMENT

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Background Parenteral nutrition (PN) involves multicomponent intravenous mixtures of high complexity and is considered a high-risk medicine. Monitoring systems are needed to reduce the morbidity and mortality of patients receiving PN.

Purpose To report the introduction of a gravimetric process of weighing to encourage its future implementation and increase the quality and safety in the preparation of parenteral nutrition (PN).
Materials and Methods In order to standardise the gravimetric control of PN, a protocol was developed by the nutrition unit. The quality of the PN preparation was established by calculating the accuracy (the mean of the error in the gravimetric analyses (EGA)) and precision (square root of the mean square of the EGA) and the alert limits were set at ±5%.

The first step was to determinate the densities of the components of the PN and update the parenteral nutrition programme. The PN labels were modified to show the theoretical weight of the PN and the maximum and minimum limits allowed.
Results One strategy established for the quality control of the final product was to compare the final weight of the product with the volume and the density calculated for each component.

In the first 67 days 150 parenteral nutrition mixtures were made in the neonatology department. The average theoretical weight was 323.68 g (±236.04) and the average measured weight was 323.45 g (±239.94).

The mean difference of the actual weight versus the theoretical was 2.8% (±0.04).
Conclusions Gravimetric analysis is a strategy to cheque the accuracy and precision in PN and complements the quality assurance processes normally used to regulate the preparation.

No conflict of interest.

GRP-091 IMPLEMENTATION OF KEY PERFORMANCE INDICATORS IN CYTOTOXIC COMPOUNDING UNITS

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Background The Capital Region Hospital pharmacy prepares more than 90,000 bags of cytotoxic treatments a year. There has been no tradition in the pharmacy of systematically monitoring essential parameters in the productions units. Because of an increasing need for treatments on the wards, the delivery time for cytotoxics went up to 5 hours, resulting in complaints from patients. The number of products that were rejected was very high. In 2010, the cost of rejected products was more than €200,000. Analysing and addressing root causes when nonconformities arose could take up to one year.
Purpose To reduce production time and make it more stable while improving quality and reducing costs.
Materials and Methods Three Key Performance Indicators (KPIs) were introduced: Delivery, Rejects and GMP non-conformities, in order to ensure a stable, short production time and a constant focus on cost and product quality. The three KPIs are continuously monitored and posted on boards in the production area. The KPIs are discussed with the staff in weekly meetings.
Results Overall delivery time has been reduced. 75% of patients are now waiting less than 1½ hours and 90% of the pre-ordered treatments are delivered on time.

1. The number and types of rejects are now known. The goal is to reduce the value of rejects by 15% in 2012.
2. Processing time for non-conformities is now a maximum of 21 days.

Conclusions By defining the relevant KPIs, and having an ongoing dialogue with employees about the KPIs, it has been possible to significantly increase awareness among the employees of the overall performance of the production process. The increased awareness has resulted in a significantly improved performance that provides value for our patients.

No conflict of interest.

GRP-092 IMPLEMENTATION OF RECOMMENDATIONS ARISING FROM THERAPEUTIC MONITORING OF VANCOMYCIN TROUGH LEVELS IN A TERTIARY HOSPITAL

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Background In 2009 we established a consensus review of therapeutic monitoring of vancomycin by several societies including the American Society of Health-System Pharmacists (ASHP), the Infectious Diseases Society of America (IDSA) and the Society of Infectious Diseases Pharmacists (SIDP).
Purpose To study the use of plasma concentrations (PCs) as a tool for monitoring the effectiveness and safety of vancomycin treatment; follow-up of the changes made in response to the recommendations made.
Materials and Methods Retrospective descriptive study in a tertiary hospital during the first four months of 2012. Vancomycin trough plasma concentrations (PCs) were collected. The laboratory service requested and identified patients treated with vancomycin in the unit dose dispensing system. An automatic system recorded the doses, days of treatment indicated, glomerular filtration rate (GF) prior to and during treatment with vancomycin (calculated by the MDRD formula, considering renal function impairment (RFI) lower GFR 80 ml/min) and concomitant treatment. The recommendations contained in the consensus document on vancomycin therapeutic monitoring of the Infectious Diseases Society of America (IDSA) and the American Society of Health-System Pharmacists (ASHP) were used as the standard criteria for vancomycin PC monitoring: RFI, treatment for more than five days or concomitant nephrotoxic drug administered.
Results 30 patients were enrolled, median age 66, 21 men, median treatment duration of 7 (1–46) days. The PC was checked in 10% (3) of the patients, two had PCs within the recommended values. In the third patient a single plasma level was requested, which revealed less than the recommended values but the same dose and schedule was maintained throughout the 29 days of treatment. In none was the area under the curve divided by the minimum inhibitory concentration (AUC/MIC) reported, the pharmacokinetic parameter best related to the effectiveness of vancomycin. Plasma levels were not requested in 27 patients, 90% of the total treated with vancomycin. 63% met one or more criteria for monitoring; treatment for longer than five days was the most common criterion (20). In one patient the recommendations made were acted on.
Conclusions The established recommendations on therapeutic monitoring of vancomycin are not being applied in our hospital.

A high number of patients treated with vancomycin did not use the PC as a parameter with which to monitor the efficacy and safety of antibiotic treatment.

One possible cause could be a lack of training of medical staff on the usefulness and benefits of vancomycin monitoring, particularly during prolonged treatment and in patients with RFI.

No conflict of interest.

GRP-093 IMPLEMENTING AND IMPROVING MEDICINES RECONCILIATION ON ADMISSION AT NORTH BRISTOL NHS TRUST (NBT)

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Background Medicines Reconciliation ensures that medicines prescribed on patient admission correspond to those taken before

admission. This process involves discussion with patients/carers/using primary care records.

Medicines errors cause harm to patients, lead to increased morbidity/mortality/inflated healthcare costs [1, 2]

NBT has invested in many safety initiatives including: the Safer Patients Initiative (SPI2) and the Southwest Quality and Patient Safety Improvement Programme (SWQPSI).

Purpose To implement and improve Medicines Reconciliation. The objectives were to: Ensure more than 95% of patients admitted receive Medicines Reconciliation within 24 hours; Improve the quality of Medicines Reconciliation and reduce medicines errors on admission.

Materials and Methods Using improvement methodology, tests of change were trialled and spread, involving:

- **Phase 1: 2007–2008: (1–8 wards)**
  - Introduced a Medicines Admissions Proforma
  - Developed an e-audit tool
- **Phase 2: 2008–2009: (8–11 wards)**
  - Training DVD was designed
  - Analysed admissions data to spread towards where admissions were >2% of the total number of admissions
  - Collected randomised data electronically as a run chart
  - Improved communication (Patients/Ambulance/GP's)
- **Phase 3: 2009–now: (11–30 wards)**
  - 2010: tests of change on accuracy of Medicines Reconciliation, spreading to 42 wards
  - 2012: Surgical Pharmacist funding agreed following a Pre-admissions clinic trial.

Results The medians in the table show improvements 2007–2012. In 2011 we achieved and maintained our target. Accuracy data showed only 55% of admissions drug histories taken by doctors alone are accurate.

Conclusions From February 2011 we achieved and maintained our 95% target on 30 wards. We improved the quality of medicines reconciliation and reduced medicines errors on admission.

The Institute for Healthcare Improvement congratulated us and QIPP's national programme benchmarking teaching hospitals also highlights our remarkable results.

Abstract GRP-093 Table 1

Date	Median%
May 2007	60%
July-Dec 2007	56%
Jan-Jun 2008	67%
Jul-Dec 2008	73%
Jan-Jun 2009	77%
Jul-Dec 2009	77%
Jan-Jun 2010	85%
Jul-Dec 2010	92%
Jan-Jun 2011	96%
Jul-Dec 2011	95%
Jan-Jun 2012	95%
Sep 2012	98%

References

1. National Institute for Health and Clinical Excellence/National Patient Safety Agency: Medicines Reconciliation guidance
2. Quality, Innovation, Productivity and Prevention (QIPP) including Medicines Optimisation and Transfer of Care

No conflict of interest.

GRP-094 IMPROVEMENT OF THE CLINICALLY RELEVANT SAFETY OF CHEMOTHERAPY BY THE INVOLVEMENT OF A CLINICAL PHARMACIST

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Background To avoid medical errors and thus to improve the safety and quality of cancer treatment in our institution, all chemotherapy prescriptions are critically checked by a clinical pharmacist. Prescription errors are communicated immediately to the attending physician and corrected prior to the preparation and administration of the drugs.

Purpose To compile error statistics and to assess the potential severity of errors in chemotherapy prescriptions, we retrospectively analysed and evaluated prescription errors in order to improve the safety of treatment.

Materials and Methods 42624 paper written (no CPOE) chemotherapy prescriptions (containing 86101 prescriptions for medicines) from 19 departments of the University Hospital of RWTH Aachen between 2004 and 2009 were analysed retrospectively by the hospital pharmacy. The most important criteria for analysis were wrong patient, wrong drug, missing drug, wrong dose, wrong application day and wrong protocol. The clinical relevance of the medical errors detected was assessed independently by four oncologists and two clinical pharmacists using the criteria of Small *et al*, [1].

Results In total, 696 medicines errors were detected in 373 prescriptions during the routine verification by the pharmacist. By far the most abundant errors (92.4% of the total) were related to the dose. Of the 373 prescriptions the team reviewed 20% of the errors as minor, 50% as significant, 25% as severe and 5% as potentially fatal. Potentially fatal errors were detected in regard to overdoses and once to the prescription of the wrong drug.

Conclusions Our results clearly show the relevance of clinical pharmacists being part of the therapeutic team to reduce medicines errors and to prevent any patient harm.

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No conflict of interest.

GRP-095 IMPROVING MEDICATION SAFETY: THE DANAPAROID STOREY

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Background During rounds a clinical pharmacist identified and corrected subtherapeutic doses of danaparoid. This error was caused by misleading information in the German Summary of Product Characteristics (SPC).

Purpose To improve medication safety an in-house standard operation procedure for the use of danaparoid sodium was implemented and changes in the SPC were requested.

Materials and Methods The error frequency when using danaparoid was determined over a period of 4 months. The medicines information centre intensified the routine cheque of prescriptions for danaparoid as well as the counselling on dose adjustment. Medication errors were reported to the manufacturer and the Federal Institute for Drugs and Medical Devices (BfArM). At the same time an interdisciplinary working group developed in-house dosing recommendations. Suggestions for modifications of the SPC were submitted to the BfArM.

Results From April to July 2011 subtherapeutic doses were detected in 7 of 21 patients treated with danaparoid at the university hospital Klinikum rechts der Isar: because of misleading information in the SPC, prophylactic doses were administered despite indications for therapeutic anticoagulation. In July 2011 the results

of the working group were communicated in the hospital's formulary committee meeting, an in-house journal published by the pharmacy and the intranet-based quality management system. The BfArM initiated steps to effect a change of the German SPC at the European level in November 2011.

Conclusions As a result of collaboration between a clinical pharmacist, the medicines information centre, the quality management system and external experts an in-house guideline was developed. At the European level the BfArM intends to bring about a change in the German SPC.

No conflict of interest.

GRP-096 IMPROVING SAFETY OF HIGH RISK MEDICATIONS IN A PSYCHIATRIC HOSPITAL

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Background Medicines are major causes of adverse events in hospitalised patients, which can be serious. However, not all drugs carry the same risks.

Purpose The purpose of the study was to identify a list of High Risk Medicines (HRMs) and increase their safety of use in a hospital (25 Care Units (CUs)) where an electronic drug process is in place.

Materials and Methods A multidisciplinary team was formed. Its task was to:

- conduct a literature review in order to identify HRMs
- perform an audit to assess drug processes in all CUs
- set up measures to improve the safety of HRMs

Results The literature review led us to establish an HRM list of 14 drugs (including oral/parenteral anticoagulants, anti-arrhythmics, insulins, parenteral hypertonic solutions, adrenergic agonists, opioids and digoxin).

Results of a clinical audit performed in 2011 revealed that 50% of the 391 referenced oral drug tablets are not fully identifiable until the administration stage; at least one error of storage in medicine cabinet was found in 32% of CUs; parenteral hypertonic KCl and $MgSO_4$ solutions were present in 76% and 28% of CUs respectively.

Measures taken to improve safety of HRMs were:

- ensure recognition with an alert pictogram for their storage in the pharmacy and CUs
- attribute an electronic HRM alert in prescription software
- re-label blister packs for non-unit packaging HRMs (relevant to 3/15 drugs on the list)
- rationalise keeping hypertonic solutions in CUs
- implement good clinical practise for HRMs and distribute a newsletter about HRM use
- develop a systematic statement of HRM errors
- provide information about relevant HRMs to patients
- arrange training for healthcare professionals

Conclusions Corrective actions should help to improve HRM safety by preventing medication errors. An evaluation of the efficacy of these measures in practise is needed. This work will allow us to meet the requirements of French legislation.

No conflict of interest.

GRP-097 IMPROVING THE QUALITY USE OF MEDICINES IN CHINA BY DEVELOPING THE ROLE OF THE CLINICAL HOSPITAL PHARMACIST: A SYSTEMATIC REVIEW

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Background China recently initiated ambitious healthcare reforms aiming to provide affordable and equitable basic health care to all by 2020. To meet these goals, new policies issued by China's Ministry of Health surrounding hospital accreditation and antimicrobial use highlighted the role of clinical pharmacy services. International studies highlight the benefits of such services; however to date they have excluded literature reported in Chinese.

Purpose To summarise all available evidence showing the effectiveness of clinical pharmacy services in improving the quality use of medicines in China's hospitals.

Materials and Methods For the English databases, Web of Science, Medline, IPA and Embase were searched using the following keywords: ('pharmacists' OR 'pharmacy' OR 'pharmaceutical services/care') AND ('China'). For the Chinese database, Chinese Biomedical Literature Database on disc was searched using the following keywords: ('clinical pharmacist/pharmacy' OR 'pharmaceutical services/care'). A native bilingual Chinese pharmacist processed relevant Chinese articles.

Results 75 published papers were included. The majority of studies were conducted in the inpatient setting (68%), which included clinical pharmacy interventions such as educating doctors and patients, evaluating and monitoring the implementation of hospital policies and reviewing medications on the ward. In the outpatient setting, the majority of studies conducted involved educating patients.

Clinical pharmacy services frequently focused on antimicrobials (44%). More than half of these studies employed an administrative intervention alongside the clinical pharmacy service. Clinical pharmacy research in China was also found to occur primarily in provincial capital cities (63%) and to use a comparative study design (61%).

Conclusions Clinical pharmacy services in China, with its unique healthcare system and cultural nuances, appear to positively influence patient care and the appropriate use of medicines. From the published literature, it is expected that clinical pharmacy services could make a strong contribution to China's healthcare reform given further governmental and educational support.

No conflict of interest.

GRP-098 INAPPROPRIATE PRESCRIBING FOR ELDERLY PEOPLE: IS THE HOSPITAL THE INITIATOR?

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Background Adverse drug reactions are frequently encountered in older people. They represent the cause of hospitalisation of 10 to 20% of hospitalised people aged 60 years or over. The quality of geriatric prescription is thus a healthcare priority.

Potentially inappropriate drugs (PIDs) are medicines with an unfavourable benefit/risk ratio or questionable efficacy while other and safer therapeutic alternatives are available.

Purpose To evaluate the quality of prescribing in our hospital for patients who are 75 years old or over. Are PIDs prescribed to our patients? Who first prescribed this treatment: our hospital doctors or family doctors?

Materials and Methods A list of potentially inappropriate medicines, judged by 34 criteria, specially adapted to French medical practise, was used as reference. 28 of these drugs are used in our hospital. We analysed the prescriptions of patients who were 75 years old or over, hospitalised on one day chosen arbitrarily, in order to collect data about their treatments.

Results 133 patients (29.6% of patients hospitalised in medical and surgical care units) were included. On average, 8 systemic drugs were prescribed per patient. 31 patients had at least 1 PID prescribed (23.3%): 24 (18%) had 1 PID, 5 (3.8%) had 2 PIDs and 2 (1.6%) had

3 or more PIDs. 70.9% were psychotropic drugs. 53.7% of them were initiated by doctors working in our hospital, 86.4% of which by a senior doctor versus 13.6% by a resident.

Conclusions This study shows that a significant proportion of PIDs are initiated in our hospital. To improve practise, pharmacists have to make doctors aware of PIDs and suggest therapeutic alternatives before treatment is started. If PIDs are prescribed, pharmacists should formulate pharmaceutical interventions.

We will add this criterion to our trigger tool which selects high-risk prescriptions.

No conflict of interest.

GRP-099 INCIDENCE OF DRUG INTERACTIONS IN A CARDIOLOGY DEPARTMENT

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Background Starting in 2007, the Pharmacy Institute at Bajcsy-Zsilinszky Hospital in Budapest was the first healthcare institution in Hungary to use centralised medicines Daily Dose System (DDS).

The number of medicines administered to a patient may increase the probability of drug interactions. If physicians prescribe treatment without due foresight this may cause subsequent problems for the patient.

Purpose Pharmacists are the last cheque-point in the medicines system. The study sought to justify the importance of this by monitoring interactions.

Materials and Methods The incidence of theoretical and clinically relevant interactions was followed on the cardiology department at Bajcsy-Zsilinszky Hospital in a four-week period cross-sectional study. During this period, the drug treatment and the potential interactions were examined by using NovoHosp.win software.

Results A total of 218 patients were registered in the study, gender distribution of the sample: 100 women (46%) and 118 men (54%). A total of 1,893 drugs were prescribed, an average of 9 drugs per patient. The NovoHosp.win software found 603 interactions, which was an average of 3 interactions per patient. 174 patients had at least one possible interaction, but clinically relevant problems (increased APTT and INR values, potassium level differences and uric acid changes) had only arisen in 25 patients, 8 women (32%) and 17 men (68%). The software indicated 4 theoretical and 1 clinically relevant interactions in this patient group. The relevant interactions were classified as follows: potassium level differences 19%, uric acid changes 22%, APTT abnormalities 37%, changes in INR 22%.

Conclusions In the present study, 25 patients had 30 relevant interactions, as a result of which medicines were changed on 22 occasions. Changes in the dose, dose adjustments or drug substitution abolished the interactions. The study also demonstrates the importance of cooperation between hospital/clinical pharmacists and physicians.

No conflict of interest.

GRP-100 INCIDENCE OF ERRORS IN DRUG DOSAGE ACCORDING TO KIDNEY FUNCTION-ESTIMATING EQUATIONS IN MEDICAL INPATIENTS

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Background Inpatients frequently require dose adjustments of medicines due to acute changes in renal function. The FDA recommend adjusting medicines according to the estimated glomerular filtration obtained with the Cockcroft-Gault formula. However the Modification of Diet in Renal Disease (MDRD) study equation is widely recognised as more accurate than Cockcroft-Gault, which confuses clinicians because they do not know its utility for adjusting drug doses.

Purpose To compare the incidence in inpatients of medicine dosing errors depending on the type of equation used to estimate it: Cockcroft-Gault or MDRD.

Materials and Methods A cross-sectional study was conducted in a low complexity unit. Patients were included with impaired renal function who were not on haemodialysis.

We used the FDA guidelines to determine the incidence of errors.

Fisher's test was used to compare the groups, with statistical significance level <0.05.

Results We included 56 inpatients and 214 prescriptions. 58% were women and 68% were older than 65. We detected 42% and 28% of errors using CG and MDRD, respectively ($p = 0.014$). The most common error was an overdose (79%) followed by an underdose (12%) and contraindication (9%).

Further analysis found that the difference between the two equations occurred only in the following subgroups of patients: patients with mild to moderate impairment of renal function (38% versus 23%, $p = 0.03$), older than 65 years (51% versus 30%, $p = 0.01$) and low body weight (37% versus 31%, $p = 0.04$).The distribution of types of errors was similar in the three subgroups.

Conclusions The percentage of dosing error for both methods was similar to that reported in the literature.

The two equations were not discordant except in the elderly, in patients with low body weight and with mild renal dysfunction. This could explain why there were differences in the incidence of medicine errors in these subgroups.

In the absence of a gold standard to assess the acute deterioration of renal function and considering the limitations in estimating renal function with these equations, clinicians should include clinical judgement when determining the dose for each patient. The dose should be determined by weighing the risk of toxicity with higher doses versus the risk of treatment failure with lower doses, especially in elderly and low body weight patients.

No conflict of interest.

GRP-101 INSULIN: IMPROVING PRESCRIBING SAFETY

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Background Insulin has been defined as one of the highest risk medicines worldwide, [1] with a 2009 national UK audit demonstrating prescribing errors in 19.5% of in-patient insulin prescriptions. [2] The NPSA (National Patient Safety Agency) Rapid Response Report, issued in June 2010, further highlighted errors in the administration of insulin by clinical staff and called for immediate action to improve insulin prescribing. [2]

Purpose In 2010, an audit of insulin prescribing was conducted at North Bristol NHS Trust (NBT), using the Patient Safety First 'insulin prescription bundle' data collection tool that focused on five key safety-critical prescribing elements. [4] Following the results of the 2010 audit and NPSA alert, an insulin prescription chart was developed with the aim of significantly improving insulin prescribing.

Materials and Methods On 4th October 2012, the impact of the NBT insulin prescription chart was examined during a one-day cross-sectional audit (incorporating all specialities), using a special data collection form developed from the 'insulin prescription bundle'.[4] This incorporated five key audit standards:

a. All prescriptions written by brand name with the word *'insulin'* included
b. The word *'Units'* written in full

c. All prescriptions signed
d. All prescriptions dated
e. Insulin delivery device specified

Results In 2010, adherence to the five key elements was only seen in 3% of prescriptions (n = 68), with an increase to 74% (n = 54) post-chart initiation in 2012 (P = 0.007). Ward-based clinical pharmacists were found to have specified the insulin device in 81% (n = 42) of those prescriptions incorporating a device.
Conclusions By incorporating the five key prescribing elements in a specifically designed insulin chart, a statistically significant improvement in insulin prescribing was seen. Individual pharmacists also demonstrated a significant contribution in improving prescribing safety of this high-risk medicine, with an ultimate reduction in error potential and decreased risk of patient harm.

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No conflict of interest.

GRP-102 INTEGRATION OF MEDICINES RECONCILIATION INTO AN ELECTRONIC PRESCRIBING PROGRAMME

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Background Reconciliation is the process of assessing a listing of the patients' previous medicines with the current prescription. Around 46% of medicines errors in hospitals are reconciliation errors.
Purpose To evaluate the effectiveness of a method of integrated medicines reconciliation in an electronic prescribing programme (EPP).
Materials and Methods Prospective study of 22 months.

Within 24 hours of admission, a nurse records the patient's usual medicines in the EPP.

The programme requires the doctor, before prescribing, to review the recorded home medicines. The programme suggests reconciliation for each drug, and the doctor must indicate if he accepts it. The home medicine automatically goes to the hospital prescription if the doctor accepts the suggestion, or he can suspend the drug or accept the therapeutic interchange that the programme offers him.

In the case of a drug that is not available in the hospital or for which there is no therapeutic equivalent, the doctor must decide if he suspends it or if he asks the patient to bring it from his home, in which case the medicine is sent to the Pharmacy department to repackage and dispense through a unit dose system.

All hospital beds were included in the study (450).
Results About 65% of the patients were on drug treatment when they were admitted to hospital.

- The average number of drugs per patient was 3.5.
- Home medicines reconciliation at admission was performed in 95% of patients admitted.
- We found only 9.6% of discrepancies: of which 91.4% were justified. Of the unjustified discrepancies: 7% were due to mistakes in the record of the home medicine or unregistered drug, 1.4% home of medicines were suspended without justification and there were 0.2% unjustified duplications.
- Reconciliation at discharge was only performed in 20% of the patients, since the programme does not yet require the doctor to do it.

Conclusions The implementation of medicines reconciliation in the EPP ensures it is done and reduces the discrepancies to 9.6%.

No conflict of interest.

GRP-103 INTEGRATION OF ORAL ANTICANCER DRUGS INTO STANDARDISED COMPUTERISED PHYSICIAN ORDER ENTRY SYSTEMS

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Background Oral anticancer drugs still contain some of the most critical issues in terms of right use and compliance. Patients need to be advised and guided concerning dosing schedules, risks and important supportive measures. Package sizes distributed by the pharmaceutical industry often contain more doses than one patient needs especially for short-term stays in the hospital.
Purpose Our goal was to dispense patient-individual unit doses of oral anticancer drugs based on individual computerised prescriptions.
Materials and Methods For this purpose we implemented evidence-based treatment regimens in the prescription software to prevent errors and support the use of standardised treatment plans. Additionally patient information leaflets were created. The first drugs to be computerised in this way were capecitabine and temozolomide.
Results Individualised dispensing of oral anticancer drugs allows more extensive pharmaceutical care of these patients. In view of the risks described above oral anticancer drugs have to undergo a pharmaceutical plausibility cheque and the amount has to be found suitable according to the treatment regime before dispensing. Moreover, the available instructions for use e.g. treatment schedules including supportive measures and the patient information brochure improve the information flow and the safe use.
Conclusions Due to the positive feedback from the operators we are extending the procedure to all oral anticancer drugs.

No conflict of interest.

GRP-104 INTERACTIONS BETWEEN MEDICINAL GASES AND OTHER MEDICINAL PRODUCTS: DEVELOPMENT OF A HOSPITAL DRUG DATABASE

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Background Deliberation no. 56/CD/2008 from the Portuguese Authority of Medicines and Health Products (INFARMED) approves the regulation of medicinal gases set out by Decree-Law no. 176/2006, which considers them as medicines for human use. This Deliberation addresses the manufacture, packaging, labelling, package leaflet, technical management, transportation, distribution, marketing, supply and home delivery of medicinal gases. In this context pharmacists play a proactive role by providing essential information about the proper use of these medicines.
Purpose To develop a database of medicinal gases that allows hospital pharmacists to detect medicinal gases/other medicinal product interactions and validate medical prescriptions in a quick, safe and effective way.
Materials and Methods Review of the summary of product characteristics (SPC) of all medicinal gases currently available in Portugal and consultation with the manufacturers of medicinal gases and analysis of responses. A literature review was also performed, through research and analysis of articles obtained from PubMed

since January/2007 to September/2012, intersecting the terms 'medicinal gases' and 'medical gases'.

Results A total of 6 medicinal gases currently available in Portugal were analysed: medicinal air, nitric oxide, nitrous oxide, nitrous oxide/oxygen, oxygen and xenon. The main interactions of these gases with other medicinal products are: i) nitric oxide: oxygen, almitrine, nitroglycerin, sodium nitroprusside, phenylephrine, phosphodiesterase inhibitors, prilocaine, sulfonamides; ii) nitrous oxide: cyanocobalamin, drugs that depress the central nervous system (CNS), methotrexate; iii) oxygen: antiarrhythmics, bleomycin, chloroquine, chlorpromazine, corticosteroids, dactinomycin, doxorubicin, nitrofurantoin, phytomenadione, sympathomimetics; iv) xenon: antihypertensives, drugs that depress the CNS, other inhaled anaesthetic agents, sympathomimetics. No interactions were found with medicinal air. The database developed also describes the interaction mechanisms for each medicinal gas with each drug mentioned and the measures recommended to prevent major side effects.

Conclusions The database produced is a valuable tool for Portuguese hospital pharmacists who dispense medicinal gases, contributing to validating prescriptions for these medicines quickly and effectively.

No conflict of interest.

GRP-105 INTRODUCTION OF A MEDICINES RECONCILIATION PROGRAMME IN THE ORTHOPAEDIC SURGERY UNIT

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Background The average hospitalised patient is subject to at least one medicines error per day. More than 40% of medicines errors are believed to result from inadequate medicines reconciliation.

Purpose To investigate the introduction of a medicines reconciliation programme in the orthopaedic surgery unit.

Materials and Methods January 2010–March 2012. The patient selection criteria were ≥65 years old, home treatments ≥5 drugs and anticipated hospital stay ≥3 days. The reconciliation treatment was also performed for any other patients when requested by the doctor. Patients were found to be sensitive to the reconciliation by the pharmacist. Any Drug Related Problems (DRPs) detected were recorded and categorised. A prescription was given with the home treatment, with the aim of continuing treatment, discontinuing it or performing a therapeutic exchange. The process ended with oral and written pharmacotherapeutic information on the day of discharge.

Results Medicines reconciliation was carried out on 300 patients with an average age of 75.86, average stay of 9.57 days and distribution by gender 224 women (75%) and 76 men (25%).The number of medicines/patient was 6.57. During the prescription by the pharmacist, 1058 drugs were provided according to guidelines, 276 were suspended and in 663 cases a therapeutic exchange was performed. As regards the DRPs detected, 50 were caused on admittance and 15 at discharge. The DRPs were classified as follows: safety 51, effectiveness 10, adherence 2 and indication 2. Types of DRP: overdose 17, adverse reaction 4, need of extra treatment 6, unnecessary medicine 23, unsuitable drug 10, insufficient dosing 4, not dispensed 1. As to the seriousness of the DRPs: class 1: 5 patients didn't use the medicines that they needed; class 2, 24 patients used medicines that they didn't need; class 3, 23 patients used an erroneously chosen medicine; class 4,10 patients used an erroneously chosen medicine; class 5, 3 patients used a lower dose and/or a different dosage schedule from that required and/or don't continue treatment for the full duration of the treatment indicated, according to the Granada consensus of 1998.

Conclusions Participation of the pharmacist in the reconciliation of treatment allows DRPs to be detected at admission and discharge and educated the patient on his or her treatment at discharge from the hospital.

No conflict of interest.

GRP-106 INVOLVEMENT OF THE PHARMACY AND THERAPEUTICS COMMITTEE IN CLINICAL DECISION SUPPORT SYSTEMS FOCUSED ON ANTICOAGULANTS

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Background Adverse drug events related to anticoagulants are common and clinically significant. Computerized physician order entry (CPOE) and clinical decision support systems (CDSSs) are widely viewed as crucial for reducing prescribing errors.

Purpose To make prescriptions safer and to promote good practise, by developing CDSSs focused on oral and injectable anticoagulants.

Materials and Methods A review was carried out of existing guidelines and practise in the units.

About ten meetings with clinicians (cardiologists, thrombosis specialists) and pharmacists from the Pharmacy and Therapeutics Committee (PTC) were required to write these CDSSs.

The CDSSs were presented and tested in the cardiology units. New discussions and improvements in the CDSSs were made with prescribers, nurses and pharmacists.

The final CDSSs were validated by the Pharmacy and Therapeutics Committee (PTC).

Results Nine CDSSs had already been validated by the PTC: Vitamin K Antagonist (VKA), heparin sodium, heparin calcium, Low Molecular Weight Heparins (LMWHs) in prophylactic and curative treatment of deep-vein thrombosis and pulmonary embolism, LMWHs for acute coronary syndrome ST-segment elevation myocardial infarction and non-ST-segment elevation myocardial infarction, LMWHs for cardiac arrhythmia, and treatment of heparin-induced thrombocytopenia.

There are still regular meetings to develop CDSSs on new anticoagulants: dabigatran, rivaroxaban and apixaban.
Each CDSS provides:

- Information on the choice of a therapeutic strategy based on the indication and the clinical context.
- Usual doses and rates of administration.
- A dose calculation based on weight (heparins).
- Overrun alerts when the dose is exceeded.
- Regular laboratory tests at the recommended frequency.
- Protocols for dosage adjustments based on the biological values.
- Administration modalities for the nurses.

Since the implementation of the CDSS on VKA, annual fluindione prescriptions have decreased by 17% and annual warfarin prescriptions have increased by 53% in accordance with the recommendation to prescribe warfarin as the first-line oral anticoagulant.

Conclusions Development of CDSSs referred to by the CPOE system takes a lot of time but is a good way of disseminating PTC guidelines to all prescribers, pharmacists and nurses. CDSSs can assist clinicians in the management of patients requiring anticoagulant treatment by improving compliance with care standards. These CDSSs are updated following changes in guidelines and clinical practise. Other CDSSs focused on high-alert medicines will be introduced when computerised prescribing is implemented for the entire hospital.

No conflict of interest.

GRP-107 IS WEAKNESS IN OLDER PATIENTS CAUSED BY INAPPROPRIATE DRUG USE?

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Background The use of potentially inappropriate medicines (PIMs) is common among the older population. Inappropriate drugs as well as polypharmacy expose older people to a greater risk of adverse drug reactions, and may cause hospitalizations. Only a few studies have examined the potential influence of the use of PIMs on functional status, cognitive status, quality of life, visual acuity and handgrip strength in older people.
Purpose To evaluate the relationship between the use of PIMs and weakness measured by functional status, cognitive status, quality of life, visual acuity and handgrip strength.
Materials and Methods A longitudinal study of patients aged ≥65 years admitted to an Acute Medical Ward in Denmark. Data was collected from October–December 2011, at admission and at a follow-up visit 30 days after discharge. Data included information on social status, home care, functional status, cognitive status, handgrip strength, quality of life, visual acuity and medicines at time of follow-up, both over-the-counter medicines and those from the general practitioner. In addition data about days of hospitalisation, age, gender and comorbidities was also collected. PIMs were evaluated by a Danish list of PIMs, and polypharmacy was defined as a regular use of ≥5 drugs. The Charlson Comorbidity Index was used to categorise comorbidities.
Results Seventy-one patients (55% men) with a median age of 79 years participated. The median number of drugs was eight per person. Eighty percent were exposed to polypharmacy. PIMs occurred in 85% of the participants, and PIMs were associated with low function status (β: −1.88, p = 0.032), low handgrip strength (β: −9.82, p = 0.006) and reduced quality of life (β: −0.19, p = 0.0005), but not with morbidity as assessed by Charlson Index. Social status, home care and visual acuity were not associated with PIMs.
Conclusions PIMs are common among older people. The use of potentially inappropriate drugs has a negative impact on functional status, handgrip strength and quality of life.

No conflict of interest.

GRP-108 LEAN CULTURE: AN OPPORTUNITY IN THE HOSPITAL PHARMACY PRODUCTION DEPARTMENT

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Background Since 2009, the executive management of CHU Mont-Godinne has chosen to implement the LEAN methodology in our institution. Considering the multiple issues arising in our hospitals, a fundamental reorganisation of our processes and changing our behaviour is a matter of survival. Production accounts for about 30% of the work of the CHU Mont-Godinne hospital pharmacy. Constraints in a production facility are many: consistent quality, inventory management, delivery in time, productivity, teamwork.
Purpose To optimise resources using the LEAN tools.
Materials and Methods LEAN Tools

1. The 5S Philosophy focuses on effective workplace organisation. The objective is to achieve higher goals and thus improve the work done. There are five primary 5S phases: sorting, straightening, systematic cleaning, standardising, and sustaining.
2. 'Spaghetti diagram'
   Visual method
   - to depict the information flow.
   - to determine the physical flow and distance that information and people travel to process work.
3. Standardisation of practise
   The process is filmed; a discussion takes place on this movie to define best practise.
   This best practise is written as a standard and constitutes a training tool. The standard process is regularly revised in the context of continual improvement. Training improves the versatility of assistants in production.
4. Visual management
   Improved communication through the implementation of short meetings:
   What is the idea or problem? What is the action to perform? Who is responsible for it? When? Status?

Results We obtained an improvement in

- productivity: time required for preparation decreased, for example a 28% decrease for Tazocin 4 g diluted in glucose
- communication: two daily meetings
- standardisation of processes: 20 to 60%
- versatility of assistants in production: 10 to 40%

Conclusions Teamwork and standardisation of processes are now the keys elements to coping with the constraints of a production department of a hospital pharmacy and to obtaining continual quality improvement and optimising resources.

No conflict of interest.

GRP-109 LENALIDOMIDE: HAEMATOLOGICAL SAFETY PROFILE

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Background Lenalidomide was authorised in 2007 by EMA for the treatment of multiple myeloma (MM). It is also used off-label for myelodysplastic syndrome (MS). The drug is given orally at 25 mg on days 1:21 (28-day therapeutic cycle) associated with dexamethasone. Dose modifications or cessation of treatment may be necessary in the event of haematological adverse events (HAEs).
Purpose To evaluate lenalidomide dose modifications in MM and MS patients due to haematological toxicity, as recommended in the EMA's drug specifications.
Materials and Methods Retrospective observational study involving 16 patients who started treatment with lenalidomide between May 2008 and September 2010. Information was collected from the clinical and pharmacotherapeutic history. If neutropenia or thrombocytopenia arose, modifications made in treatment were analysed.
Results 16 patients were found, 14 treated for MM and 2 for MS. Male/female ratio was 8/8 and median age was 68.3 years (CI95%: 63.1–73.4).

Median number of cycles per patient was 6 (2–21). Considering all cycles, 98 were studied.

Pre-cycle neutropenia and thrombocytopenia were the main dose-restricting toxicities. Platelet counts $<30 \times 10^9$/L were found in 9 cycles; the dose was reduced in 2 patients, spaced out in 1 and both adjustments in another patient.

Neutrophil counts $<0.5 \times 10^9$/L were found in 12 cycles; the dose was reduced in 4 patients and spaced out in 3. No modifications were made in 55% and 41.6% of thrombocytopenic and neutropenic patients, respectively. No records were kept about support measures such as platelet pools or granulocyte-stimulating colony-growth factors.

Conclusions Lenalidomide's haematological toxicity is dose-related and often made worse by the basal bone marrow damage due to the haematological disease. Despite this certainty, hardly half of the patients with platelet or neutrophil damage had their dose or schedule adjusted. At this point, the patients could benefit from hospital pharmaceutical care. Important limitations of our study were lack of data about support measures and the small number of cases.

No conflict of interest.

GRP-110 LINEZOLID ADVERSE REACTIONS. A ONE YEAR OVERVIEW

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Background Linezolid is an antimicrobial approved for the treatment of hospital or community-acquired pneumonia and complicated skin and soft tissue infections due to Gram positive bacteria. Its use, though effective, is not free from possible harm.
Purpose To describe the incidence and nature of the adverse reactions related to linezolid, taking place before and after the 28-day limit given in the label information.
Materials and Methods All the linezolid treatments over one year (September 2011–September 2012) were recorded. Data sources were the electronic chart as well as the electronic prescription programme.
Results 280 cases were recorded, the median treatment duration being 8 days (1 to 73 days). 4 treatments were interrupted early due to potential interactions with antidepressants. A total of 27 patients developed adverse reactions.

Among the 255 patients treated for less than 28 days, 19 developed adverse reactions. 14 presented suppression of at least one myeloid cell line, 7 of them requiring transfusions (one with adverse skin reaction as well). Among the others, two had diarrhoea, one a skin reaction, one vomiting and the remaining patient, asthenia. Median treatment duration in patients with adverse reactions treated for less than 28 days was 12 days (3 to 27 days)

25 patients exceeded 28 days of treatment, 8 of whom had adverse reactions. Seven presented suppression of at least one myeloid cell line, 5 of whom required transfusion. The other patient suffered from asthenia. Median treatment duration in these patients was 37 days (32 to 56 days).
Conclusions Attention should be paid to blood cell counts from the beginning of the treatment, since, as seen, hematologic adverse reactions are not limited to treatments lasting more than 28 days. The same is applicable to other less frequent reactions such as skin reactions, vomiting and asthenia.

No conflict of interest.

GRP-111 MANAGEMENT OF METHOTREXATE-INDUCED RENAL FAILURE WITHOUT GLUCARPIDASE

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Background Glucarpidase (Voraxaze) is effective in the treatment of methotrexate (MTX)-induced renal dysfunction but many cases this can be handled with standard treatment.
Purpose To describe the progress of a patient with MTX-induced renal failure in whose management glucarpidase was not used.
Materials and Methods A 13 year-old girl with acute lymphoblastic leukaemia treated with high-dose MTX. Baseline laboratory tests were normal, except for elevated transaminases and GGT.
Results The patient received her first consolidation cycle with 500 mg/m^2 of MTX in 30 minutes, followed by 4500 mg/m^2 in 23.5 hours, oral mercaptopurine 30 mg/m^2/day and triple intrathecal therapy. Simultaneously, she received hyperhydration/alkalinisation (3000 ml/m^2/day).There was no pharmacological interaction to MTX. 24 hours after the MTX infusion stared, the serum creatinine level (Cr) had tripled (see the table below).The following measures were taken: hyperhydration/alkalinisation (4500 ml/m^2/day), colestyramine (3 g/6 h) and folinic acid rescue at 500 mg/m^2/6 h 31 hours after the start of the MTX infusion. Although the protocol provides for the possibility of administering glucarpidase, it was decided not to do this because the methotrexate level was <250μM and glucarpidase administration can be delayed until 96 hours after the start of MTX infusion. Difficulty in the subsequent monitoring, the absence of effect in renal function improvement and high cost were the reasons for delaying the treatment until at least having levels at 36 and 48 hours. Although Cr values were still high, elimination kinetics of the drug were seen as adequate. Without the use of glucarpidase, methotrexate levels were undetectable at day nine. The patient recovered her baseline renal function and did not have mucositis or liver toxicity.
Conclusions An early intervention with supportive treatment based on folinic acid, hyperhydration and urine alkalinisation was effective in the management of MTX-induced renal toxicity.

Abstract GRP-111 Table 1

Time since MTX infusion started (h)	Cr (mg/dL)	MTX levels (μM)
0	0.35	0
24	1.12	190
36	1.41	24
48	1.32	5.9

No conflict of interest.

GRP-112 MEDICAL DEVICES IN MOROCCO: WHAT GUARANTEES OF QUALITY AND SAFETY?

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Background Nowadays, all over the world, many medical devices, initially considered as non-risk or low risk, have been proved to be extremely dangerous to human health, as evidenced by the latest scandal of PIP implants.
Purpose To report the experience of Mohammed V Military Teaching Hospital of Rabat in evaluating the quality and safety of medical devices and to analyse elements that can compromise the quality of these products in our country.
Materials and Methods 30-month prospective study (January 2010–June 2012). We collected claims relating to the quality of medical devices at our hospital, in normal conditions of acquisition, dispensing and use. We also analysed the processes of placing on the market medical devices, the systems governing their use in hospitals and the main Moroccan rules regulating them.
Results 30 claims were collected. They concerned: catheters (40%), surgical drapes (20%), gloves (17%) and other medical devices (23%).

47% of their defects were discovered before they were used in patients, 13% presented a risk of incident and 40% caused an incident in patients.

The process of marketing a medical device, ensuring its quality and safety, must satisfy several cheques regarding the design, manufacture, import, sale purchase and use, before Ministry of Health certification can be obtained.

Conclusions Claims concerned several categories of medical devices. Abnormalities detected compromise the quality and the safety of our patient care. Checks must take place at all levels of the distribution chain to avoid these risks.

Abstract GRP-112 Table 1

Medical devices	Types of claim
Catheters	• *urinary catheters*: too flexible or too rigid, balloon hernia; • *haemodialysis catheters*: thrombogenic, insufficient blood flow; • *infusors tubes*: tube bending.
Surgical drapes	low impermeability, a blue tint was released in the operating field.
Gloves	• *clean gloves*: poorly talc-powdered, low impermeability, break easily; • *sterile gloves*: poor resistance, difficult unpacking in sterile conditions.
Others	• *trocars*: mandrel hard to remove, difficult screwing and unscrewing; • *needles*: difficult handling, nonconformity of the tip; • *sticking plaster*: poor adhesion.

No conflict of interest.

GRP-113 MEDICINES HISTORY IN THE CARE PROCESS OF PLANNED SURGERY: A KEY STEP

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Background Since January 2011, pharmacists have been taking medication histories (MHs) both in abdominal and orthopaedic surgery wards. Out of 1400 annual MHs, 40% are for patients whose intervention is planned. During the pre-anaesthesia consultation, the anaesthetics form (AF) is filled out and currently used as reference for post-operative prescriptions.

Purpose The objective was to assess the concordance between the MH and the AF data in order to find ways of improvement.

Materials and Methods A five-week prospective study was conducted by two experienced pharmacy students (>100 MHs done by each one). During the medicines reconciliation, the discrepancies were split into two groups: medicines (inappropriate drug, missing or additional medicine, incorrect or omitted dosage) and administration plan (omitted, incorrect or incomplete).

Results 70 patients, involving 272 medicines according to the MH and 223 according to the AF, were included in the survey. Discrepancies were found in 73% of patients. These patients were significantly older and were taking more medicines than the ones without any discordance (60.5 years versus 47.5; 5.3 medicines/patient versus 1.7). Among the discordances, 44.9% (n = 122) were due to 'medicines errors' with the following breakdown: missing medicine 45% of cases, omitted dosage 38%, medication discontinued 13%, incorrect dose 2%, wrong drug 2%. Regarding the discordances linked to the 'administration plan', the plan was omitted, incomplete or incorrect in 47%, 40%, or 13% of cases, respectively.

Conclusions This demonstrates that the pharmaceutical consultation including MH is mandatory and when done prior to admission can greatly improve the post-operative prescription process. The final step to be done with other healthcare professionals involved (anaesthetists, surgeons, nurses, pharmacy technicians, pharmacists), is to identify the best time to schedule MHs in the whole process.

No conflict of interest.

GRP-114 MEDICINES RECONCILIATION BY THE PHARMACIST AT THE EMERGENCY DEPARTMENT

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Background Medicines reconciliation is done to avoid errors in patient treatment such as omissions, duplications, dosing errors, drugs not included in the hospital formulary or drug interactions. Admission to hospital is one of the best times to reconcile medicines for patients with multiple comorbidities.

Purpose To analyse the pharmacist's intervention in the medicines reconciliation process in the Emergency Department of a General Hospital.

Materials and Methods Prospective observational study in the Emergency Department (ED) of a General Hospital in October 2011 to September 2012. We included all patients admitted to the ED of our hospital whose medical orders (MOs) contained a conflict of medicines. When medical or nursing staff detected a conflict they sent the prescriptions to the unit dose drugs distribution system (UDDDS) and the pharmacist checked the drugs taken by the patient upon admission. All pharmaceutical interventions were recorded at the Pharmacy Department.

Results During the study period 969 MOs were received at the UDDDS and the pharmacist interventions were: 344 (35.5%) exchanged medicines not included in the hospital formulary for other alternatives, 219 (22.6%) exchanged to therapeutic equivalents, 167 (17.2%) exchanged to a brand of the same drug stocked in the hospital, 174 (18%) no alternative dosage forms, 24 (2.5%) interventions for errors in dosing regimen, 17 (1.8%) checked the parenteral or oral route, 7 (0.7%) prevented duplication of treatment and 17 (1.8%) other interventions.

Conclusions The role of the pharmacist in medicines reconciliation at patient admission increases coordination between different health care providers and maybe improves the global quality of care.

No conflict of interest.

GRP-115 MEDICINES RECONCILIATION PROCESS AT ADMISSION IN PATIENTS OVER 75 YEARS OF AGE

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Background Elderly patients are likely to be served by different health professionals with the consequent appearance of polypharmacy, increased risk of adverse drug reactions and increased hospital admissions. Therefore, we consider this population candidates for a medicines reconciliation process.

Purpose To identify the type, frequency and severity of discrepancies between the medicines prescribed during admission and their chronic medicines and to investigate medicines involved in reconciliation errors.

Materials and Methods Retrospective and descriptive study conducted in a general hospital from November to December 2011. A pharmacist reviewed the treatments 24 hours after hospitalisation, comparing the prescription for medicines sent to the pharmacy with the clinical history and patient interview. Discrepancies were classified according to the consensus document on terminology, classification and assessment of the reconciliation programmes, and severity according to the NCCMERP index.

Results 192 patients were analysed, the median age of patients was 84.3 years (SD: 5.7) of whom 56.3% were women. 98.4% took

medicines chronically (7.4 medicines/patient). 563 discrepancies were detected in 170 patients (88.5%): 372 discrepancies did not require clarification and 191 discrepancies required clarification with the physician. Among the discrepancies requiring clarification, 37.7% were accepted by the physician as reconciliation errors (REs). Most were due to the omission of the patient's chronic treatment. Most REs were associated with cardiovascular drugs, nervous system drugs and gastrointestinal drugs. The severity of RE was mostly classified within category C but 30.6% had category D and 4.2% had category E (potential harm).

Conclusions The reconciliation process has detected the existence of discrepancies in patients older than 75 years. Special attention should be paid to drugs belonging to the cardiovascular system, nervous system and the digestive system. Most REs would probably not have caused damage but more than 30% had category D and E.

No conflict of interest.

GRP-116 MEDICINES RECONCILIATION: AN INNOVATIVE COMPUTER-BASED USE OF THE MEDICINES LIST

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Background Medicines reconciliation is as an important approach to prevent medicines errors and adverse health outcomes. However, the implementation of these interventions is frequently unsuccessful especially due to difficulties in information access and communication.

Purpose To analyse the outcomes of a computer programme developed to summarise patients' medicines on a list including additional information for the patient.

Materials and Methods Descriptive analysis was performed of medicines lists created from May 2010 to September 2012. The impact of the project was measured through a questionnaire on patients' opinions about the medicines list.

Results A computer programme was developed by our hospital multidisciplinary team. A database was created by adding to the National Medicines Database information written for patients, by pharmacists, on how to take some of the medicines and their therapeutic goals. Monthly updates are performed to include or eliminate medicines.

Access for physicians is available throughout the hospital for reconciliation at discharge and consultation, allowing for medicines lists updates.

Over the study period 1057 medicines lists were completed for 720 different patients. Neurology and Internal Medicine doctors were the most frequent users of this computer programme. Polypharmacy and individual motivation were identified as the main factors for physicians' adherence.

Specially-written information was available for 17% of the total database medicines by September 2012. Considering the lists, 55% of the medicines included this information since the most commonly-used therapeutic groups had been selected as high priority for information development by pharmacists.

A total of 48 patients and caregivers answered the questionnaire. 87% considered that the lists were very useful in medicines management at home while 92% thought that the written information was very clear.

Conclusions The programme we created is an effective tool for medicines reconciliation and is accepted by patients. This approach may improve patients' knowledge and medicines use at home, reducing medicines errors.

No conflict of interest.

GRP-117 MEDICINES WITH ANTICHOLINERGIC ACTIVITY IN ELDERLY PATIENTS

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Background Medicines with anticholinergic activity have been linked to a variety of adverse drug reactions in the elderly.

Purpose To determine the anticholinergic burden in revised profiles, and the level of risk.

Materials and Methods The Prescription Quality Unit (PQU), which is staffed by a doctor, two pharmacists, a nurse and other technical-administrative staff, is integrated into the geriatric care team. The Unit provides care to 6800 residents in 163 centres.

The PQU provides training and support to different care teams by reviewing procedures and holding conciliation meetings. The process of rationalisation consists of systematically reviewing medicines plans according to the criteria of efficacy, safety and efficiency. The team suggests modifications in medicines plans and reports to the health care professionals involved. Anticholinergic drugs were selected from the review. These medicines were classified into four groups, according to the anticholinergic potency.

Results A prospective study was undertaken during the period June 2011–June 2012: 7,347 patients were reviewed (some in duplicate). 959 patients were identified, and those patients were prescribed 1,984 drugs with anticholinergic activity (mean age 85 years (52–111 years)).

In 162 patients, strong anticholinergic activity drugs were found: 62% oral antimuscarinics for urinary incontinence, 33% tricyclic antidepressants, 4% antispasmodics with anticholinergic properties and 1% systemic H_1 antihistamines (dexchlorpheniramine); 252 patients with moderate anticholinergic activity drugs (70% paroxetine); 500 patients with mild anticholinergic drugs and 45 patients had drugs whose activity was concentration-dependent.

Sixty-eight patients were simultaneously being prescribed more than one medicine with anticholinergic activity (17 patients on strong anticholinergic activity drugs simultaneously).

Conclusions Due to the comorbidities and frailty of this population, medicines must be selected individually for each patient, selecting drugs with the lowest level of anticholinergic activity. We observed a group of patients at special risk who were being treated for pathologies related to the urinary tract.

No conflict of interest.

GRP-118 MONITORING PATIENTS TREATED WITH DRONEDARONE

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Background Dronedarone is a drug related to amiodarone, marketed in 2010. Soon after, there were several safety alerts that forced Health Authorities to reduce their use, and require hepatic and renal function cheques. The alert (reference SGMUH (FV), 16/2011) requires initial and then at least 6-monthly hepatic and renal function tests.

Purpose To assess the degree of compliance with the analytical tests required by the Competent Authority in patients taking dronedarone (creatinine and liver enzymes) in a health area of 200,000 inhabitants.

Materials and Methods We selected patients who were prescribed dronedarone during the last half of 2011. These patients were identified by querying the electronic prescription billing system. The prescriptions were analysed in three groups of patients: those who started treatment after publication of the alert so cheques

should have been performed in patients prior to dronedarone treatment (GROUP A), those who started the treatment before the alert (group B), and finally patients who discontinued this semester (GROUP C). In group B patients we checked whether the ongoing controls specified in the alert had been done. Similarly, in Group A patients we checked whether the start of treatment controls had been done (renal and hepatic function before and the week of the start of treatment). Serum creatinine concentration was considered valid as a cheque of renal function; transaminase levels were suitable for the liver function test. Selene (clinical history management software) and Agora Plus (primary integrated medical record-hospitalisation management software) were used to retrieve the serum concentrations.

Results We examined 72 clinical histories. Group A contained 17 patients. Only 5% had liver and kidney function tests as required by the Competent Authority. In group B (48 patients), 31.2% had none of the controls required. Only 6.2% of patients had a creatinine cheque. Only 4.1% of patients had a liver function cheque. In Group C with 7 patients (two deaths), 71.4% had no analytical controls of any kind, and in only 14.2% were renal function tests performed.

Conclusions The degree of compliance with tests required by the Health Authority in patients taking dronedarone is very low. It seems necessary to review and improve the system of drug alerts to physicians, and the pharmaceutical care of patients seen in primary healthcare. Computer systems such as the Agora Plus that integrate primary and hospitalisation data are critical for this type of monitoring.

No conflict of interest.

GRP-119 MOST FREQUENT DRUG-RELATED EVENTS DETECTED BY PHARMACEUTICAL ANALYSIS OF COMPUTERIZED PHYSICIAN ORDER ENTRY AND PROPOSED SOLUTIONS

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Background In 2012, Toulouse University hospital implemented a Computerized Physician Order Entry (CPOE) system in two digestive surgery departments (41 inpatient beds). Clinical pharmacists in the wards contribute to safeguarding the medication process by reviewing prescriptions.

Purpose To highlight recurrent and avoidable drug-related problems identified by pharmaceutical analysis of CPOE and to raise physicians' awareness regarding these prescription problems.

Materials and Methods From April to July 2012, Pharmaceutical Interventions (PIs) concerning prescription problems were recorded in the CPOE according to the codification defined by the working group of the French Society of Clinical Pharmacy. We extracted the following data from the CPOE: drugs, type of problems and PIs. We identified the main prescription problems and drugs involved. After data analysis, preventive measures were submitted to the physicians.

Results 2396 prescriptions were analysed and 450 Pharmaceutical Interventions (PIs) were accepted by physicians (18.8%). Main prescription problems concerned analgesics (52 PIs made): inappropriate administration and dosage errors; heparins (31 PIs): dosage errors; antiemetics (24 PIs): dosage errors and drug-drug interactions; antibiotics (16 PI): inappropriate prescription. To prevent these problems, a multi-disciplinary group was set up with physicians, nurses and pharmacists. This group has reviewed standardised order sets and has developed a pocket guide to help new residents while prescribing.

Conclusions This study describes the most frequent CPOE problems. Communication and collaboration with physicians and nurses are the key to reducing avoidable adverse drug events and to safeguarding CPOE.

No conflict of interest.

GRP-120 MULTIDISCIPLINARY INTERVENTION: INTRATHECAL AND INTRAVENTRICULAR CHEMOTHERAPY IN PAEDIATRICS

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Background A communications system was designed after notification of two errors in two months, in intrathecal and intraventricular chemotherapy in paediatric oncohaematology: prescribing by protocol, consultation sheet standardised and computerised; transcription using the Farmis integrated system for chemotherapy and preparation centralised in the pharmacy after standardisation, and administration with a double cheque. Functions were established and detailed in each process to all groups involved.

Purpose To conduct a retrospective observational descriptive study to cheque compliance with the intrathecal and intraventricular rules at each level: prescription, transcription, preparation, distribution and administration and to analyse any change in the errors made with intrathecal and intraventricular chemotherapy before and after the new system was implemented.

Materials and Methods Each of the processes in the system was tracked, during the year after the intervention – July 2011. Prescriptions were analysed through electronic medical records, Farmis, nursing and pharmacy records.

Medicines error reporting to the Safety Commission was monitored during the year after the implementation. The error rate was determined by comparing the two months prior to the intervention.

Results 167 prescriptions were checked, 133 intrathecals and 34 intraventriculars. The professionals involved were monitored 100% in all processes, except the administration checklist by neurosurgeons, which was only 62.5% checked. The error rate reported by number of prescriptions went from 0.14 in the previous two months to 0.006 in the year after intervention.

Conclusions There has been high system monitoring by all professionals involved. The number of medicines errors became lower in the post-intervention period. Thus, centralization and standardisation of intrathecal and intraventricular chemotherapy has helped increase patient safety.

No conflict of interest.

GRP-121 MULTIDISCIPLINARY MONITORING OF PSYCHIATRIC MORBIDITY OF HCV-INFECTED PATIENTS TREATED WITH INTERFERON AND RIBAVIRIN

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Background Treatment of hepatitis C virus (HCV) infection with pegylated interferon and ribavirin may induce psychiatric disorders, which may result in poor adherence and response to antiviral treatment.

Purpose We aimed to describe the incidence of neuropsychiatric disorders in a cohort of HCV-infected patients treated with interferon and ribavirin, and their impact on treatment adherence and viral response rate (SVR).
Materials and Methods Data from a cohort of HCV patients who visited an outpatient pharmacy service (OPS) included all adult patients mono-infected with HCV who had completed treatment in 2010. Monitoring of neuropsychiatric disorders was assessed at weeks 0, 4, 12, 24, 48, and 72 through the self-administered questionnaires Hospital Anxiety and Depression Scale (HADS) and General Health Questionnaire (Goldberg). Adherence to treatment was assessed by counting drugs dispensed and patient reporting. Virological response was determined by the physician according to standard criteria.
Results Of the 76 patients included, 19 (25%) had a pre-existing psychiatric disorder, mostly depression and anxiety. The incidence of medically-confirmed neuropsychiatric disorders was 33% (n = 25), with a peak of abnormal results in the tests in week 12. Patients with and without pathological scores did not differ in baseline characteristics, except for pre-existing psychiatric disorder [60.0% vs. 7.8%, respectively ($p < 0.001$). Antidepressants and/or anxiolytics were prescribed to 48% of patients with medically confirmed disorders (n = 12). Overall, 43% of patients achieved an SVR. Strict adherence (96% vs. 90%; p = NS) and SVR (39% vs. 52%; p = NS) were similar in patients with or without medically confirmed disorders.
Conclusions Patients often develop neuropsychiatric disorders during interferon therapy. Neuropsychiatric side effects had a non-significant effect on adherence to treatment and attainment of SVR. Multidisciplinary monitoring provided during the treatment of hepatitis C can contribute to early detection and management of neuropsychiatric disorders and to improve integrated patient care.

No conflict of interest.

GRP-122 NEW PERSPECTIVES OF HOSPITAL PHARMACISTS' ROLE IN COMMUNICATING PHARMACEUTICAL POLICY TO HEALTHCARE PROFESSIONALS AND PATIENTS IN GREECE

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Background Given the burden of unfortunate economic conditions in Greece, hospital pharmacists find themselves at the crossroads of different approaches to patient treatment options, trying to ensure the patient gets the best treatment from both the financial and medical point of view.
Purpose To highlight the importance of hospital pharmacists' role in the 'communication chain' within and beyond the hospital.
Materials and Methods Everyday practise experience (e.g. frequently asked questions) at the hospital including communication with patients, doctors and the hospital administration has been taken into account in addition to the Hellas Health IV survey (sample size: 1008 persons).
Results Everyday experience shows that the majority of patients don't really understand why there is a change (e.g. generic substitution) in their treatment and they insist on it not being changed. The survey showed that 63% didn't know the meaning of generic medicine and only 26% of those who knew were sufficiently informed to realise that the generic version is therapeutically equivalent to the original brand.
Conclusions It is important for hospital pharmacists to be aware of developments in health care communication, for example to be able to recommend on-line resources to patients about the treatment of their disease and use of generic drugs. Moreover they have to develop and improve the required skills in medical and financial issues as they are important stakeholders in the chain of health promotion in the hospital.

No conflict of interest.

GRP-123 NON FORMULARY DRUG MANAGEMENT – ABSURD OR REASONABLE?

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Background Non-formulary drugs are prone to cause medication errors due to their less common use in the daily routine on the ward. Therefore non-formulary drug (NFD) management in the hospital pharmacy includes checking the dose and indication which is usually very time consuming. In 2010 the drug information centre had to deal with 12,903 prescriptions for NFDs.
Purpose Loss of relevant drug information at the interface between pharmacy and ward has been observed in some cases. Therefore a survey was performed to detect information gaps. Did the pharmacist's recommendation reach the medical staff?
Materials and Methods During a period of four weeks all NFD prescriptions were documented concerning the type of medicine. If a treatment-relevant intervention (e.g. dose correction) was made the trainee pharmacist visited the ward to clarify if the pharmacist's advice was received. In addition the medical staff were interviewed about the general procedure of information transfer within the ward staff.
Results 1158 NFDs were ordered. Out of these 261 required extensive action with pharmacist intervention. 256 interventions were accepted on the ward and only 5 were rejected. In only one case out of these the pharmacist's information had to be resupplied to the ward as it had not reached the staff. The survey showed a very high acceptance (98.1%) of the drug information provided. 83 drugs within the ATC Code "antibiotics for systemic use" were particularly counselling-intense. Dosing problems were the most frequent drug-related problem (52). Information transfer within the ward turned out to be highly inhomogeneous.
Conclusions The pharmaceutical advice offered to the ward was accepted to a very high percentage. To prevent information loss on the ward a standardised system for information transfer amongst the staff needs to be established.

No conflict of interest.

GRP-124 NON-BIOLOGICAL COMPLEX DRUGS AND THEIR REGULATORY APPROACH – OF CONCERN FOR HOSPITAL PHARMACISTS AND MEDICINES MANAGEMENT?

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Background Intended copies of originator medicinal products (MPs) are categorised as generics or biosimilars (complex large molecular biological MPs) with distinct regulatory pathways for marketing authorization. In recent years, a new category of non-proteins and non-biotech-derived MPs has emerged, the non-biological complex drugs (NBCDs) comprising IV iron

carbohydrates (polynuclear iron (III)-oxyhydroxy cores stabilised by carbohydrates), glatiramoids (polypeptides) and liposomal drugs [1]. Like biological MPs, NBCDs are complex MPs consisting of non-HOMO molecular, partially nanoparticle, structures. Composition, in vitro and in vivo characteristics are defined by manufacturing. Subtle changes of the manufacturing modify quality, efficacy and safety of the MP. NBCDs are not fully characterised physicochemically. In contrast to biosimilars, a regulatory framework is not established.

Purpose Intended copies of NBCDs such as the iron sucrose similars have been approved in several countries by the classical generic pathway. Growing scientific evidence in the non-clinical and clinical setting has raised doubts about interchangeability and/or substitutability.

Material and Methods

Science-based statements for comparability of intended copies and reference MPs were discussed among experts from regulatory science, clinicians, hospital pharmacists and industry in a Workshop at FIP 2012. The conclusions were used to propose regulatory requirements for NBCDs.

Results The FIP 2012 consensus meeting confirmed the lack of an appropriate regulatory market authorization of intended copies of NBCDs. For liposomes, physicochemical equivalence testing seems to be more likely to be achievable, but clinical efficacy trials are needed on a case-by case base (EMA). Nanoparticle iron sucrose similars show almost no comparability and therapeutic equivalence has to go through quality, efficacy and safety assessments [2]. Glatiramoids, with a not-understood mode of action, also need a broad, as yet to be defined, regulatory approach. Nanoparticle assessment includes sizing and morphology (FDA) and also evaluation of in vivo biodisposition (EMA). The upcoming Terminology and a White Paper will integrate these conclusions.

Conclusions For NBCDs and their specific characteristics a regulatory pathway is needed to assess comparability and eventually therapeutic equivalence of originator and intended copy MPs. In multiprofessional medicines management specific attention to the limits of interchangeability and substitutability is mandatory.

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No conflict of interest.

GRP-125 OBSERVATIONAL PROSPECTIVE STUDY ON PULMONARY ARTERIAL HYPERTENSION AND DRUG EXPOSURE

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Background Pulmonary arterial hypertension (PAH) is a rare disease characterised by an elevation of the pulmonary vascular resistances leading to right cardiac failure and death. Among different aetiologies of PAH, association with drug exposure was proved forty years ago with aminorex and more recently with benfluorex. Other drugs such as dasatinib or interferons seem to be associated with PAH development and/or severity. Pharmacovigilance is critical to improve our knowledge of PAH associated with drug exposure.

Purpose To confirm the feasibility of collecting the drug exposure history in PAH patients during hospitalisation by a systematic interview.

Materials and Methods This pilot study was performed in the French national PAH reference centre. Patients with idiopathic, heritable PAH, PAH known to be associated with drug exposure and pulmonary veno-occlusive disease were included. A standard questionnaire to collect the past and current medicines history was designed and approved by pharmacists and pneumologists. For each patient, this questionnaire was systematically assessed by a pharmacist after patient consent had been obtained.

Results Interviews were performed in 57 PAH patients. The median time of interview was 30 minutes. 16% of patients had a history of anorexigen exposure which led to 5 pharmacovigilance reports. The remaining four other patients were already known to the pharmacovigilance centre. Twenty seven patients (47%) had been exposed to psychoactive drugs, two patients to cytotoxic agents and one patient to interferon. Interestingly, a quarter of all patients had a history of nasal vasoconstrictor exposure.

Conclusions This pilot study demonstrates the feasibility of collecting the history of drug exposure in PAH patients during hospitalisation. Our observations match those reported in the literature except for the nasal vasoconstrictors, for which no epidemiological data have been published yet. Further studies are warranted to investigate the potential harmfulness of nasal vasoconstrictors.

No conflict of interest.

GRP-126 OFF-LABEL PRESCRIPTIONS IN THE NEONATAL INTENSIVE CARE UNIT AT MARSEILLES NORTH HOSPITAL

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Background The availability of drugs specifically assessed for use in neonates is limited as evaluation is more difficult in neonates than in adults. The result is a widespread off-label use of drugs, especially in neonatal intensive care units. Such practise is an essential part of their care and should be based on the best available evidence.

Purpose To describe and analyse the off-label use of medicines in a neonatal intensive care unit.

Materials and Methods Prospective observational study conducted over three months, from 27 February 2012 to 27 May 2012. All the drugs prescribed were analysed with regard to their licence status for the: indication, dose, route of administration, mode of administration, age category, formulation (compounding of capsules, oral suspensions, eye drops), contraindications and warnings specified in the summary of product characteristics of the marketing authorization.

Results In total, 638 prescriptions, comprising 59 different medicines were written, 107 newborn babies were admitted (60 male, 47 female). Their age varied from 0 to 27 days (average: 2 days), their mean gestational age was of 34 weeks of amenorrhea (65% premature), their weight ranged from 630 g to 4700 g (average: 2230 g). A total of 487 prescriptions were written off-label (76%), with 101 patients (94%) receiving at least one drug used off-label. Drugs were prescribed off-label mostly concerning the indication (48%), then came off-label use for the dose and the age category. The medicine most often prescribed off-label was caffeine citrate.

Conclusions Critically ill neonates are exposed to numerous medicines, a significant proportion of which are not yet approved for use in this vulnerable group of patients. Despite European initiatives aiming to promote greater awareness and research in the paediatric population, there is still a high percentage of unlicensed or off-label drug use in neonatal intensive care. This study underlines the need for clinical research and approval of the clinical data acquired within the neonatal population.

No conflict of interest.

GRP-127 ON-LINE QUALITY CONTROL OF CYTOTOXIC DRUGS: ULTRA-FAST CHROMATOGRAPHIC SEPARATION OF VINCA ALKALOIDS

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Background Due to repetitive and tedious handling tasks, production of anticancer drugs for infusion is associated with a high risk of non-conformity. Thus, on-line quality control is necessary to improve the quality of preparation. Since the quantities produced are ever growing, very fast analytical methods of control are needed to minimise the delay before release.
Purpose A high-performance liquid chromatography method has been developed for quality control of vinca alkaloid infusion bags (vindesine, vincristine, vinorelbine and vinblastine).
Materials and Methods The separation was optimised by a Doehlert experimental design using a mixture of those 4 alkaloids. Chromatography was performed using Prostar Varian chromatographic equipment with a Photodiode array Detector. A short Polaris C18 column (3 µm, 50 mm × 4.6 mm) was used for all separations. The optimization varied 3 parameters: pH of the phosphate buffer 25 mM (7.0–7.6), flow rate of the mobile phase (0.7–1.3 mL.min^{-1}) and proportion of acetonitrile (47–53%). 36 trials were necessary. The target response was the shortest run time giving a minimal resolution score of 1.5 for the most critical pair of peaks.
Results For vinorelbine, pH had a major effect on resolution. Optimal resolutions were obtained with a pH of 7.25. Then, the flow rate was set at 1.6 mL.min^{-1} with a mobile phase consisting of water-acetonitrile (47–53 v/v). Under these conditions, resolution was at least 1.6 with an analysis time less than 2.0 min. Retention times were 1.03, 1.27, 1.39 and 1.68 minutes for vindesine, vincristine, vinblastine and vinorelbine respectively. Methods were validated according to ICH criteria and are now routinely used without troubleshooting.
Conclusions This method allows in-line quality control of 4 vinca alkaloids in a very short time (less than 2 minutes) and constitutes a suitable and safe tool for chemotherapy preparation.

No conflict of interest.

GRP-128 PARENTERAL IRON: FRENCH PHARMACISTSÍ CHOICES FOR PREVENTING IATROGENIC EVENTS

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Background Ferric carboxymaltose (FCM) (Ferinject) is a new parenteral iron used to treat iron deficiency anaemia. Infusion modalities are different from ferric hydroxide sucrose complex (FHSC), formerly used in our hospital until July 2012. In particular, for FCM, the infusion takes 15 min (or less at doses below 500 mg), instead of 90 min for FHSC (for which shorter infusion times may be dangerous). Despite the higher cost of FCM and the lack of recommendations from our National Health Agency, we have decided, to avoid medicines errors, to keep Ferinject only on the hospital formulary.
Purpose To discover the approach followed by other Parisian Public Assistance Hospitals (AP-HP) (n = 40) to avoid the risk of confusion between the different forms of parenteral iron.
Materials and Methods In October 2012, a questionnaire was developed to assess 3 items: the type of parenteral iron on the hospital formulary, methods of dispensing and occurrence of medicines errors. Hospital pharmacists were phoned to answer the survey.
Results Of the 30 pharmacists who responded, 14 referenced FCM and 16 did not; 11/14 stocked both FCM and FHSC. Three pharmacists had opted to keep FCM only. In 50% of hospitals in which FCM was available, it had to be prescribed by the brand name and checked by a pharmacist. Two hospitals of the 14 had reserved FCM for specific wards. To the best of their knowledge of pharmacists who answered the survey, no iron administration error had occurred in their hospitals.
Conclusions This study shows that choice of parenteral iron is not homogeneous in the different hospitals of AP-HP. We suggest that the risk of medication errors, when FCM and FHSC are both present in the same hospital, could be underestimated.

No conflict of interest.

GRP-129 PARENTERAL NUTRITION-ASSOCIATED CHOLESTASIS

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Background Parenteral nutrition-associated cholestasis (PNAC) results in significant morbidity and mortality. Progression to end-stage liver disease and subsequent hepatic failure is the most feared complication. A number of approaches have been proposed for the prevention and treatment of PNAC with mixed results.
Purpose To investigate the alteration of liver blood tests and the parenteral nutrition (PN) characteristics that trigger PNAC.
Materials and Methods Clinical blood tests and PN data of adults on artificial nutrition from January to August 2012 were collected.

Survival studies were conducted for each liver parameter studied. Primary endpoint was to fall above the upper limit of normal, considering them for women and men respectively: aspartate transaminase (ASP): 32, 40 IU/L; Alanine transaminase (ALT): 78, 78 IU/L; gamma-glutamyl transferase (GGT): 55, 85 IU/L; alkaline phosphatase (ALP): 136, 129 IU/L; bilirubin: <1, <1 mg/dl.

PASW Statistics 19.0 and Microsoft Office 2007 were used.
Results One thousand eight hundred and ten PN bags for 124 patients (55% men) with mean 61 years old (18–95) were analysed.

Percentage of patients with values within limits after follow-up: bilirubin 92%; ALT 76%; ASP 59%; ALP 54%; GGT 27%.

Time until values went out of normal limits (days): ALT (13); ALP (13); ASP (12); bilirubin (12); GGT (6).

Age, gender, liver enzymes value before PN, and PN characteristics (volume, timing of infusions, calories, nitrogen and carbohydrates) were not significant PNAC trigger factors when considered individually.

Risk factor: initial value of bilirubin (each 0.1 mg/dL before PN, multiplies the risk of hyperbilirubinaemia by 14.5 times).

Protective factor: PN fat content (each gramme reduces the risk of high serum GGT concentration by 3.6%).
Conclusions The results show that PN poses a risk factor for PNAC, GGT being the test most affected.

However, none of the factors surrounding the PN and the patient, individually, account for the majority of the liver damage. On the contrary it is a conglomerate of different factors contributing to the final impairment. The lack of enteral nutrition also predisposes to PNAC.

This makes it difficult to find the right approach when prescribing PN. The indications for PN should be considered responsibly as should a return to enteral feeding whenever possible.

No conflict of interest.

GRP-130 PARENTS/CAREGIVERS' KNOWLEDGE TOWARDS MEDICINES ADMINISTRATION IN PAEDIATRIC PATIENTS

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Background The increasing complexity in paediatric patient care emphasises patient safety as a topic of high priority. Parents/caregivers' lack of knowledge on how to administer extemporaneous formulations to paediatric patients can be a potential source of medication errors.
Purpose To assess parents/caregivers' knowledge of medicines administration in paediatric patients
Materials and Methods A 2-month cross-sectional study was conducted with a convenient sample of paediatric outpatients' parents/caregivers from four hospitals in Lisbon. A questionnaire was developed to assess knowledge on how to administer the medicine (liquid or powder), how to measure the dose to be administered, the administration schedule, the storage conditions, the validity period of the extemporaneous formulation, and appropriate behaviour in case of missing a dose or vomiting immediately after taking the medicine. A univariate analysis was performed using SPSS v.19.
Results Eighty-four individuals participated in the study. The mean (SD) age was 34 (18.6) years, 26.0% were non-Caucasian, 75.3% were married, 46.8% had an average of nine years of education and 50.6% were professionally active. The mean level of knowledge as assessed by the questionnaire was 53.7%. The lowest levels of knowledge were found for appropriate behaviour in case of missing a dose or vomiting after taking the medicine, for which only 10.7% and 20.2% parents/caregivers, respectively, gave the correct answer. Non-Caucasian parents/caregivers and lower education level were significantly associated with a deficit of knowledge ($p < 0.05$).
Conclusions Low levels of knowledge were found among parents/caregivers of paediatric patients. Strategies to increase knowledge, such as promoting short educational programmes at the hospital, should be considered to improve patient safety.

No conflict of interest.

GRP-131 PATIENT SAFETY – ANALYSING MEDICATION-RELATED ADVERSE EVENTS

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Background Medication-related adverse events (AEs) lead to increased morbidity, mortality and costs. In Denmark, frontline personnel in hospitals and in the primary care sector are obligated to report adverse events to a national reporting system 'The Danish Patient Safety Database'. Since September 2011 it is also possible for patients and relatives to report AEs to the database.

An increased understanding of the causes of AEs may assist in preventing them.
Purpose The aim was to analyse medication-related AEs reported to the Danish Patient Safety Database in Zealand Region.
Materials and Methods Medication-related AEs are categorised by the person reporting the AE using the WHO classification system available in the Danish Patient Safety Database. The reported AE is subsequently analysed by a clinical pharmacist.

The analysis is performed using a modified version of the classification system, which was proposed by Ferner & Aronson. Errors are divided in two major categories:

- Mistakes (errors in planning actions), which are divided into knowledge-based errors and rule-based errors
- Skill-based errors (errors in executing correctly planned actions), which are divided into action-based errors (slips, including technical errors) and memory-based errors (lapses)

Data were received Oct. 2011–May 2012.
Results During the study period, 741 AE reports concerning events associated with medication in hospitals were filed in Zealand Region. They averaged 93 events every month.

The Danish Patient Safety Database showed that the medication-related AEs are mainly categorised as prescribing (31%) and administration (29%), and some as dispensing (19%).

For comparison, results from Ferner & Aronson showed that 60% are rule-based errors, 31% action-based errors, 8% knowledge-based errors and 1% memory-based errors.
Results Ferner & Aronson's classification tool by is useful in categorising medication-related AEs, and the resulting subgroups can add to our knowledge about how errors may be prevented.

No conflict of interest.

GRP-132 PATIENTS DISCHARGED FROM HOSPITAL WITH OPTIMAL MEDICATION DUE TO PHARMACEUTICAL INTERVENTIONS

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Background Medication errors are common when transferring medication records between health care professionals in secondary and primary care. This can lead to suboptimal pharmacotherapy and decreased quality of health care. At our hospital pharmaceutical medication review has been successfully implemented at hospital admission on the acute ward to ensure rational pharmacotherapy.
Purpose To ensure rational pharmacotherapy and accurate medication status at hospital discharge, a clinical pharmacist supports the medical staff by conducting medication review and improves transfer of relevant discharge information to primary care.
Materials and Methods The study took place at a general medical ward at Lillebaelt Hospital, Vejle. A clinical pharmacist conducted systematic medication review according to rational pharmacotherapy for discharge patients treated with at least six medicines. In addition the clinical pharmacist conducted medication reconciliation and verified the plan for further medical treatment in the discharge information to primary care emphasising the changes in medication made during hospital stay.
Results From February to September 2012, 326 medication records (with a total of 3973 medicines) were reviewed by the pharmacist. 730 clinical interventions were suggested to the medical staff with a top-3 of; 1. Duration of medical treatment, 2. Inappropriate dosing and 3. Supplemental medicine treatment. 85% of all interventions were accepted and led to medical changes, but nevertheless, for 32% of the patients, the pharmacist still had supplementary or altered information to the discharge plan.
Conclusions Our results indicate that pharmaceutical intervention contributes to appropriate medication use and more accurate discharge information. This on-going quality initiative can ensure the use of rational pharmacotherapy and thereby increase the quality of health care.
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No conflict of interest.

GRP-133 PHARMACEUTICAL CARE PROGRAMME IN AN EMERGENCY DEPARTMENT

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Background Over recent decades, the pharmacist's role has evolved with the development of pharmaceutical care, defined as the active participation of the pharmacist in patient care, in collaboration with the doctor and other healthcare professionals in order to improve the patient's quality of life. Based on this, we have established a pharmaceutical care programme in an emergency department (ED).

Purpose

1. To describe more frequent pharmaceutical interventions (PIs) in an ED
2. To analyse the rate of acceptance of the PIs and which were accepted.

Materials and Methods Descriptive-prospective study, for six months, in a University Hospital. All medical prescriptions from the ED were evaluated. If any drug-related problems (DRPs) were detected, the prescriber was notified of a recommendation. The following variables were collected: sex, age, reason for the intervention: DRPs especially adaptation to the pharmaceutical guide used in the hospital (AP), medical service (emergency, medical unit, surgical unit), type of PI, type of DRP, acceptance rate (accepted, not accepted, not assessable). Data were analysed with SPSS vs. 5.

Results The pharmacist reviewed the medical orders of 987 patients. A total of 669 interventions for 320 patients (77 years ±15, 50.3% female) were recorded. The pharmacist carried out an average of 0.7 interventions/patient throughout the study period. PIs/unit: 59% emergency, 28% medical unit, 13% surgical unit. The reasons for interventions were: DRP (60%) or AP (40%) detected. Types of DRP: indication 32.6%, efficacy 26.6% and safety 40.8%. More frequent PIs: AP 40%, posology change 26%, start treatment 13%, change in form of administration 10%, stop treatment 8%. The overall rate of acceptance of the pharmacist's recommendations was 76.8% (8.6% rejected and 14.6% not assessable).Rate of acceptance/unit: emergency 85%, medical unit 75%, surgical unit 76%.

Conclusions The most frequent PIs were adaptation to the pharmaceutical guide and dosage change.

Emergencies physicians accepted more PIs than other doctors or surgeons and medical units rejected more PIs than other units (25%).

Interventions by a clinical pharmacist had a major impact on reducing prescribing errors in the study period, thus improving the quality and safety of care provided.

No conflict of interest.

GRP-134 PHARMACEUTICAL INTERVENTION IN A BRAZILIAN HOSPITAL: ANALYSIS OF INTERVENTIONS FOCUSING ON PATIENT SAFETY

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Background Drug interactions (DIs) occur when one drug affects the activity of another drug when both are administered together. This is clinically relevant as it may cause drug-related adverse events, and is generally preventable. [1–3]

Purpose To analyse potential DIs in prescriptions for hospitalised patients. The drugs investigated were lithium, levothyroxine, phenytoin, risperidone, clozapine, olanzapine, quetiapine and ziprasidone.

Materials and Methods A longitudinal and descriptive study of pharmaceutical interventions (PIs) conducted in a Brazilian public hospital specialising in psychiatry with 145 beds, from 5 January to 30 September 2012. The drugs analysed were lithium, levothyroxine, phenytoin, risperidone, clozapine, olanzapine, quetiapine, and ziprasidone. The searches for DIs were done once a week and categorised according to severity (mild/moderate/severe). [4]

Results 134 DIs were analysed in 108 patients. Of the 134 DIs 59.85% were mild; 19.71% moderate and 2.92% severe risk. 1.46% of all prescriptions showed moderate to severe risk and 11.68% showed mild to moderate risk. Of the 134 DIs detected, 59 resulted in a written communication to the physician. The 59 written communications sent to physicians resulted in 25 prescriptions interventions, therefore 34 did not generate a medical intervention. The drugs most frequently involved in an interaction were: lithium (58); olanzapine (44); risperidone (19); levothyroxine (4) and clozapine (7). Of all 25 prescription interventions, 14 removed the potentially risky drug; in 4 the doctor reduced the dose and the other 7 the appearance of adverse reactions was monitored. In all prescriptions with severe and moderate/severe risk the drug with potential risk was replaced and the number of DIs reduced due to pharmaceutical interventions.

Conclusions The study demonstrated the importance of pharmaceutical evaluation of potential DIs in prescriptions and provided information for the prescribing physician to increase patient safety. In addition this study showed that potential DIs generally unnoticed by the prescribing physician were detected by pharmaceutical intervention.

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No conflict of interest.

GRP-135 PHARMACEUTICAL INTERVENTION IN OUTPATIENT SAFETY: PREVENTION OF MEDICATION ERRORS IN AN INTRAVENOUS MIXING UNIT

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Background The 'Study on patient safety in primary health care' (APEAS), published in 2008 by the Spanish Health Ministry declared that 48% of adverse events (AEs) detected in these patients were due to medicines errors (MEs). The Institute for Safe Medication Practices (ISMP) promotes the development of internal systems to report medicines-related incidents in hospitals in order to achieve effective preventative measures.

Purpose To analyse total errors in an intravenous mixing unit and establish checkpoints to prevent them.

Materials and Methods Prospective observational study (August–December 2011) which included outpatients who might be exposed to an error with intravenous medicines. The variables were: Wrong drug, original prescription service, prescription type (manual or printed), who detected the error and process error (prescription, validation, preparation or administration). Errors were classified according to severity category and error type based on the

taxonomies listed in ISMP Spain. The errors observed and reported by the staff involved with the process were recorded by the pharmacist. The differences between frequencies were checked with the Chi-Square statistical test.

Results The total error frequency (EF) was 1.27%. The drugs most frequently involved were natalizumab (2.43%), infliximab (1.23%) and intravenous immunoglobulin (1.23%). No statistically significant differences between EF of each drug and the mean frequency were detected (P = 0.94, 0.76 and 0.94). The services involved were: Gastrointestinal (2.98%), Neurology (1.57%), Rheumatology (1%), Haematology (0.15%) and Oncology (0.035%). Only in the Haematology and Oncology services were differences from the average found (P = 0.038, p = 0.001). Most failed orders were manual (67%). All incidents occurred in the prescribing process and were detected by the pharmacist during validation. No errors reached the patient (category B). In the classification by error type: 67% were incorrect date (periodicity in the cycle), 22% dosage (50% excess) and 11% in the rate of administration.

Conclusions After reviewing the results we can assume that the main checkpoints where our activities should focus on are the following: incorrect date, dosage and rate of administration.

A possible methodological bias can be considered because the data were collected in the pharmacy unit and all errors were prescription errors – no pharmacy or process errors.

No conflict of interest.

GRP-136 PHARMACEUTICAL INTERVENTIONS AND E-PRESCRIBING TOOLS IN A TERTIARY-CARE INSTITUTION

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Background Failure Mode and Effect Analysis (FMEA) is a tool to identify, assess and prevent possible failures that could occur in a process.

Purpose

1. To describe FMEA as a method to identify weaknesses in the process of prescription and transcription of medical orders.
2. To isolate the key steps according to their risk priority number (RPN).
3. To report the steps taken.

Materials and Methods A multidisciplinary study group was assembled. Possible errors in the prescription/transcription workflow were identified and classified according to their RPN score (calculated by multiplying the severity, occurrence, and detection). Strategies for improvement were established.

Results Errors in the prescription were classified as follows: (1) Patient-and-history identification, (2) Clinical and laboratory data checkout, (3) Treatment conciliation, (4) Allergies, (5) Verbal prescription, (6) Handwritten prescription. Errors in transcription: (7) Patient identification (nurse), (8) Internally mailed prescriptions, (9) Paper transcription, (10) Check in pharmacy, (11) Patient identification (pharmacist), (12) Prescription validation, (13) Prescription printing, and (14) Acknowledgement of errors by the pharmacist. Top-ranked item (number), suggested solution, and indicator, respectively were: (5) Verbal prescription (288), storage of verbal prescriptions in pharmacy, % of verbal prescriptions; (9) Failure in paper transcription (288), computerised physician order entry (CPOE), % of electronic prescriptions; (14) Error report to the pharmacist (288), implementation of a two-way communication protocol, number of reports; (8) Paper-based prescriptions sent to pharmacy (243), CPOE, % of electronic prescriptions; (10) Check in pharmacy (216), CPOE, % of electronic prescriptions. The pharmacy, medical director, and Quality Unit were responsible for the changes undertaken in all cases.

Conclusions Verbal prescription, failure in paper transcription, error report and mailed prescriptions to pharmacy were the steps with the highest risk of error. For most cases, CPOE was implemented, whereas the percentage of electronic prescriptions was the key indicator to measure the overall improvement in these processes. In conclusion, further efforts and pharmacy policies should focus on the implementation of CPOE in all inpatient areas, thus preventing failure of prescription/transcription and validation loops.

No conflict of interest.

GRP-137 PHARMACEUTICAL INTERVENTIONS AT BEATRIZ ANGELO HOSPITAL

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Background Beatriz Ângelo Hospital (HBA) is 424-bed district hospital (210-bed Medical Specialties, 90-bed Surgical Specialties, and 22-bed Intensive/Intermediate care unit, among others).

All prescriptions are validated by a pharmacist at the Department of Pharmacy (DP), and it is always possible to access the electronic medical record of each patient to consult clinical data and record any suggestions or interventions. For the purposes of this study, pharmaceutical interventions (PIs) are defined as contact with other healthcare providers in order to prevent any medicines-related problems (MRPs).

Purpose To quantify and characterise PIs at HBA following the identification of any risks of MRPs during prescription validation.

Materials and Methods Prospective data collection from 1 July to 30 September and subsequent entering of the data into a PIs database created by the HBA's DP according to a protocol developed by the DP of Hospital da Luz and Faculdade de Farmácia da Universidade de Lisboa.

Results During the period of analysis, 914 PIs were recorded for a total of 280 patients (an average of 3.3 PIs per patient), with the following distribution: 242 PIs in Intensive Care units, 400 in the Medical Specialties, 214 in the Surgical Specialties and 58 in other units. The most frequent causes of PIs were: unsuitable use of medicine due to the renal function (n = 420 [46.0%]); potential adverse effect/toxicity (n = 139 [15.2%]); and lack of therapeutic efficacy (n = 112 [12.3%]). The most frequent PIs were therapeutic drug monitoring (n = 343 [37.5%]); suggestions regarding parameters found in blood tests (n = 241 [26.4%]); adjustments to dose and frequency of administration (n = 106 [11.6%]); adjustments to route of administration and medicine formulation (n = 07 [11.7%]).

As for the expected effects of PI, the most frequent were: increased effectiveness (n = 548 [60.0%]); reduced drug toxicity (n = 205 [22.4%]); reduced risk associated with route of administration (n = 104 [11.4%]).

Concerning the results of PI, the most frequent were: no clinical improvement/no clinical aggravation (n = 289 [31.6%]); problem prevented (n = 248 [27.1%]); clinical improvement (n = 238 [26.0%]). Of all PIs, 813 (88.9%) were accepted, and 328 (35.9%) of all PIs were recorded in the patient's electronic medical record.

Conclusions The high acceptance of PIs confirms the interdisciplinary cooperation of all the healthcare providers within the institution. The results show that PI is fundamental in promoting the good use of medicines and preventing MRPs. The development of a software application integrated in the electronic medical record will allow us to be more agile in documentation and to quantify the pharmacist's contribution within the clinical team.

No conflict of interest.

GRP-138 PHARMACEUTICAL INTERVENTIONS IN THE SETTING OF LIPIDS IN PAEDIATRIC PARENTERAL NUTRITION

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Background The preparation of paediatric parenteral nutrition (PPN) is subject to a great deal of variability in clinical practise. Standardization in the process is indispensable to ensure stability and improve patient safety. The pharmacist plays an essential role in the proper preparation of all-in-one PPN, and in interventions to avoid problems associated with instability.
Purpose The 2008 Spanish consensus on the preparation of parenteral nutrient mixtures established a minimum lipid percentage of 1.5%. The aim of this study was to detect PPN prescriptions with a lipid percentage below 1.5%, considered the safe limit for lipid emulsion stability in ternary mixtures.
Materials and Methods Observational retrospective descriptive study of PPN requirements in a tertiary level hospital. It was conducted between September 2011 and June 2012. Prescriptions in which the lipid composition of the PPN was less than 1.5% of the mixture were reviewed. In all cases, the intervention involved having the pharmacist contact the prescribing physician. Proposed alternatives to preserve the stability were: a) increase the proportion of lipid; b) exclude lipids from the mixture; or c) decrease the mixture volume.
Results A total of 107 interventions were made during this period. 100% of the physicians contacted accepted the intervention. In 81.3% of cases they agreed to increase the weight of lipids by an average of 1 g; the median was 0.8 g. The 18.7% remaining cases chose to exclude lipids from the mixture during the first few days, and add lipids gradually thereafter. In these cases the initial average of lipids was 1.1 g, and the median 0.8 g. In no case was the total volume changed.
Conclusions The results support the role of the pharmacist in the proper management of paediatric PNN, and in ensuring the quality and safety of the mixture. The results also support the importance of pharmacist-physician collaboration.

No conflict of interest.

GRP-139 PHARMACIST INTERVENTIONS IN THE EMERGENCY ROOM OF A TERTIARY-LEVEL HOSPITAL

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Background The presence of a full-time pharmacist in the ER is well established and acknowledged in many institutions to be of great value.
Purpose To analyse and assess the clinical impact of the pharmacist's interventions in the ER of a tertiary-level teaching institution.
Materials and Methods Patients >65 years-old on >4 medications were included. Drug-related problems (DRP) were classified according to: (a) therapeutic group; (b) intensity: mild, moderate, severe, and very severe; and (c) type (from Martí *et al*, 2005): indication, safety, adherence, and effect. Patients were monitored for up to 72 h upon subsequent admission to a ward.
Results 111 patients were included, 70.2% male, median age 78.9 years [65–94]. 34 pharmaceutical recommendations were made (one for every 3.2 patients included), of which 85.2% were subsequently accepted. The largest number of interventions concerned antithrombotics, followed by antihypertensives (29.4 and 5.4% of the interventions, respectively). 18.01% met an indication (81.1% of them were off-label conditions), 5.4% were to do with safety (mostly overdose), 1.8% concerned compliance and 0.9% involved under-dosing. Overall, 75.86% of the interventions had a mild-to-moderate impact, whilst 17.25% were moderate-to-severe (involving mainly anticoagulants), and 6.89% (immunosuppressants) were serious or very serious.
Conclusions Real time support to physicians and nurses in the ER allowed the early detection of potential DRPs in one third of the patients. Cardiovascular disease required almost two thirds of interventions, with antithrombotic drugs as the drugs mainly involved (1/10 patients in need of thromboprophylaxis lacked it). However, the clinical impact was minimised by the short time spent in the unit (slightly under one day), and by the further revision of their medicines upon admission to a ward. In addition, the narrower the therapeutic range of the drugs involved (such as immunosuppressants), the more important is the timely contribution of the pharmacist. In conclusion, the presence of a full-time pharmacist in the ER would reduce DRPs by an exhaustive assessment of pharmacotherapeutic needs, which is particularly important for older or polymedicated patients.

No conflict of interest.

GRP-140 PHARMACIST INVOLVEMENT IN CYTOSTATIC DOSES: IN AN OBESE POPULATION

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Background The dosing of chemotherapy according to the body surface area (BSA) in obese adult patients, who present a BSA above 2 m^2, is usually set to an established BSA maximum limit of 2 m^2. The recent publication (April 2012): 'Appropriate chemotherapy dosing for obese adult patients with cancer' in the American Society of Clinical Oncology Clinical Practice Guidelines (ASCO), considers the benefit of full dosing, without adjusting to a maximum BSA, especially when the goal of treatment is curative.
Purpose To suggest recommendations for adult obese people according to the current ASCO guidelines and evaluate the medical prescribers' level of acceptance.
Materials and Methods Prospective observational study of all patients from the oncology, haematology and palliative care services receiving chemotherapy from April to June 2012. In those obese patients where the cytostatic dose was adjusted to BSA 2 m^2, it was recommended to dose according to their actual BSA. The article was disseminated in these services and a spreadsheet was created to record the level of acceptance from the medical prescriber in each of the clinic units.
Results 368 patients (56% female) were included: 82.3% from the oncology service, 16.6% from haematology and 1% from the palliative care service. The average ± standard deviation age was 61.2 ± 1.6 years, 69.3 ± 14.1 Kg and 1.7 ± 0.2 m^2. The number of patients with a BSA above 2 m^2 was 26 (7%): 50% were from the oncology service and none from the palliative service.

Recommendations were made in 17 (65%) of the patients with a BSA >2 m^2, of which the haematology service was the largest cohort (58%). The acceptance level was 53% (66.6% haematology service). Recommendations were not made to 35% (66.6% oncology service) because the treatments were started after the article had been disseminated and full doses were prescribed.

The use of full doses was well tolerated by all patients, no adverse outcomes were observed of the use of greater doses of chemotherapy.

Conclusions Following the recommendations, full dosing in patients commencing treatment was observed.

Those recommendations not followed were due to patients whose treatment was not curative or those where a dose increase would cause a degree of toxicity.

The involvement of the Pharmacist responsible for updating the cytostatic unit led to a change in chemotherapy dosing in obese adult patients.

No conflict of interest.

GRP-141 PHARMACOTHERAPY FOLLOW-UP AND ANALYSIS OF CHANGES IN ANTIRETROVIRAL THERAPY

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Background Antiretroviral therapy (ART) has markedly decreased the morbidity and mortality due to HIV. However, toxicity, comorbidity and treatment failure, among others, may result in frequent initial ART regimen change.

Purpose To identify and analyse the changes in ART and the reasons for it in HIV patients over two years of follow-up in our hospital.

Materials and Methods We retrospectively reviewed all patients who attended the outpatients pharmaceutical care unit who received ART during a two-year period (2010–2011)

For each patient whose ART was changed we created a database of pharmaceutical care and recorded and analysed the following data: previous and new treatment, reason for treatment change, viral load, CD4 cell count, resistance profile and differential cost of change.

Results The table below summarises the total of patients reviewed

Abstract GRP-141 Table 1

Period of study	Number of patients in follow-up	Number of patients with treatment changes	Number of treatment changes
2010	111	22 (24.4%)	23
2011	113	14 (15.8%)	16

The most frequent reason for change was adverse reaction to treatment 15 patients (38.4%); the most common were dyslipidaemia (5 cases) and neuropsychiatric disorders (4 cases); the other reasons were simplification of antiretroviral therapy 10 patients (25.6%), treatment failure 4 patients (10.2%), resistance to treatment 4 patients (10.2%) and other causes 6 patients (15.4%) (noncompliance, interactions, cardiovascular risk and unknown).The most common treatment regimens preceding the change were tenofovir/emtricitabine (TDF/FTC) + lopinavir/ritonavir (LPV/r) and tenofovir/emtricitabine/efavirenz (TDF/FTC/EFV) (6 and 5 patients respectively), after the change tenofovir/emtricitabine (TDF/FTC) + darunavir/ritonavir (DRV/r) 600/100 mg was the most usual regimen (7 patients).

The average monthly differences in cost per patient after a change of antiretroviral treatment were 125.5 and 99.0 euros in 2010 and 2011 respectively.

Conclusions The identification and description of the changes in ART can act as a support tool in the overall monitoring of HIV patients.

It should be noted that adverse effects and desire to simplify ART contribute greatly to the reasons for change.

No conflict of interest.

GRP-142 PHARMACOVIGILANCE AND NON-MEDICAL PRESCRIBERS: EXPLORING PERCEPTIONS OF TRAINING, CONTRIBUTION AND POTENTIAL FOR ENHANCEMENT

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Background The UK-based process for spontaneous reporting of adverse drug reactions (ADRs), known as the 'Yellow Card Scheme' (YCS), [1] encourages reporting by healthcare professionals, patients and the general public. Poor reporting rates are a long-standing limitation of YCS. [2] The introduction of prescribing rights for pharmacists, nurses and other healthcare professionals has the potential to enhance participation in regulatory pharmacovigilance processes. [3]

Purpose The aim of this research was to determine nurse and pharmacist prescribers' perceptions of their training, contribution and potential for enhancement of their pharmacovigilance role.

Materials and Methods Participants completed an online survey on: prescriber demographics (13 questions); pharmacovigilance training (9); YC reporting (13); attitudes toward ADR reporting (13); comments encouraging YC reporting (4). Nurse prescribers were sampled through the Association of Nurse Prescribers (n = 912); pharmacist prescribers (n = 2439) through professional organisations. Quantitative data were analysed using SPSS; open question responses analysed thematically. Ethical review was not required.

Results Responses were received from 293 nurse (32.2%) and 320 pharmacist (13.1%) prescribers. Asked whether pharmacovigilance featured in their prescribing training, a third 'couldn't remember' (35.6%); nurses indicated greater recall ($p < 0.001$). While a third (34.2%) strongly agreed/agreed that they needed further training, fewer (29.6%) were unsure/did not agree that they were competent in pharmacovigilance. Less than half (41.4%) had never submitted a YC. Pharmacist prescribers were more likely to have reported ($p < 0.001$). A third (35.1%) expressed concern about legal implications of ADRs from their prescribing. Most commonly suggested measures to enhance reporting were publicity and education.

Conclusions Although the response rate was low, respondents provided detailed answers. Respondents felt competent and aware of their pharmacovigilance role with further training indicated. Findings may not be generalisable; no information is available on non-respondents. Increased publicity and education are identified as key measures for enhancing non-medical prescribers', other healthcare professionals' and patients' YC reporting.

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No conflict of interest.

GRP-143 POTASSIUM MONITORING: DO WE GIVE IT THE ATTENTION IT DESERVES?

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Background Potassium (K+) is the principal intracellular cation and is essential to maintain the function of multiple organs. It is a critical component of cardiac conduction and has a narrow therapeutic/toxic range.
Purpose To investigate the effect of pharmaceutical intervention through computerised prescription order entry (CPOE) in hospitalised patients with K+ disorders.
Materials and Methods Prospective study carried out over 7 weeks. Pharmacists first added information about drugs that affect the K+ level as a support in the prescription programme. We then identified patients with abnormal K+ levels using a link with laboratory data (<3.1 and >5.3 mmol/l). Pharmacists reviewed the pharmacotherapy daily in order to detect possible medication errors related to K+ disorders. Lastly we analysed the effect of pharmaceutical recommendations and physician acceptance rate.
Results 183 patients were included (67 ± 17 years old on average), 128 patients (69.9%) with hypokalaemia and 55 (30.1%) with hyperkalaemia. A total of 3,380 electronic prescriptions were selected. Of them, 540 (16.0%) could affect K+ levels mainly through furosemide, piperacillin-tazobactam and meropenem; pharmacists checked 383 orders thoroughly to prevent possible medication errors. 232 (60.6%) required pharmaceutical recommendations, 130 of them (56.0%) were related to optimising K+ therapy in hypokalaemic patients and 35 (15.0%) were safety recommendations for closer monitoring. Clinicians accepted 72.4% of recommendations.
Conclusions There is a high rate of prescription errors related to K+ disorders that could jeopardise patient safety. Pharmaceutical intervention through CPOE helps to minimise them and increases physician awareness of the necessity of closer K+ monitoring in these patients.

No conflict of interest.

GRP-144 POTENTIAL DRUG-DRUG INTERACTIONS IN PATIENTS ADMITTED TO A TRAUMA HOSPITAL

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Background The current complexity of pharmacotherapy in trauma patients increases the risk of drug-drug interactions (DDIs).
Purpose To identify potential DDIs (severe/moderate) and their clinical relevance in patients admitted to a tertiary trauma hospital on an ordinary day.
Materials and Methods One-day retrospective observational study performed in patients admitted to a trauma hospital. The following variables were recorded for each patient from the pharmacy database: sex, age and pharmacology treatment during a day of hospitalisation.

A Spanish DDI database (Medinteract NR) was used to determine potential DDIs.
Results The study included 110 patients (54 men and 56 women) with a mean age of 61 years (range 13–94), 45% of those patients being over 65 years old. The mean number of drugs prescribed per patient was 8.8. We detected 357 potential DDIs (30 severe, 327 moderate) in 89 of the 110 patients (mean potential DDI of 3.5 per patient).

Among the severe potential interactions we highlighted the following risks:

- 20% involved an increase in the risk of haemorrhage (enoxaparin-acetylsalicylic acid, enoxaparin-acenocoumarol),
- 23% involved a prolonged QT interval (quetiapine-haloperidol and quetiapine-citalopram),
- 37% involved a serotoninergic syndrome (due to the association of an opioid analgesic with a selective serotonin reuptake inhibitor)
- 6% involved rhabdomyolysis: simvastatin-risperidone, simvastatin-amlodipine

Conclusions Due to the high incidence of potential DDIs, the pharmacist should play two key roles when facing a potential interaction: if possible, suggest an alternative with the same therapeutic profile, but without the interaction risk; or evaluate the benefit/risk balance and if it is worth taking the risk, monitor the patient closely and warn the rest of the medical staff.

No conflict of interest.

GRP-145 POTENTIALLY INAPPROPRIATE PRESCRIBING IN ELDERLY FALLERS: A REVIEW OF CURRENT PRACTISE AND THE IMPACT OF PHARMACIST-LED MEDICINES REVIEWS

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Background Falls in the elderly represent a significant health burden in Ireland and internationally. Falls are consistently the most frequently reported patient incident in the MMU Hospital. Polypharmacy and inappropriate prescribing are considered important extrinsic risk factors for falling. Section H of the Screening Tool of Older Persons' Potentially Inappropriate Prescriptions (STOPP) criteria relates to medicines known to adversely affect fallers.
Purpose To explore the current level of medicines review afforded to elderly fallers.

To determine if use of the STOPP criteria & subsequent pharmacist intervention result in a greater reduction in the number of prescriptions for, & the number of patients receiving, ≥1 potentially inappropriate medicines (PIMs), compared to the current standard of care.

To develop prescribing guidelines for inclusion in a future falls prevention policy for the hospital.
Materials and Methods A STOPP-based research protocol for the identification of PIMs in elderly fallers was developed and piloted.

A programme of usual care versus pharmacist intervention was undertaken.

In the intervention study the investigator alerted medical teams to PIM(s) through communication in patients' medical notes.

Ward pharmacists reviewed patients' drug charts after the investigator's review, & recorded changes to identified PIMs.

The investigator participated in a falls working group set up to develop and implement a policy on the prevention of falls in MMUH.
Results Pharmacist intervention resulted in reductions in both the number of patients prescribed ≥1 PIM, & prescriptions for PIMs; however, these results failed to reach statistical significance ($P = 0.08$ & 0.074, respectively).

Patients prescribed ≥1 PIM were taking 3 more regular medicines than those who were not ($p < 0.001$).

The MMUH Falls Working Group developed a policy on falls prevention. The STOPP criteria were used to formulate the relevant sections relating to medicines & falls.
Conclusions Pharmacist intervention may have a positive impact on rates of potentially inappropriate prescribing in elderly patients who fall during admission. However, further research is needed.

No conflict of interest.

GRP-146 PRACTICE ASSESSMENT OF ANTIBIOTHERAPY GUIDELINES FOR URINARY INFECTIONS AND LOWER RESPIRATORY TRACT INFECTIONS IN ELDERLY PATIENTS OF A NURSING HOME

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Background The elderly population keeps growing and a lot are living in nursing homes, where infections are frequent as patients are weak and the risk of transmission is high.
Purpose Nursing home physicians wanted to standardise practise for antibiotic treatment. With the aim of quality and safety of care, prescriptions for antibiotics for urinary infections (UIs) and lower respiratory tract infections (LRTIs) were assessed.
Materials and Methods A prospective study: for two months, each prescription for antibiotics was studied. For each antibiotic, the site of infection, dose, duration and reassessment of the treatment after 48 to 72 hours were checked. These criteria were compared to guidelines approved by our 'antibiotics committee'. Results of bacteriological samples, history of antibiotic treatment in the previous three months were also checked.
Results 82 patients were treated with antibiotics. Mean age was 81.4 years old. There were 56 LRTIs, 13 UIs. There are no guidelines for the treatment of bronchitis in the elderly so assessment of antibiotic treatment was not possible. The choice of drug was appropriate in 100% of UIs and LRTIs. The dose was adequate in 100% of the cases. Duration of treatment was adequate in 50% for cystitis, 0% for prostatitis, and 97.4% for LRTIs. Most of treatment was empirical (95.5%), few bacteriological samples were taken: 3% for pneumonia, 7.10% for bronchitis, 0% for exacerbations of chronic obstructive pulmonary disease, 62.5% for cystitis, and 33.3% for prostatitis. Traceability of reassessment after 48–72 hours couldn't be found in 98.7% of cases.
Conclusions Specific guidelines for antibiotic treatment were written to facilitate and standardise the prescribing process. Pharmacists and physicians decided to treat bronchitis like pneumonia. Indeed, this study underlined the specificity of patient care in nursing homes. However, more bacteriological samples need to be taken to prescribe the right treatment and to prevent antibiotic resistance.

No conflict of interest.

GRP-147 PRE-POST STUDY OF INTERRUPTIONS IN A PHARMACY DEPARTMENT

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Background Interruptions are a major concern in hospital pharmacy settings, given the nature and the requirements of the work such as sustained focused attention, validating prescriptions and performing complex processes. Interruptions may jeopardise the safe delivery of pharmaceutical services.
Purpose The primary objective was to compare the number of stimuli per hour received and made by pharmacists and pharmacy technicians between 2010 and 2012. The secondary objective was to evaluate the impact of five corrective measures.
Materials and Methods This was a pre-post cross-sectional observational study. The study was conducted in the main dispensing area of the pharmacy department of a University Hospital Center. The area is composed of three data entry stations each assigned one pharmacist and one pharmacy technician. Stimuli received and made by pharmacists and pharmacy technicians were counted before (2010) and after (2012) the implementation of corrective measures. The effect of five corrective measures was measured with a t-test for targeted stimuli.
Results Sixty-two random 30-minute observation periods in 2010 (n = 2,663 stimuli) and 31 periods in 2012 (n = 1,217 stimuli) were conducted. An average rate of 85.9 ± 22.2 stimuli per hour was calculated in 2010 vs. 78.52 ± 20.1 in 2012 (P = 0.06). We observed a statistically significant decrease in the mean rate of stimuli per hour for three types of stimulus for pharmacists (i.e. printer noise 3.7 ± 2.4 vs. 0.6 ± 1.8 $p < 0.001$, face-to-face non-professional conversations 4.4 ± 4.2 vs. 1.2 ± 1.8 p = 0.003, Web browsing 1.3 ± 2.2 vs. 0 ± 0 p = 0.009) and for one type of stimuli for pharmacy technicians (i.e. printer noise 4.7 ± 3.2 vs. 0.75 ± 1.8 $p < 0.001$).
Conclusions Despite the corrective measures, there was no statistically significant difference between the rates of stimuli per hour observed in 2010 and 2012. Other studies are needed to identify more efficient corrective measures and to better describe the nature and the impact of stimuli, distractions and interruptions in pharmacy practise.

No conflict of interest.

GRP-148 PREPARATION OF A RISK MAP FOR A PHARMACY SERVICE IN A HEALTHCARE AREA

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Background Safety is a priority in the medication use process.
Purpose To prepare a risk map to identify the risks to safety in a Pharmacy Service and prioritise the risks found.
Materials and Methods Formation of a multidisciplinary working group.

1. Description of the different processes linked to the healthcare area which included the clinical pharmacy unit sited in the Hospital and primary health care pharmacies.
2. Identify the risks linked to the processes by the FMEA or Failure Mode and Effect Analysis: (mode of failure, cause of failure, effect of failure).
3. Rank risks by a risk matrix (vertical axis: likelihood and horizontal axis: consequence). The matrix uses a colour code.
4. Prioritize the risks by the modified Hanlon method. Once the risks have been identified, rate each risk on the following criteria: size of the risk (A), magnitude of the risk (B), feasibility of possible interventions (C) and effectiveness of potential interventions (D). Then, calculate priority scores using the following formula: $(A+B)C \times D$.

Results In the unit clinical hospital pharmacy, eleven processes were identified: 1) Drug acquisitions; 2) Pharmacy stores; 3) Drug stock management; 4) Automatic dispensing systems; 5) Traditional drug-dispensing systems; 6) Out-patient pharmacy; 7) Patient education; 8) Centralized cytotoxic preparation; 9) Pharmacy production; 10) Intravenous admixture preparation; 11) Clinical trials. The process with the highest risk score was the centralised cytotoxic preparation.

In primary health care pharmacies, eight processes were identified: 1) Methadone treatment programme; 2) Drug stock management; 3) Pharmacy stores; 4) Vaccination dispensing and storage; 5) Management of off-label drug use; 6) Drug prescription validation; 7) Health education; 8) Rational use of drugs. The process with the highest risk score was vaccination storage and dispensing.
Conclusions Preparing a risks map is a useful tool to identify risks to safety. Prioritization of the risks allows us to identify the most unsafe practises and provides a starting point for implementing measures to improve safety in the work environment.

No conflict of interest.

GRP-149 PRESCRIBING ERRORS IN ANTINEOPLASTIC PRESCRIPTIONS

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Background Validation of antineoplastic prescriptions is an important job in hospital pharmacy to ensure appropriate patient treatment.
Purpose To evaluate the prescribing errors in antineoplastic orders detected during oncology pharmacist validation.
Materials and Methods We conducted a two year prospective study (2010–2011) in which all prescriptions containing antineoplastic agents were reviewed for errors and all were accounted for in the analysis. Adjuvant medicines were excluded. One oncology pharmacist and one second year pharmacy resident were needed for this work. Prescriptions included: standardised chemotherapy order forms (SCOFs), individually typed and handwritten prescriptions. The primary outcome was the number of prescribing errors detected. The error rate was calculated by the ratio of the total number of prescription errors to the volume of prescriptions. Prescribing errors were then classified as follows: dose changed, antineoplastic error, dose reduction error, dose calculation error, dose omission, scheme changed, acronym changed, wrong patient identification, failure of therapeutic programme, antineoplastic omission and addition.
Results The number of prescribing errors detected was 80. The error rate was 0.55% (for a total of 14,600 prescriptions). Principal types of errors detected were: dose changed (1%), antineoplastic error (5%), dose reduction error (14%), dose calculation error (32%), dose omission (12%), scheme changed (12%), acronym changed (1%), wrong patient identification (1%), failure of therapeutic programme (16%), antineoplastic omission (5%) and addition (1%). None of the errors reached the patient.
Conclusions Our study points to the fact that, although chemotherapy prescribing errors are intercepted during pharmacist validation and do not reach the patient, there are still some problems in the chemotherapy ordering process and we should target preventive measures in order to improve patient safety.

No conflict of interest.

GRP-150 PRESCRIPTION OF BISPHOSPHONATES IN CHRONICALLY INSTITUTIONALISED PATIENTS

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Background Osteoporosis is associated with significant morbidity and mortality. Oral bisphosphonates have become a mainstay of treatment, but concerns have emerged that long-term use of these drugs may suppress bone remodelling, leading to unusual fractures.
Purpose To assess the intervention on bisphosphonates prescribing of institutionalised geriatric residential centres, by the Prescription Quality Unit (PQU).
Materials and Methods The PQU cheques that bisphosphonate treatment is based on patient age, duration of treatment, fracture, concomitant medicines and bisphosphonate prescribed. The PQU reviews the patients' medicines plans. The results of the review are communicated to the respective physicians, who analyse and discuss the medicines plans on the PQU report. The PQU performs regular clinical sessions and provides the doctors with drug data information (alerts, newsletters, surveys) involved in prescription reviews.
Results Interventions in bisphosphonates prescriptions from June 2011 to June 2012:

383 interventions were made (3.7% of all interventions) and 86 were accepted, 22.4% on the bisphosphonates.
In 2011 one was accepted (19.11%) while in 2012 27.2% were accepted.
The mean age of patients with bisphosphonates was 86 years (10.63% male and 89.37% female).
Bisphosphonates represented 4.1% of total prescriptions.
The breakdown of bisphosphonates prescriptions was 75.4% alendronate, 4.3% alendronate/cholecalciferol combination, 5.6% ibandronic acid and 14.61% risedronic acid.

Conclusions The intervention in bisphosphonates prescribing has been much more effective in 2012 than in 2011 and more intensive updates and drug date information has been provided to physicians in this period.

There were no problems in the use of the recommended bisphosphonate, alendronate.

No conflict of interest.

GRP-151 PROGRAM INTERVENTIONS TO OPTIMISE THE DURATION OF ANTIBIOTIC TREATMENT

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Background Reducing unnecessarily prolonged antibiotic treatment is one of the main initiatives to ensure the appropriate use of antibiotics.
Purpose To analyse the preliminary results of a pharmaceutical interventions programme trying to minimise the duration of antibiotic treatment, promoted within the antibiotics stewardship programme of a tertiary hospital.
Materials and Methods A protocol was agreed on by the antibiotics stewardship group, to capture via the Pharmacy Department antimicrobial treatments lasting more than 10 days made through the electronic prescribing programme. A pharmacist intervened to suspend or change these antibiotics treatments. We excluded: oncohaematology patients, treatments for urinary tract infections, endocarditis, diabetic foot, empyema, if Pseudomonas aeruginosa was detected or when it was impossible to confirm the type of infection. We analysed the results of interventions from 27 January to 17 July 2012. The following variables were examined: antibiotics involved, prescriber department, number of interventions, acceptance, indication for treatment and treatment at discharge.
Results A total of 111 interventions were carried out. The most commonly used antibiotics were: amoxicillin/clavulanic acid (15.3%), meropenem (13.5%) and levofloxacin (13.5%). The departments most involved were: Multipathological Care (43.2%), Internal Medicine (35.1%) and Pneumology (8.1%). 74.8% of the antibiotic treatments were initiated because of respiratory infection. 18.9% of patients maintained antibiotics at discharge. The range of overall duration of antibiotic treatment in respiratory infection ranged from 10 to 20 days. The overall acceptance of the interventions was: 65.8%. Within the accepted interventions, 68.5% caused antibiotic treatment to be suspended and 31.5% caused a change in the antibiotic used.
Conclusions The preliminary result of acceptance of interventions may be considered positive to ensure the programme is continued. To improve the acceptance of the interventions, it is necessary to increase involvement of Internal Medicine and Pneumology. The optimal duration of antibiotic therapy must assess the overall exposure, taking into account that established at the outpatient level.

No conflict of interest.

GRP-152 PROSPECTIVE STUDY ON THE USE OF RESTRICTED-USE ANTIBIOTICS: ERTAPENEM, LINEZOLID, TIGECYCLINE AND DAPTOMYCIN

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Background Because of antibiotic resistance problems and frequent inappropriate use of antimicrobial agents in hospitals, these drugs have often been the target of attempts to restrict their use.
Purpose To analyse the appropriateness of use of restricted-use antibiotics approved by the Drug and Therapeutics Committee (DTC).
Materials and Methods The study was conducted prospectively from October 2011 to February 2012 in our hospital.

We included all patients treated with restricted antibiotics. The data required for the clinical monitoring of patients were collected from the clinical history. The variables were: age of the patient and laboratory data, clinical service, justification of the indication and duration of treatment.
Results We included a total of 100 patients, of whom 39 were treated with ertapenem (39%), 7 with tigecycline (7%), 49 with linezolid (49%) and 5 with daptomycin (5%). The percentage of non-compliance, based on criteria for use approved by the DTC, was 14%.

In analysing the results for Services we found that 90% of prescriptions that conformed to the approved DTC indications were prescribed by General Surgery, 81.8% by Internal Medicine, 55% by Infectious Diseases, 85% by Traumatology, 71.4% by Cardiovascular Surgery, 66% by Pulmonology, 50% by Urology and 100% by other services. The suitability was 92.3% for ertapenem, 85.71% for tigecycline, 83.67% for linezolid and 60% for daptomycin. The average duration of treatment was 4.5 days for ertapenem, 12.5 days for linezolid, 11 days for tigecycline and 18 days for daptomycin.
Conclusions

1. The appropriateness of use of restricted antibiotics as approved by the DTC, although acceptable, could be improved.
2. An antibiotic control programme between the Pharmacy and Infectious Diseases could improve the quality of patient care.

No conflict of interest.

GRP-153 RECOMMENDATION FOR ERROR PREVENTION IN ANTICANCER DRUG TREATMENT

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Background Due to the high toxicity of anticancer drugs and their low therapeutic index, any errors in anticancer drug treatment can cause serious injury, even at approved doses. For this reason it is necessary have some national guidance to prevent errors during anticancer treatment.
Purpose To prevent errors in anticancer drug treatment, the Ministry of Health has developed a specific Recommendation addressed to healthcare workers (physicians, pharmacists and nurses).
Materials and Methods A working group consisting of pharmacists, oncologists, nurses, psychologists and patients representatives was set up. The same format of Recommendations made by MoH for Patient Safety was followed.
Results The Recommendation is addressed to Regions, Health facilities, clinical risk managers, healthcare workers; it finds application inside the Medical Oncology and Haematology Units of private and public hospitals, inside hospital pharmacies and at the patient's home. The Recommendation is to protect patients needing anticancer drug treatments. Highlight: the hospital should provide working instruments and develop a procedure including all instructions for proper anticancer drug management. They also have to: draw up a Patient Safety Training Plan, promote communication and integration among health professionals, provide accurate and complete information to patients and their families, consider the psychological and emotional state of patients and give detailed indications for the delivery of drugs at discharge.
Conclusions The Recommendation is a reference for health professionals involved in handling anticancer drugs, providing information about the patient's objectives and expected benefits from treatment. The document provides guidance aimed at preventing errors that can occur during anticancer drug treatment and includes recommendations encouraging the promotion of clinical governance. A verification of this Recommendation is expected soon. Many experts gave their suggestions to facilitate its implementation.

No conflict of interest.

GRP-154 RECONCILIATION AND DRUG INFORMATION TO GERIATRIC POLYMEDICATED PATIENTS AT DISCHARGE USING INFORMATION TECHNOLOGY

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Background Aging of the Spanish population increases the elderly patient consensus and demand for health care in hospitals. Elderly patients have particular characteristics that increase the risk of medication errors.
Purpose To establish a programme that involved medicines reconciliation and adapted drug information for elderly patients with polypharmacy at discharge. Several electronic resources were used in order to promote continuity of care and adherence to pharmacotherapy.
Materials and Methods Geriatricians selected patients according to three criteria: more than 70 years old, at least five medicines at discharge and some difficulty understanding them. Doctors electronically requested the Pharmacy Department to complete the developed 'Medication Information Form at Discharge.' A pharmacist reviewed the treatment prescribed at discharge and reconciled it with the patient's medicines during hospitalisation via electronic records. The pharmacist resolved discrepancies found with the physician. A visually appealing and understandable form was submitted electronically to be given to the patient.
Results From April 2011 to March 2012, this service was performed for 57 patients. Most of them were women (77.2%) with a mean age of 88.5 (SD 6.2) years old. 555 Drugs were reported (9.7 drugs/patient) and 696 were reconciled (12.2 drugs/patient). 143 discrepancies were found (2.5 discrepancies/patient): 135 of them were justified (94.4%) and the other 8 were medicines errors (0.014%).
Conclusions Information technology enables pharmacists to undertake this work: improving communication between professionals, inserting the 'Medication Information Form at Discharge' into clinical documentation, enabling medicines reconciliation and adapting the information sheet to the geriatric population. This practise provides reconciliation of medicines that have been prescribed before, during and after hospitalisation. In summary, it is necessary to achieve adequate therapeutic adherence and to avoid administration errors, which may have consequences on patient health and increased costs.

No conflict of interest.

GRP-155 RECONCILIATION ERRORS ASSOCIATED WITH ANTIRETROVIRAL TREATMENT

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Background Electronic health records systems facilitate reconciliation of patients' medicines. However, chronic medicines prescribed by hospital physicians and dispensed only at hospitals such as HIV treatments, are not yet recorded in primary care records and sometimes the dose and frequency are not correctly recorded in patients' medical histories when they enter hospital.
Purpose To describe and analyse the discrepancies in HIV chronic treatments prescribed by hospital practitioners at admission to hospital.
Materials and Methods From June to October 2012, data of patients admitted with antiretroviral medicines were collected. HIV patients admitted to the Infectious Diseases Service or treated chronically in other hospitals were excluded. The pharmacist compared the computerised prescriptions at admission with the current HIV treatment recorded in the pharmacy chronic prescriptions dispensed programme (Farhos). In the event of discrepancies the pharmacist informed the physician/nurse and corrected the order. Non-justified discrepancies were notified and classified as reconciliation errors.
Results 68 patients' treatments were analysed (Average age: 46 years. 44 men, 24 women). 49 patients were admitted to the emergency ward (E) and 19 to other wards (O). The average HIV drugs per patient were 2.2. In 17 patients (25%) the treatment was not correct (22.5% of E and 31.5% of O).

23 discrepancies were found in 150 medicines (0.33 per patient). 12 of these were associated with darunavir (41.6% of darunavir treatments were wrong). Classified by reconciliation errors: dose/frequency incorrect (16), omission (5), wrong drug (2).
Conclusions Incorrect prescriptions at admission of chronic hospital medicines such as HIV treatments cause a great number of reconciliation errors. Complex regimes, such as those including darunavir, facilitate prescription errors. Until HIV medicines are recorded in patients' primary care records or recording is complete in hospital medical histories, the pharmacy data and pharmacist interventions are needed to guarantee the correct treatment. Due to the results, HIV stock drugs were removed from the Emergency Service.

No conflict of interest.

GRP-156 RECONCILIATION ERRORS AT CARDIOLOGY UNIT ADMISSION

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Background The reconciliation process detects medicines errors and is a key point for improving patient safety.
Purpose To analyse the incidence, type and severity of reconciliation errors at Cardiology Unit admission.
Materials and Methods Descriptive prospective observational study from October-November 2011 in patients admitted to the Cardiology Unit in a tertiary hospital. Demographic data studied: sex and age.

The patient's usual chronic treatment, obtained by comprehensive interview of the patient and by reviewing the clinical history, was compared with the medicines prescribed on admission in order to identify: no discrepancies (ND), intentional discrepancies (ID) (Formulary substitutions/modifications in response to a patient's clinical status) and apparently unexplained discrepancies requiring clarification with the physician (DRCs). After clarification, Reconciliation Errors (REs) (discrepancies resulting in physician order changes) were classified by type and severity.
Results 113 patients were included. The median age was 71.2 ± 10.4 years. 56.2% were male. Only 50 patients were reconciled due to logistical reasons.

528 medicines investigated: 159 ND (30.11%), 256 ID (48.49%) and 113 DRCs (21.40%).

After clarification, 47 (41.59%) DRCs were REs, while 5 discrepancies (4.42%) (2 patients) could not be resolved. 8.91% of prescriptions (47/528) were REs.

REs affected 22 (45.83%) of the 48 real study patients. The average number of REs per patient was 2.14 ± 1.21.

Types of RE were: omissions (n = 31), different dose/route/frequency (n = 7), unnecessary medicines (n = 5), wrong medicine (n = 3) and incomplete prescription (n = 1).

In terms of severity, REs were distributed as follows: No error, but possible (n = 10), error that does not reach the patient (n = 25), error reaching but not harmful (n = 11) and error requiring monitoring (n = 1).
Conclusions The process of taking a pharmacotherapeutic history at hospital admission is inadequate since almost half of the patients showed REs, mostly omissions.

Although most REs caused no harm, if perpetuated at discharge, they might have worse consequences and/or affect the effectiveness of treatment.

The pharmacist's work in hospitalisation units is vital to reduce errors in care transitions and represents an opportunity to develop integral pharmaceutical attention in order to increase patient safety.

No conflict of interest.

GRP-157 REDUCING THE INCIDENCE OF "MISSED DOSES" AT NORTH BRISTOL NHS TRUST (NBT)

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Background In 2010 the National Safety Agency published a report on reducing harm from omitted and delayed medicines in hospital: 'Missed Doses occur when a medicine is not given to a patient when prescribed and may result in harm'.

NBT invested in Patient Safety, including: the Safer Patients Initiative (SPI2) and the Southwest Quality and Patient Safety Improvement Programme (SWQPSI). There are various causes of missed doses, our initial focus was drug unavailability.

NBT was set targets by the local commissioning body of reducing missed doses by 20% by 2010/11, and a further 15% by 2011/12.
Purpose To reduce the incidence of missed doses due to drug unavailability. The objectives were to: Raise awareness of the effects on patients; Understand the reasons for missed doses and to introduce an e-audit tool for ward use.
Materials and Methods Using improvement methodology, tests of change were trialled and spread to 40 wards:

Phase 1: February 2010–July 2010:
We determined the criteria for missed doses and developed an e-audit tool using Plan Do Study Act (PDSA) cycles.

Phase 2: August 2010–April 2011:
The Ward e-audit tool was tested then spread; Wards were given a stock medication location report and Pharmacy prioritised missed doses.

Phase 3: May 2011–September 2011:
A Training package was introduced/spread and Ward Posters and Handover sheet were developed.

Phase 4: October 2011–August 2012:
Monthly run charts of results were shared with senior managers. Pink order slips and orange leaflets were introduced.

Results We achieved our target for 2010/11. The 1.95% target for 2011/2012 was more difficult but was achieved as shown in the table.
Conclusions In achieving our targets we improved communication and changed the culture from staff not unduly concerned with missed doses to staff taking action to reduce missed doses and improve patient care.

Abstract GRP-157 Table 1

Date	% Missed Doses (Target 1.95%)
Nov 2011	2.37%
Jan 2012	1.88%
Feb 2012	1.47%
Mar 2012	1.05%

No conflict of interest.

GRP-158 REPORTING AND ANALYSIS OF ERRORS IN CANCER TREATMENT IN THE ANTIBLASTIC DRUGS LABORATORY OF THE EUROPEAN INSTITUTE OF ONCOLOGY

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Background The lack of management software for patients undergoing chemotherapy suggested to us that we should investigate errors that have occurred at all stages of the process: prescription, transcription, preparation, distribution and administration of treatment.
Purpose To encourage reports and classify the errors, in order to develop a computerised system of internal management of chemotherapy which can reduce the risk of error at all stages.
Materials and Methods Two reporting channels were established: one for major errors, such as prescriptions or preparations containing incorrect drugs or dosages, improper units of measurement, diluents incompatible with the active ingredient, improper administration. These errors are shared in corporate software with the Risk Management Office.

The second concerns minor errors, prescriptions containing compilation errors, incomplete compilation of the treatment regimen, incomplete administration of treatment; these errors are reported in an internal Excel file.
Results From January to September 2012, 73 major errors were reported from a total of 30406 preparations. Some of these were: prescription of paclitaxel instead of docetaxel, vinorelbine written as vinblastine; preparation of a 5-fluorouracil weekly dose in a two-day infusor, administration of paclitaxel bag to the wrong patient. In 85% of these cases the intervention of pharmacist avoided the error. 468 minor errors were reported, including 447 prescription errors, 3 transcription errors, 8 for lack of a cheque of the output treatment and 10 for incomplete delivery of the treatment.
Conclusions This analysis allowed us to draw a picture of the most frequent types of error. Most of them concerned the prescription stage, which we hope to minimise with the implementation of a computerised prescribing system. This will also cut down the transcription and administration errors by reading the barcode of the preparation with a patient wristband. The reduced number of preparation errors can be attributed to the use of an automated system for chemotherapy preparation.

No conflict of interest.

GRP-159 RETROSPECTIVE ANALYSIS OF MOST FREQUENT RISK ERRORS RELATED TO INFORMATIZATION SYSTEM FOR PRESCRIBING AND ADMINISTERING MEDICATION

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Background Although implementing an electronic system shows significant functional effects associated with saving time, reducing costs and contributes to a safe medication process by improving patient safety and quality of service, it can also cause confused actions leading to new types of medication errors (MEs).
Purpose To identify and classify the most frequently observed MEs generated by the computerised tool when prescribing (physician order) and administering drugs (nurses' work).
Materials and Methods In June 2011, Orbis Medical (Agfa-Healthcare) software was introduced in our hospital for the medication process including integrated electronic prescription, pharmaceutical analysis and administration (4 clinical units representing 107 beds). Different risks of error were identified during pharmaceutical interventions (PIs) recorded between June 2011 and October 2012 and classified according to the French Society of Clinical Pharmacy recommendations. The focus is on MEs related to computerisation.
Results 605 PIs were made on 3933 prescriptions supplied over 466 days. Among these notifications, 1/3 were attributable to the use of the electronic system. Most MEs reported were due to: 1-regarding the prescription: incorrect dose regimen due to selecting the wrong units, incorrect schedule for dose administration, misuse of the commentary zone (free full text related to specific information), redundancy of 2 lines of the same prescribed drug, false interpretation of alert message; 2-regarding administration: failure to record administration, wrong drugs selected to be administered, misuse of the philtre function, single validation for different schedules.

It was noticed that MEs decreased after the staff had used the software for a period of time.
Conclusions Introducing an electronic tool may have an impact on professional practise. Although making healthcare processes safer, it generates new types of iatrogenic harm (other studies have revealed 5–35% MEs were attributable to computerisation). The introduction of new technology should be accompanied by regular training and evaluation to prevent misuse and potential adverse events.

No conflict of interest.

GRP-160 REUSE OF STERILE IV LIDOCAINE 2% VIALS IN BERGMANN'S INFUSION IN AN ORTHOPAEDIC DEPARTMENT IN STIP CLINICAL HOSPITAL

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Background Single-use vials should be used clinically only for one dose for one patient and then discarded or reused under strictly controlled conditions. Certain conditions may justify repacking of single-use vials into smaller doses each intended for a single patient. This process must be performed under aseptic conditions by properly trained operators.

Purpose To demonstrate the necessity for aseptic technique and conditions and preparation by the pharmacy.
Materials and Methods For a period of six months 15 patients were prescribed Bergman's solution 500 ml to which was added 5 ml pentoxiphylin and 12 ml lidocaine 2% (50 ml vials divided between 4 patients) in the orthopaedic department. This infusion was prepared in the nursing room, by the nurses without suitable aseptic conditions. For the next six months pharmacists prepared this infusion in the hospital pharmacy aseptic facility. 17 patients in the orthopaedic department got this solution.
Results The nurses used each 50 ml vial of lidocaine for several patients until the vial was used. The vial was saved for use the following day after initial entry. Within days of application 8 patients required antibiotics and prolonged hospitalisation. Microbiological tests showed MRSA infection. One of the nurses forgot to wash hands before preparing the infusion for 3 patients, one used the same needle for both drugs for 4 patients, and one accidentally touched the needle in 1 patient. In the next six months the hospital pharmacy prepared 17 infusions for 17 patients in the aseptic facility. All patients finished their treatment in very good condition without any complications.
Conclusions Nurses' rooms and training are unsuitable for reusing single dose vials for several patients. Subdividing must follow highly controlled environmental conditions, with training and qualifications of personnel and procedures for reuse, which are met by the hospital pharmacy and pharmacists in our hospital.

No conflict of interest.

GRP-161 RISK ASSESSMENT FORMS FOR PHARMACY PREPARATION

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Background Pharmacists are allowed to prepare medicines for the needs of patients. They have to balance the benefits and risks of the clinical and pharmaceutical qualities. In other words they have to perform a risk assessment for extemporaneous preparation as well as for stock preparation.

To perform a risk assessment the pharmacist should be able to list the benefits and risks and needs a tool to balance them. Some approaches have been published, but they don't deal with all aspects in one view. We think there is a need for a risk assessment tool that is simple, transparent and conclusive and that deals with all relevant aspects.
Purpose To analyse the pharmaceutical process for decisive steps, levels of evidence and actors. To incorporate these aspects into a practicable form.
Materials and Methods 15 years of feedback from community and hospital pharmacists on former assessment forms, discussions with authorities, 40 years searching for sound reasons for pharmacy preparation, writing an opinion on the Resolution on pharmacy preparation of the Council of Europe, have been used as an input for creating a new form that emphasises the benefit and risk balance.
Results Two forms were developed for the pharmacist: for extemporaneous and for stock preparation. They use the same type of benefit and risk aspects but extemporaneous preparation affects an assignable patient and the request is from an assignable physician. Often two pharmacists are involved, the attending pharmacist and the preparatory pharmacist. All four carry responsibility but the preparatory pharmacist has to decide whether to fulfil the request or not. For stock preparations the preparatory pharmacist will put together the information about benefits and risks. The physician, patient and attending pharmacist have to balance them. Stock preparation requires numerous items per batch and serves a number of patients. This requires a higher level of evidence about the clinical value and a higher quality of design.
Conclusions Forms were developed for the risk assessment of extemporaneous and stock preparations. They show decisions and provide transparency, pointing at responsibility and accountability. Practical experience will provide more information about the roles of pharmacist(s), physician and patient.

No conflict of interest.

GRP-162 RISK CATEGORIZATION OF STANDARDISED CONTINUOUS INJECTION/-INFUSION SOLUTIONS AT THE UNIVERSITY MEDICAL CENTER MAINZ

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Background The prescription, preparation and use of parenteral solutions are complex processes composed of many steps, during which mistakes can occur. However, by means of the National Patient Safety Alert 20 (NPSA 20), a risk evaluation of continuous injection/-infusion solutions can be performed.
Purpose To evaluate the risks associated with the intravenous drug treatment of intensive care unit patients at the University Medical Center Mainz. We planned to use the results to identify high-risk products and implement measures to reduce potential risks.
Materials and Methods The NPSA 20 defines eight different risk factors for the evaluation of overall risk. The risk evaluation was conducted for 78 continuous injection/-infusion solutions used in intensive care unit patients. These parenteral solutions are used in standardised concentrations; 16 of them were prepared as ready-to-use products in the hospital pharmacy. The potential risks of these 16 preparations were compared with the risks of those not prepared centrally in the hospital pharmacy department.
Results The risk evaluation of the 78 continuous injection/-infusion solutions revealed that most of the standardised 78 solutions were moderate-risk products (68%). Other solutions were classified as low-risk products (26%). Only 6% of the solutions were high-risk products. The favourable results of the risk analysis can be explained by the hospital-wide use of standardised concentrations. Doses are adjusted by using the infusion rate. For a number of products (12%) the risk category was downgraded from moderate to low, since ready-to-use products were prepared in the hospital pharmacy department.
Conclusions Out of 78 drug products administered as continuous injection/-infusion solutions to intensive care unit patients only 6% were categorised as high-risk. This favourable result is explained the use of standardised concentrations and preparation of ready-to-use products in the pharmacy department.

No conflict of interest.

GRP-163 RISK MANAGEMENT MEASURES TO PREVENT PHYSICAL-CHEMICAL INCOMPATIBILITIES DURING CONTINUOUS IV INFUSION

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Background Patients in critical care (ICU) settings usually require multiple medicines administered as continuous IV infusions. As a reliable IV access is often unavailable, simultaneous administration through the same line is performed using a Y-site connector.

If any drug/drug or drug/solvent incompatibilities occur, physical-chemical reactions may occur at the Y-site expressed as clouding, colour variation, emulsion breaking. These reactions can give rise to clinically significant complications such as reduction of bioavailability and therapeutic effect, catheter obstruction, parenchymal deposits. The potential impact, in terms of increase of morbidity/mortality and prolonged hospitalisation, could be important.

Purpose To create a working tool to help health professionals make responsible and evidence-based decisions when administering several medicines to critical patients.

Materials and Methods A systematic search for stability/compatibility information for injectable drugs was performed (Trissel's, Stabilis, King's Guide to Parenteral Admixtures, Micromedex database, Martindale, Summary of Product Characteristics).

A literature review of data concerning compatibility for intravenous administration of 119 drugs and 4 diluents commonly used in anaesthesia and intensive care was undertaken.

Results 7488 drug/drug and drug/solvent compatibilities were analysed, showing: 44% compatibility, 12% physical and/or chemical incompatibility, 4.5% limited compatibility (depending on solvent, concentration, contact time, temperature). The data collected conflicted in 1.8% of references.

All data were summarised in a colour-code wall chart, which admits, circumscribes or denies the possibility of simultaneous infusion (green: compatible, red: incompatible, violet: limited data, yellow: conflicting data, white: no information). This working tool was shared with health staff and made available in the ward for a safe and quick search.

Conclusions The use of this visual working tool in ICUs and other units may reduce adverse events due to physical-chemical incompatibility of infused medicines, thus improving care quality and patient safety.

No conflict of interest.

GRP-164 RIVAROXABAN VERSUS ENOXAPARIN: COMPARISON OF OUTPATIENT TREATMENT ADHERENCE IN CLINICAL PRACTISE

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Background Rivaroxaban (Riv) is a selective, direct Factor Xa inhibitor indicated in the prevention of venous thromboembolism in adult patients undergoing elective hip or knee replacement surgery (HKRS). [1] It was introduced into the pharmacotherapeutic formulary of the Hospital Centre of Cova da Beira (CHCB) in February 2011. It is administered orally, which is a potential advantage in terms of compliance when compared to enoxaparin (Eno).

Purpose To compare adherence to Eno versus Riv in adult patients undergoing elective HKRS. The occurrence of adverse drug reactions (ADRs) was also compared between the groups.

Materials and Methods Cross-sectional study of outpatient compliance to Eno or Riv, in patients undergoing KHRS in CHCB, from February/2011 to April/2012. Medicines adherence was evaluated using a validated questionnaire and the occurrence of ADRs was evaluated in a structured interview.

Results The study included a total of 60 patients, who underwent elective knee (29 patients) or hip (31 patients) surgery; 41 patients were treated with Eno (17 knee + 24 hip) and 19 with Riv (12 knee + 7 hip). In all, 91.7% patients were considered adherent to the treatment, but a significant difference (P = 1) was not observed between patients anticoagulated with Eno (92.7% adherent) or Riv (89.5% adherent). Similarly, there was no significant difference (P = 0.35) in treatment adherence between patients undergoing knee or hip surgery. However, there was a significantly higher occurrence of ADRs (P = 0.001) in patients treated with Eno (39.0%; hematoma at the site of injection) when compared to patients treated with Riv (no ADRs were attributable to this drug).

Conclusions Although a significant difference in adherence to subcutaneous Eno vs oral Riv was not observed, which may be potentially attributed to the short-term anticoagulation treatment (2 to 5 weeks), the occurrence of ADRs was significantly lower in patients treated with the oral anticoagulant. This difference in drug-related adverse events differs from other studies that detected similar adverse-event profiles.[2] From a methodological point of view, this is a small cross-sectional study and our results must be considered exploratory in nature.

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No conflict of interest.

GRP-165 ROOT CAUSE ANALYSIS AS AN OPPORTUNITY TO IMPROVE THE SAFETY OF PAEDIATRIC CARE

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Background Patient safety is a serious global public health issue. Causal analysis with a systematic and participatory approach is a useful tool for improving safety.

Purpose To perform a root cause analysis (RCA) in a medication error in order to identify improvement opportunities, to propose actions aimed to increase patient safety and to promote a collaborative approach in the health team.

Materials and Methods Retrospective study by the Patient Safety Team using RCA to investigate the cause of a medication error that happened in the paediatric unit in a tertiary level hospital, Spain. It included the following steps: identification and selection of the error, data collection and description of the event, construction of facts map, analysis of contributing factors and study of barriers that may prevent damage and finally, developing solutions and an action plan.

Results An administration error in a paediatric patient was selected. The patient received a single dose of antibiotic instead of a dose every 24 hours. RCA permitted the identification of human and patient factors as well as latent system failures associated with organisational factors and factors related to equipment, procedures, working conditions, education and training. Electronic prescribing and an individualised dispensing system failed as the main barriers.

The action plan proposed by the interdisciplinary team included: modification of the individualised dispensing system for the paediatric unit, improved electronic prescribing software, systematic visitor pass medical-nurse, and review of returns in the individualised dispensing system to detect errors.

Conclusions The analysis of a medication error by RCA identified the factors that caused the event and was a learning opportunity for the health team. Its use permitted a patient safety improvement through the identification and correction of latent system failures.

No conflict of interest.

GRP-166 SAFETY EVALUATION OF RITUXIMAB OFF-LABEL USE FOR SYSTEMIC AUTOIMMUNE RHEUMATIC DISEASES

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Background Systemic Autoimmune Rheumatic Diseases (SARDs) are a group of syndromes caused by antibodies inflammation related. Rituximab is a biological drug that targets antigen CD-20 present on the surface of B-Lymphocytes and thus potentially active against SARDs refractories to conventional treatment: steroids and immunosuppressants.
Purpose To describe and evaluate safety parameters of the risk management protocol for adults SARDs patients treated with off-label Rituximab.
Materials and Methods Descriptive-observational study from January 2011 to July 2012 realised by the Pharmacy and Rheumatology Service. Data were obtained from electronical medical records. Three types of risk management protocol data were evaluated. A) Clinical parameters: infection (including Tuberculosis), cardiovascular disease, severe cytopenia, neoplasia or new neurologic symptoms. B) Complementary tests: hemogram and general biochemistry while on Rituximab. C) Others: adverse events related with Rituximab infusion.
Results 21 patients were included (mean age 52.71 ± 16.11 years). Diagnoses were Sjögren's Syndrome (10), Systemic Lupus Erythematosus (4), Mixed Connective Tissue Disease (3), inflammatory myopathy (2), Systemic Sclerosis (1) and Wegener's Granulomatosis (1).

A. Clinical parameters: infection was detected on 5 patients (23%), severe cytopenia in 1 patient (4,7%) and peripheral neurological symptomatology in another one. Nor cardiovascular disease or neoplasia were detected.
B. Complementary tests: patient presented severe thrombocytopenia (platelets< 2.000/mcL)
C. Adverse events infusion related: detected on 19% of patients.

Conclusions Rituximab off-label use for SARDs has increased over the last years and pharmacovigilance strategies as well as risk management protocols have proved useful identifying risks, controlling adverse events, improving quality of care and integrating Pharmacist into direct patient care.

No conflict of interest.

GRP-167 SAFETY OF ADJUVANT CHEMOTHERAPY IN ELDERLY COLON CANCER PATIENTS

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Background Adjuvant chemotherapy trials provide little information on safety in elderly patients because they exclude them or pool their results with those of younger patients.
Purpose To describe the safety of the different adjuvant chemotherapy treatments used in elderly patients with colon cancer.
Materials and Methods Retrospective observational study of colon cancer patients (age >65) diagnosed in 2010 and treated with adjuvant chemotherapy. Each patient was followed from the beginning of the treatment until the end of it. Demographic data, disease stage, antineoplastic agents and treatment-related toxicities were collected from patients' clinical histories.
Results 16 patients (5 women, 11 men) were included in the study with a mean age of 75.1 years. 87.5% and 12.5% of patients had stage III and stage II disease, respectively. 6 patients (37.5%) were treated with a combination of 5-fluorouracil and oxaliplatin regimen (FOLFOX), 4 patients (25%) with capecitabine in monotherapy and the remaining 6 patients (37.5%) with a combination of capecitabine and oxaliplatin regimen (XELOX). Adverse events were documented in 100% of patients. 57 adverse reactions were detected, the most frequent toxicities being: neurotoxicity (75% of patients), fatigue and anorexia (68.8%), diarrhoea (37.5%) and thrombocytopenia (37.5%). 54.5% of the undesirable effects were grade 1, 30.9% grade 2 and 14.6% grade 3 toxicities. There were no grade 4 adverse reactions. XELOX was associated with high rates of hand-foot-syndrome (75% of patients) and XELOX and FOLFOX with a high incidence of neurotoxicity (100% and 83.3% respectively). Oncologists had to delay the cycle or reduce the treatment doses in 11 patients (68.8%) and 5 patients (31.3%) had to discontinue the treatment due to the toxicity.
Conclusions A high number of adverse reactions were detected, but majority were grade 1–2. The safety profile of drugs studied in our population is in line with that described in the literature in younger patients.

No conflict of interest.

GRP-168 SAFETY OF SUNITINIB VERSUS PAZOPANIB IN METASTATIC RENAL CANCER IN A TERTIARY HOSPITAL

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Background Sunitinib and pazopanib are tyrosine kinase inhibitors used in the treatment of metastatic renal cancer. Pazopanib has been approved more recently, so the user experience is not as extensive as with sunitinib.
Purpose To evaluate the safety profile of pazopanib and sunitinib in patients with metastatic renal cancer.

To compare the incidence of adverse reactions between the two drugs.
Materials and Methods We identified patients treated with sunitinib and pazopanib at the hospital in the past two years, using the pharmacy database.

We looked at the medical records of patients through digital medical records, collecting dose patterns, line of therapy, adverse reactions detected, their severity and if dose reductions were necessary, using Excel.
Results A total of 26 patients with metastatic renal cancer were identified: 16 treated with sunitinib and 10 with pazopanib.

Asthenia was the most frequent drug-related toxic effect in both treatment groups, with an incidence of 93.75% for sunitinib and 60% for pazopanib.

Nausea/vomiting and diarrhoea were detected in 50% of patients treated with pazopanib. In sunitinib patients nausea/vomiting were detected in 6.25% of patients and diarrhoea was detected in 68.75% of patients

For patients who received pazopanib, the rate of mucositis was 20%, whereas for those treated with sunitinib it was 75%. Palmar-plantar erythrodysaesthesia syndrome occurred in 43.75% of those on sunitinib treatment, while none was detected for pazopanib, and the frequency of other skin pigmentation disorders for the two drugs was 62.5% and 30% respectively.

Blood pressure was decompensated in 37.5% of patients treated with sunitinib and 10% of those taking pazopanib, although most patients required antihypertensive drugs to get better control.

Dose adjustment was required of sunitinib in 43.75% of cases and in 25% pazopanib.

Conclusions Pazopanib may be better tolerated than sunitinib, with an acceptable adverse event profile and fewer dose adjustments.

Also, the severity of adverse events looks lower with pazopanib.

However, the number of patients was too small to arrive at definitive conclusions, so it is necessary to enlarge this study.

No conflict of interest.

GRP-169 SCREENING FOR CLINICALLY RELEVANT INTERACTIONS IN LIVER TRANSPLANT PATIENTS

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Background Drug-drug interactions are a frequent problem in liver transplant (LT) patients, further hindering pharmacotherapeutic management, which is a very important risk to the patient's life.
Purpose To detect drug-drug interaction of clinical relevance in LT patients in a tertiary hospital.
Materials and Methods Descriptive transversal study of the LT patients in our hospital during 2011 who were admitted to the Digestive Surgery Unit (DSU). Variables analysed were: sex, number of drugs prescribed at admission and number of days of hospitalisation in the DSU. Data were collected from clinical and pharmacotherapeutic histories and the unit dose dispensing log. Drug-drug interactions were detected and analysed by the Micromedex Healthcare series® database. The results were analysed with the SPSS v.19 statistics software.
Results Of a total of 51 transplant patients, we included 44 (5 patients died and in 2 patients the medicines were not recorded at admission to the DSU).

75% of patients were male and 25% female, mean age of patients was 53 ± 12 years. The median number of days in hospital was 11 [9.18] days. The mean number of drugs prescribed on admission was 11 ± 2.5 drugs/patient.

The total number of drug interactions detected was 210 of which 153 (72.9%) were clinically relevant, representing a prevalence of 84.1% of liver transplant patients.

Of the main variables studied, only the number of drugs prescribed was found to be directly proportional ($p < 0.05$) to the number of clinically relevant interactions detected, thus no relationship was obtained between age or the number of days hospitalised.
Conclusions Liver transplant patients are critically ill patients with highly complex treatment. A high prevalence of clinically relevant interactions was detected related to polypharmacy and the use of high-risk medicines.

The presence of a pharmacist in this Unit would be beneficial to comprehensively review these patients' treatment.

No conflict of interest.

GRP-170 SEARCHING FOR THE CAUSE OF ALLERGIC CUTANEOUS ADVERSE DRUG REACTIONS: RETROSPECTIVE ANALYSIS OF A FIVE-YEAR CLINICAL EXPLORATION IN A SINGLE-CENTRE COHORT

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Background Adverse drug reactions on skin affect approximately 2% of patients. Skin and drug challenge tests were performed in the dermatology department to assess these reactions and pharmacy-compounded drugs were tested through patches, pricks and intradermal (IDR) tests.
Purpose To assess the incidence of positive allergic reactions in tested patients and to define the culprit drugs and their potential allergic role in these reactions.
Materials and Methods The study was conducted between 2007 and 2010 on patients from our hospital. We collected information on the characteristics of the adverse drug reaction on skin, the drugs tested, the tests performed and their results.
Results In the period studied, 220 patients referred by other practitioners (from the hospital or from ambulatory practitioners) for serious cutaneous reactions were tested and 3225 preparations were performed by the pharmacy. 92 patients had an immediate reaction to the drug and 128 had a non-immediate reaction. 64 (29%) patients developed a positive response: 48 (75%) through skin tests (patch, prick and IDR) and 16 (25%) through a Drug Challenge Test (DCT). The drugs most often involved in the positive tests were anti-infectious drugs (46%), paracetamol (16%) and iodinated contrast media (10%).
Conclusions The percentage of positive tests in this cohort agrees with the data found in the literature (3–76%). The large difference is due to the variability in patient recruitment.

However, it is difficult to compare these data because the preparation and interpretation of the tests are not standardised.

Allergology tests still improve the care of patients as with negative skin tests and DPTs many patients were able to continue with their treatment.

Manufacturing tests by the pharmacy standardise preparation conditions within the hospital and reduce cross contamination and microbial contamination.

No conflict of interest.

GRP-171 SECURING INTRATHECAL INJECTIONS: WHAT ABOUT NON-LUER CONNECTORS?

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Background Episodes of accidental injection of medicines intended for intravenous administration into the intrathecal space have been reported worldwide, often leading to death. Since 2001, international guidelines have been issued to prevent such risks. A major recommendation is to develop a non-luer connector to use in neuraxial procedures.
Purpose To give an overview of the development and marketing of medical devices fitted with non-luer connectors.
Materials and Methods Manufacturers' catalogues have been consulted. A literature review was conducted using the PubMed and Science Direct databases, including the following MeSH keywords 'non luer', 'connectors', 'safety' and 'intrathecal'. European Health Authorities websites have been also consulted. All searches were performed between August and October 2012.
Results The United Kingdom, which has been a pioneer in guidance, was the first to implement such connectors. Five different non-luer connectors have been designed thanks to the National Patient Safety Agency (NPSA) initiative. Literature research identified few individual tests of these new devices. Some incidents such as mismatching connectors have been documented. So the NPSA has updated recommendations about introducing secure non-luer connectors. These devices are coming onto the French and Belgian market soon. To our knowledge safety connectors are not yet available in other countries.
Conclusions Non-luer connectors for intrathecal drug administration were initially launched in Great Britain. This process obviously

improves the safety of intrathecal injections and leads other countries in the same way. However more advanced scientific studies of these connectors should be published. The main line of thought should be the standardisation of these connectors. Lack of standardisation is generating some hazards and supervised implementation of these medical devices is required.

No conflict of interest.

GRP-172 SELECTION AND IMPLEMENTATION OF PERFORMANCE INDICATORS MEASURING THE QUALITY OF THE CLINICAL PHARMACY SERVICE OF THE MATER MISERICORDIAE UNIVERSITY HOSPITAL

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Background The Health Information and Quality Authority (HIQA) in Ireland are currently promoting and guiding the development of key performance indicators and minimum data sets to monitor health care quality. A third of Irish hospital pharmacies surveyed in 2006 believed that performance indicators were the most effective quality assessment tool. Despite this, performance indicators for clinical pharmacy services in Ireland have not been published.
Purpose To obtain consensus on whether performance indicators identified from the literature provide a valid and feasible method of measuring the quality of the Mater Misericordiae University Hospital (MMUH) clinical pharmacy service and whether they could be introduced as a regular quality measurement.
Materials and Methods Review the literature relating to the use of performance indicators in a clinical pharmacy setting and identify performance indicators which have been piloted or used in other institutions.

Achieve consensus of a multidisciplinary panel, using a Delphi method of the most valid and feasible performance indicators for the MMUH clinical pharmacy service

Implement one of the selected performance indicators

Make recommendations on the further use of performance indicators
Results Performance indictors relating to hospital pharmacy are available (n = 240) in the literature.

The Delphi method achieved consensus and rated the following three performance indicators as both valid and feasible:

Percentage of reserve antimicrobials checked by a clinical pharmacy for approval by microbiology or infectious diseases

Percentage of patients discharged on warfarin who receive warfarin counselling by a clinical pharmacist

Percentage of medication orders for intermittent therapy that have been reviewed by a clinical pharmacist for safe prescribing.

The indicator chosen for measurement was the percentage of medication orders for intermittent therapy that were reviewed by a clinical pharmacist for safe prescribing. A 79% compliance with this performance indicator was achieved by the clinical pharmacy service.

Conclusions A multidisciplinary panel achieved consensus that three of the performance indicators identified from the literature provide valid and feasible methods of measuring the quality of the clinical pharmacy service of the MMUH. One of these was successfully implemented and consideration will be given to implementing further performance indicators

No conflict of interest.

GRP-173 SEVERE ANAEMIA CAUSED BY DRUG INTERACTION. A CASE STUDY

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Background Retrospective study based on the clinical history and the Naranjo causality algorithm.
Purpose To describe a case of severe anaemia in a HIV-positive patient receiving zidovudine and lamotrigine
Materials and Methods A 54-year old male HIV patient on antiretroviral therapy since 2002 (zidovudine 300 mg/12 h, lamivudine 150 mg/12 h and abacavir 300 mg/12 h), with partial epileptic seizures treated with lamotrigine (100 mg/12 h) since May 2011 who in 2007 developed low haemoglobin and haematocrit levels. A diagnosis of macrocytic anaemia was made and the patient was followed up every six months without treatment. In July 2011, at the Drug Care Unit, very low levels of haemoglobin (RBCs 1.17 M/mcL, haemoglobin 5 g/dL, haematocrit 15% and MCV 128 fL), asthenia, weight loss, and dyspnoea upon exertion were detected. These findings were reported to the treating doctor and the patient was admitted, with temporary discontinuation of antiretroviral and antiepileptic treatment. While in hospital, the patient required three consecutive erythrocyte concentrate transfusions.
Results At 8 weeks post-transfusion and discontinuation of antiretroviral and antiepileptic therapy, the patient's blood levels returned to normal. Antiretroviral and antiepileptic therapy was reinitiated with different drugs.

The causality relationship between severe macrocytic anaemia and zidovudine was shown to be 'probable' using the Naranjo Algorithm. Zidovudine causes macrocytic anaemia described in the data sheet as 'frequent' (1%). According to the lamotrigine data sheet, haematological alterations are rare (<0.01%). In this case, the macrocytic anaemia that was probably caused by zidovudine might have been made worse by a drug that rarely presents haematological toxicity.
Conclusions Macrocytic anaemia is a common serious adverse reaction to zidovudine. This drug can also cause accumulated toxicity when administrated with drugs that may also cause haematological alterations. Patients receiving these drugs require close monitoring and coordination between physician and pharmacist.

No conflict of interest.

GRP-174 SIGNIFICANCE OF POTENTIALLY INAPPROPRIATE MEDICINES FOR ELDERLY PATIENTS AT A GERMAN UNIVERSITY HOSPITAL

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Background Certain drugs are classified as potentially inappropriate medication (PIM) for the elderly because they bear an increased risk of adverse drug events resulting in major safety concerns. Several classifications have been published to identify and avoid PIM. For this study FORTA [1] (fit for the aged), PRISCUS [2] (Latin: time-honoured) and STOPP [3] (Screening Tool of Older Persons' potentially inappropriate Prescriptions) criteria have been chosen as the most relevant ones.
Purpose The aims are to determine which PIM are taken by elderly patients at University Medical Center Hamburg-Eppendorf (UKE) and how the prevalence of PIM changes from admission to discharge.
Materials and Methods Based on the criteria provided by FORTA, PRISCUS and STOPP, medication of patients >65 years is

screened within three point prevalence analyses at admission, during inpatient stay and at discharge, respectively. Medication is recorded and correlated to diagnoses and reason for admission. Patients are included in the study if they were admitted via the emergency department with at least five drugs prescribed on admission.

Results 660 patients were screened until 10/2012. 107 patients met the inclusion criteria, 63% of them were female, 64% (68/107) received at least one PIM at admission (48, 29 and 50 patients as defined by FORTA, PRISCUS and STOPP, respectively; multiple classifications possible), 82% (88/107) received PIM during inpatient stay (59 FORTA, 62 PRISCUS, 55 STOPP) and 57% (61/107) at discharge (40 FORTA, 27 PRISCUS, 48 STOPP). Zopiclone was the most often (29%) prescribed PIM during inpatient stay.

Conclusions Data of the interim analysis show that a high proportion of inpatients received PIM. Once the data acquisition is completed, further evaluation is needed to determine the consequences of PIM use, the correlation to reason for admission, which classification is best to detect PIM in hospitals and how the use of PIM at UKE can be minimised.

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No conflict of interest.

GRP-175 SMART INFUSION PUMPS IN CHEMOTHERAPY ADMINISTRATION

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Background Medication errors, mainly those that occur with high-risk drugs, are associated with high morbidity and mortality. About 38% of these errors occur during the administration phase and only 2% are intercepted.

Purpose To evaluate the use of smart infusion pumps in the oncology area and to assess if this technology reduces intravenous drug administration errors in cancer patients.

Materials and Methods We analysed the information in Signature-Edition® volumetric infusion pumps for the period January–September 2012 in the oncology area. All infusion pumps were configured with GuardRails® safety software. The drug library was specifically set up by a clinical pharmacist with all the intravenous drugs usually prescribed to cancer patients.

We established maximum and minimum limits for each drug. If the nurse in charge of drug administration exceeded the defined limit, an alarm was displayed to alert her.

Results Over nine months 14,693 infusions were administrated to 4,628 patients. The safety system was used in 99.1% of infusions. 768 alarms were triggered, in 5.2% of infusions started.

Comprehensive analysis of the alarms showed that 289 (37.6%) were caused by a rate lower than the correct rate and 194 (25.2%) by infusions set at a higher than the established upper limit. 483 drugs had to be reprogrammed.

113 alarms were not associated with a real programming error.

Conclusions Implementation of smart infusion systems based on this safety software can prevent 5% of errors in intravenous drug administration and can help us to enhance the safety of high-risk medicines.

The alarms reported are not always associated with a real administration error. It is necessary to review the limits set for some drugs to improve system applicability.

No conflict of interest.

GRP-176 STUDY OF THE IMPORTANCE OF THE PHARMACEUTICAL CONTRIBUTION IN THE DETECTION OF NON CONFORMITY (NC) IN THE MEDICATION PROCESS IN CHEMOTHERAPY

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Background Pharmacists are responsible for system quality and patient safety and make a valuable contribution to the medication process in chemotherapy.

Purpose An assessment and inventory of non-conformity (NC) took place in the chemotherapy preparation area of the hospital's anti-cancer unit (PCAU). The importance of the pharmacist in the medication process in chemotherapy was assessed.

Materials and Methods Two activities were studied for 18 weeks: the analysis of the physician's prescriptions (using Chimio® software) and the preparation of the treatment by the pharmacy assistant. An assessment grid was made for each of these activities. NC was flagged in the data whenever it was detected by the pharmacist (or the intern) in order for the anomalies to be corrected.

Results Regarding NC in prescriptions: 149 NC events were quantified in 3936 lines (3.79%):

- 54.4% had an impact on the patient's health; mistakes in the progression of the course of treatment (14.81%), in indication and/or diagnosis (13.58%), in the dose of anti-cancer chemotherapy (12.35%) or in the date of administration (11.11%).
- 45.6% had a financial impact (alternation and rounded dosages, 88.24%)

Regarding NC in preparation, 88 NC events were quantified in 3374 preparations (2.61%) – omissions of light-protective containers (23.86%), and of double checking (required in the chemotherapy medication process) (14.77%), or omission faults (13.64%).

All anomalies were noted and corrected.

Conclusions Although there is a validated quality assurance system, the intervention of a pharmacist (or intern) is important at key stages of the sequence to allow the detection of NC that is not highlighted by prescribers or preparers.

No conflict of interest.

GRP-177 THE USE OF BEVACIZUMAB IN METASTATIC BREAST CANCER

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Background Many drugs are prescribed outside the terms of the marketing authorization (off-label), especially in oncology.

Purpose To describe the use of bevacizumab in metastatic breast cancer (MCB), evaluating its suitability after the extension of the indications in 2011 by the European Medicines Agency (EMA).

Materials and Methods Retrospective and descriptive monitoring study carried out between January and December of 2011 on the use of bevacizumab in MBC in a 446-bed tertiary care hospital. Demographic data, regimens, types of treatment, dose, number and frequency of cycles and indications were examined. During the study it was considered according to technical data that treatment regimens with bevacizumab combined with paclitaxel or capecitabine were among the best for metastatic illnesses.

Results The total number of patients with MBC in treatment during 2011 was 96, 40.6% (39 patients) of whom were being treated

with bevacizumab with an average age of 62 (ranging 45–79). 40 treatments were reviewed (one patient received two different bevacizumab regimens during the monitoring process), 42.5% of which followed the indications authorised by the EMA. The regimens that didn't fit to the technical data (57. 5%) were as follows: 46% bevacizumab in monotherapy 15 mg/kg/21 days, 54% bevacizumab associated with other cytostatics different from paclitaxel or capecitabine. Combinations with bevacizumab not indicated in the technical data were: 37% bevacizumab 15 mg/kg + liposomal doxorubicin 75 mg/m^2/21 days, 37% bevacizumab 15 mg/kg/21 days + vinorelbine 25 mg/m^2 days 1 and 8, 10% bevacizumab 15 mg/kg/21 days, 10% bevacizumab 10 mg/kg +irinotecan to 125 mg/m^2/15 days and 6% bevacizumab 15 mg/kg +docetaxel 100 mg/m^2/21 days.

Conclusions Despite the extension of the bevacizumab indications in 2011 by the European Medicines Agency (EMA) the off-label use of bevacizumab remains high, probably due to the clinical evidence with bevacizumab, which has evolved rapidly in recent years. In this sense, the importance of pharmacists' role should be stressed in evaluating the use of medicine in relation to the recent evidence of the MBC.

No conflict of interest.

GRP-178 SURFACE CONTAMINATION WITH ANTINEOPLASTIC DRUGS IN SEVEN FRENCH HOSPITAL PHARMACIES

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Background Due to their carcinogenic, mutagenic and teratogenic properties, handling cytotoxic drugs presents a risk of occupational exposure for healthcare workers.

Purpose To evaluate and limit occupational risk, environmental monitoring was conducted in 7 French hospital pharmacies that prepare formulations of carboplatin, cisplatin and oxaliplatin. Platinum was used as the tracer (~20% of the production).

Materials and Methods From 2010 to 2012, 7 cytotoxic drug preparation units were investigated. Different types of surface were evaluated: the external surface of vials containing cytotoxic materials, workplace surfaces and the surfaces of antineoplastic drug preparations. Surfaces were sampled with a moistened swab. After pre-concentration by cloud point extraction, the quantity of elemental platinum was evaluated by graphite furnace atomic absorption spectrometry. The lower limit of detection corresponded to 2 ng of platinum per sample.

Results A total of 518 samples analysed had various levels of contamination and we found a frequency of cytotoxic contamination of more than 37% of samples (>2 ng). Contamination was found on 38% of vials of cisplatin, carboplatin and oxaliplatin from different manufacturers (n = 111, max 66 ng), 56% of cytotoxic preparations (n = 18, max 78 ng) with 29% of packagings (n = 24, max 15 ng) and 56% of workplace surfaces (n = 365) contaminated. Surfaces inside isolators were the most contaminated area (59%, n=169) compared with storage areas (28%, n = 89), controlled areas (15%, n = 55), control laboratories (24%, n = 25) and other areas (4%, n = 27). However the highest level of contamination was found inside storage boxes of vials containing cytotoxics with more than 20,000 ng of Pt.

Conclusions Regarding environmental monitoring, two major sources of contamination were identified: the outer surface of vials of cytotoxic material and handling cytotoxic drugs inside the isolator. Other contamination spreads from those initial points of contamination. Thus, it seems necessary to use effective individual protective equipment but also to use efficient cleaning protocols to limit chemical contamination and thus, to prevent occupational exposure.

No conflict of interest.

GRP-179 SWITCH FROM CERA TO EPO ZETA IN PATIENTS WITH ANAEMIA AND CHRONIC KIDNEY DISEASE

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Background As the result of a possible shortage of methoxy polyethylene glycol epoetin beta (CERA) within Italy, with the agreement of the EMA, AIFA (the Italian Medicines Agency) prepared a document inviting prescribers to switch patients who were undergoing treatment with different doses of CERA to any Erythropoiesis Stimulating Agent (ESA), for the treatment of anaemia associated with chronic kidney disease (CKD).

This recommendation emphasised the need to monitor haemoglobin levels (Hb) and safety and efficacy parameters.

Purpose To evaluate variations of efficacy (Hb levels) and safety (immunological reaction) of a new treatment, in patients with CKD after switching from CERA to epoetin zeta (EPO zeta), as per international and national guidelines.

To keep the same Hb level obtained before the shift.

To compare the cost differences of the two ESAs.

Materials and Methods A preliminary observational study (April–September 2012) was carried on CKD patients in haemodialysis care at the Department of Nephrology. The patients enrolled were treated with some of the doses of CERA indicated in the Recommendation for at least ten months. We evaluated ESA dosage, Hb level and dosage/kg.

Results The study included 12 patients (7 men and 5 women) with mean age 56.64 years (range 40–75). All patients were treated with EPO zeta (average initial dose 6500 IU/Kg/week); after monthly monitoring of Hb levels, the initial dose of EPO zeta was increased by 7.69% (average dose 7000 IU/Kg/week) and three months later, the median Hb level observed was 11.28 g/dl.

Statistical analysis showed no significant difference between CERA and EPO zeta in terms of Hb level (P = 0.408).

No adverse events due to treatment were recorded; no variation in iron supplementation

The use of EPO zeta resulted in savings of 250 euro per month/patient versus CERA treatment.

Conclusions After switching from CERA therapy, the use of EPO zeta appears effective and safe for CKD patient treatment. Data showed the need to increase the dose of EPO zeta to maintain a steady Hb level. Despite the increased consumption, the use of this biosimilar could contribute to containing pharmaceutical costs.

No conflict of interest.

GRP-180 TELAPREVIR AND BOCEPREVIR: SAFETY AND EFFICACY OF THE INITIAL TREATMENTS IN THE HOSPITAL

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Background These novel treatments for hepatitis C have been recently approved in Spain. Several studies have confirmed their great efficiency in achieving good virological response.

Purpose To present the preliminary results of treatment with these drugs in a 600-bed hospital and find the adherence of patients to triple treatment: ribavirin, peginterferon and boceprevir or telaprevir.

Materials and Methods All patients treated with telaprevir or boceprevir since its inclusion in the hospital (January 2012) were included. We studied the medical records to see if patients were treatment-naive or a previously treated, and we checked the occurrence of adverse reactions associated with antiviral treatment. To calculate the adherence, dispensing records from the Pharmacy Service were used and percentage adherence was calculated. The primary end point was the rate of rapid virological response at week 4 for patients who completed one month of treatment and at week 12 for patients who completed three months. We used a formula for calculating percentage adherence, stating that a patient was adherent if treatment intake exceeded 95%.

Results At the time of the study (June 2012), 8 patients were treated with telaprevir ('T group') and 6 with boceprevir ('B group'). In the T group there were 2 treatment-naive patients and 6 with no response to previous treatment. All patients who completed three months of treatment (4 patients) achieved rapid virological response. The other 4 patients completed one month of treatment and in all of them HCV RNA was undetectable at week 4. Pruritus and eczema were the most common adverse reactions in group T (in 90% of patients). In the B group, there were 3 treatment-naive patients and 3 previously treated. Four patients completed three months of triple treatment, but one of them did not reach rapid virological response. Regarding the 2 patients who completed one month of treatment, only one patient had undetectable HCV RNA at week 4. There were no adverse reactions related to boceprevir in this group. Patients of both groups were adherent to treatment.

Conclusions The addition of boceprevir or telaprevir to standard treatment increased the rates of rapid virological response, in treatment-naive and previously treated patients. The role of the Pharmacy Service is very important in promoting patient adherence despite the adverse effects that may occur.

No conflict of interest.

GRP-181 THE CLINICAL IMPACT OF CALCIUM-CEFTRIAXONE INTERACTION IN PATIENTS ON TOTAL PARENTERAL NUTRITION

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Background A safety alert about the possibility of a potentially fatal interaction in patients, especially neonates, has been issued by the FDA. Patients treated with ceftriaxone and concomitant total parenteral nutrition (TPN) are at potential risk of pulmonary or intravascular precipitation of a ceftriaxone-calcium complex.

Purpose To assess patients with TPN at potential risk of suffering a calcium-ceftriaxone interaction, its clinical significance in our hospital, and to develop a software tool for real-time detection.

Materials and Methods Patient treatment (including ceftriaxone 1 g IV/IM and 2 g IV) from March 2010 to May 2011 was obtained using the Farmatools application of the Computerized-Physician-Order-Entry-System. TPN patient requirements, including neonates, were obtained from a database we had designed ourselves. Patients who required calcium-supplemented TPN and concomitant administration of ceftriaxone were selected. Finally, administration complications or symptoms of intravascular or pulmonary precipitation were checked on patient Medical-Digital Health Records (Diraya).

To detect real-time ceftriaxone-calcium interactions when TPN is being prescribed, the Farmatools medicines database and the pharmacist TPN application were associated using ODBC(Open DataBase Connectivity).

Results During the period studied, 15495 patients were hospitalised, 1044 received ceftriaxone, and 838 administrations of TPN were prepared for 85 patients. A total of 16 patients (18.8%), none of them neonates, were found to have received TPN and ceftriaxone at the same time: 10 staggered administrations, and 6 (7%) concomitantly; the patients were exposed to the described interaction. None of the 6 patients showed clinical complications arising from such an interaction.

As a result of this study, the TPN prescribing and validation programme in the pharmacy was updated. When calcium is prescribed in a TPN, the application automatically searches for ceftriaxone in the patient's medicines and notifies the pharmacist in real time.

Conclusions Less than 10% of TPN patients could have suffered a ceftriaxone-calcium interaction in our hospital.

1. No neonates were exposed to this risk.
2. None of the patients had clinical complications due to this interaction.
3. The pharmacist TPN application was updated for real-time detection.

No conflict of interest.

GRP-182 THE CLINICAL PHARMACIST'S IMPACT ON THE APPROPRIATE USE OF MEDICINES IN ELDERLY PATIENTS

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Background Adverse effects caused by the treatment are frequent in the elderly and most often result from an inappropriate prescription. Experts have published a list of potentially inappropriate medicines for the elderly (aged 75 and over) [1].

Purpose To measure the clinical pharmacist's impact on compliance with this reference work.

Materials and Methods Our study was carried out in two units, the infectious and tropical diseases unit (SMIT) and a multipurpose medicine unit (MEPO) over a 1.5-month period. Drug prescriptions for patients aged 75 and over were analysed in the units after medicines reconciliation by the clinical pharmacist. Conformity with the list of potentially inappropriate medicines (MPIs) was assessed on the optimised medical record (BMO) and the hospital prescription entry. The list of MPIs was divided into three categories of treatment: unfavourable risk/benefit ratio (type 1), questionable effectiveness (type 2) and unfavourable risk/benefit ratio and questionable effectiveness (type 3). When an inappropriate medicine was prescribed, the clinical pharmacist suggested interruption or alternative treatments.

Results Medicines reconciliation was conducted on 32 patients aged 75 and over in the two units (9 in SMIT and 23 in MEPO). Prescription of MPIs were identified for 11 patients (7 in MEPO and 4 in SMIT). The distribution of these MPIs was: 54.5% for type 1, 18.3% for type 2 and 27.2% for type 3. Medicines were stopped (54.5%), switched (18.2%) or continued (27.3%).

Conclusions We found more at-risk patients in MEPO than in the SMIT. In 27.3% of cases, treatments were continued after consulting the doctor and reassessing the risk/benefit ratio and effectiveness. In 72.7% of cases the clinical pharmacist's contribution led to stopping or switching the MPI, confirming his essential role in the compliance with standards.

Reference

1. M.-L. Laroche, F. Bouthier, L. Merle, J.-P. Charmes. *La Revue de Médecine Interne*, Volume 30, Issue 7, July 2009, pp. 592–601.

No conflict of interest.

GRP-183 THE EFFECT OF A CLINICAL PHARMACIST-LED TRAINING PROGRAMME ON INTRAVENOUS PREPARATION AND ADMINISTRATION ERRORS IN A VIETNAMESE HOSPITAL

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Background Medication safety has been a concern for decades worldwide, but there is still relatively little research about interventions to reduce medicines administration errors in hospitals, especially in resource-restricted settings such as Vietnam. Our large study on the frequency and type of medication errors in Vietnamese hospitals indicated that the highest risk was associated with intravenous medication administration [1].
Purpose To investigate the effect of intensive training on the frequency of intravenous medicines preparation and administration errors in an urban public hospital in Vietnam.
Materials and Methods This was a controlled intervention study with pre- and post-intervention measurements using a direct observation method, carried out in two critical care units: Intensive Care Unit (ICU – intervention ward), and Post-Surgical Unit (PSU – control ward). The intervention consisted of lectures plus practical ward-based teaching sessions, carried out by a clinical pharmacist and a nurse. In each ward, all intravenous doses prepared and administered by nurses were observed 12 hours per day, on 7 consecutive days, each period.
Results A total of 1294 doses were observed, 718 in ICU and 576 in PSU. Error rate on the intervention ward (ICU) decreased from 62.7% to 52.5% ($P = 0.01$); preparation errors including wrong dose, deteriorated drug, wrong technique of preparation decreased significantly ($p < 0.05$). On the control ward (PSU) there was no significant change in error rates (73.8% vs. 73.1%, $p = 0.85$); almost all preparation error types were similar in both periods ($p > 0.05$), except for technique errors, which was increased from 15.5% to 25.9% ($p < 0.05$).
Conclusions Intensive training showed a slight improvement in overall and specific error rates, particularly preparation errors. Further measures are needed to improve patient safety.
Reference

1. *EAHP* abstract titled: "Errors in medication preparation and administration in Vietnamese hospitals", by H.T. Nguyen *et al*,

No conflict of interest.

GRP-184 THE IMPACT OF PHARMACEUTICAL INTERVENTIONS ON THE TREATMENT OF GRAM POSITIVE INFECTIONS

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Background Inappropriate use of antibiotics results in increased antibiotic resistance and poor efficiency, which should be avoided through pharmaceutical interventions.
Purpose To evaluate the impact of pharmaceutical interventions (PIs) on the effectiveness, safety and efficiency of treatment of Gram-positive infections in adult in-patients.
Materials and Methods For 4 months, all episodes of hospitalisation (on the same Gram positive antibiotic treatment) were evaluated of adult in-patients who were on vancomycin, linezolid or daptomycin for ≥24 hours, except for the indication of prophylaxis.

Variables related to: 1) Patient [sex, age, penicillin allergy or intolerance, hospitalisation unit (HU) and type of setting-acquired infection, diagnosis, length of stay], 2) treatment duration, drug and observance of the criteria of use established by the drug therapeutics committee (DTC), considering treatment of choice (vancomycin) and alternative treatments (linezolid and daptomycin), and 3) PIs: number, type (effectiveness, safety or efficiency), pharmacotherapeutic medication process, drug, type of PI (discontinuation of medicine, suggested therapeutic alternative, initiation of the medicine, dose individualization (DI), therapeutic/clinical drug monitoring (TCDM) and acceptance of the PI.

SPSS v. 17.0 was used.
Results 148 patients [(59% male; mean age 67 years (95% CI: 63–68) and penicillin allergy/intolerance: 10%] received 174 treatments. 76% patients were on medical HU; the infection originated in the community (85%); Diagnosis: bacteraemia (23%), skin and soft tissues infection (21%), pneumonia (20%). Median duration of hospital stay: 16 days (IQR: 9–27); of antibiotic treatment: 7 days (IQR: 3–11).

Most prescribed antibiotic: vancomycin (68%) [linezolid (28%), daptomycin (3%)]. 74% (128) of treatments fulfilled criteria established by the DTC; linezolid and vancomycin didn't fulfil the criteria in 35/49 (71%) and 9/118 (8%) prescriptions.

251 PIs were made, 96 (38%) during initial prescription validation, representing 1 PI/treatment (IQR: 1–2) and generating 79% acceptance. Type of intervention: safety 44% (93% in vancomycin), effectiveness 24% (94% in vancomycin) and efficiency 32% (83% in linezolid). After the PI, 84% (146) treatments met DTC criteria, the percentage of non-conforming linezolid decreasing to 23/49 (47%). 155 PIs (IQR: 1–3) were performed during follow-up, with 2PIs/treatment and an 87% acceptance; these were mainly DI (48%) and TCDM (42%) interventions.
Conclusions Pharmaceutical interventions in patients with Gram-positive infections increase treatment efficiency and pursue improvement of the effectiveness and safety throughout the antibiotic treatment, reflecting the need for continued treatment follow-up to adapt it to the patient's clinical course.

No conflict of interest.

GRP-185 THE PHARMACIST'S ROLE IN EMERGENCY FIRST AID SERVICES IN A TERRORIST ATTACK WITH SARIN: EMERGENCY INTERVENTION SIMULATION

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Background After 11 September 2011, Italy prepared a Public Health Plan for national defence and regional storage facilities for antidotes. These are managed by a physician and a pharmacist. In Friuli Venezia Giulia-Italy, the pharmacist is responsible for the safety of the antidotes, the national database, collaborates with the physician in planning for emergencies and makes antidotes available for immediate transfer to the site of the incident. Sarin, a nerve gas, even at a very low concentration, causes death rapidly if the victim isn't treated immediately with atropine and subsequently within the first 4–5 hours with pralidoxime.
Purpose To verify, by means of a simulation, that there were sufficient stocks of atropine, and the accessibility, distribution and the appropriateness of the treatment.
Materials and Methods We simulated a terrorist attack with sarin at the railway station in Udine, the seriousness equivalent to the attack in Tokyo on 20 March 1995.
Results In Tokyo, 107 people out of approximately 6000 involved in the attack with sarin, needed treatment with atropine. 80% were treated with only 2 mg, for a total of 170 mg, while 21 needed more

than 2 mg. Nobody was given more than 9 mg. In total, 350 mg of atropine was immediately necessary on the site of the attack, equivalent to 350 phials of 1 mg. In our simulation, the time for access and preparation of the antidote was about 10 minutes from the moment of the alert. The transfer and distribution time to the site was less than 15 minutes due to favourable road access, geographical factors and the short distance from the station to the storage facility.

Conclusions The pharmacist is responsible for immediate availability, accessibility and distribution of the antidotes to the site of emergency, and awareness of appropriate treatment.

No conflict of interest.

GRP-186 THE QUALITY OF ORAL CHEMOTHERAPY PRESCRIBING IN ONCOHAEMATOLOGIAL OUTPATIENTS

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Background Nowadays, in our health area, most of the oral antineoplastic drugs prescribed to outpatients are dispensed in hospital pharmacy services. Patients receiving these kinds of drugs are susceptible to suffering adverse events (AE) due to medicines errors (MEs).

Purpose To evaluate the quality of oral chemotherapy drug prescriptions (OCDPs) in oncohaematological outpatients.

Materials and Methods Descriptive prospective study. OCDPs for adult patients received in a pharmaceutical outpatient care unit were analysed for two months. The information necessary for OCDPs was established based on legal rules and international recommendations. We established that omitted or confused information in patient identification (identification number), weight, height and/or corporal surface (in drugs dosed depending on these parameters), diagnosis, treatment duration, dose and frequency of administration, presented serious risk based on possible consequences.

Results 291 prescriptions were analysed from 183 patients. 100% of prescriptions had almost one omission, 78.7% of which showed serious errors of omitted or confused information related to the following items: patient identification (0.7%), weight, height or corporal surface (56.7%), diagnosis (28.9%), treatment duration (14.1%), dose (5.8%) or frequency (12.1%). Information omitted or confused about patient and treatment information included: age or birth date (1.4%), allergies (omitted 56%, unknown 38.8%), morbidities (59.5%), cycle number (67%) and periodicity (46.7%). Drug information omitted or confused included: drug name (generic 35.7%, originator 61.5% or both 2.7%), dose units (10.7%), pharmaceutical form (83.1%) or route of administration (58.4%). Physician information omitted or confused included: name (7.6%), signature (1%) and collegiate number (1%).

Conclusions Our results show a high rate of omitted and confused information in prescriptions in OCDP. Extreme attention during the validation process was required in order to prevent MEs and AEs. New tools, such as electronic prescription, pre-printed medical orders or educational programmes for prescribers, must be implemented in order to improve the quality of OCDP.

No conflict of interest.

GRP-187 THE RATES AND TYPES OF PRESCRIBING ERRORS IN ELECTRONIC CHEMOTHERAPY PRESCRIPTIONS FOR AMBULATORY PATIENTS

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Background Electronic prescribing (EP) systems have been recognised as successful in reducing chemotherapy prescribing errors. However, electronic prescriptions are unlikely to prevent all errors, and new types of errors may emerge.

Purpose To assess prescribing error rates and identify new error types and their causes with the implementation of a electronic prescribing system for ambulatory cancer patients at a London Cancer Centre.

Materials and Methods A service evaluation was conducted in two parts, covering two different strategies for interception of prescribing errors – prospectively by pharmacists during a 2-week period, and retrospectively using data from the pharmacy EP telephone helpline service, over 41 weeks.

Results The overall rate of error-containing prescriptions was estimated to be 6%.

In the prospective part, 32 errors were identified from 571 electronic chemotherapy prescriptions. Most commonly committed errors were chemotherapy drug dose adjustments (13; 41%) and weight omissions (11; 34%).

In the retrospective analysis, 95 of 141 errors (67%) were 'e-selection errors', classified mainly as 'work-arounds' (26; 18%), 'wrong commands' (35; 25%), or 'wrong fields' (27; 19%). 63 errors (45%) were related to scheduling a chemotherapy or supportive drug or regimen.

Electronic system-related causes of prescribing errors were recognised in 4 of 32 cases (13%) in the prospective part, and in 89 of 141 cases (63%) in the retrospective part. It was estimated that with implementation of technical solutions and additional prescriber training, 85% of these errors could be prevented in the future.

Conclusions The estimated rate of chemotherapy prescribing errors was 6%. A number of different errors, specific for electronic prescribing, were identified, with a thorough explanation of how various errors may have occurred. Future larger scale studies are needed to confirm prescribing error rates, and to possibly identify other, previously unrecognised, types of chemotherapy prescribing errors.

No conflict of interest.

GRP-188 UNDER-REPORTING OF ADVERSE DRUG REACTIONS IN THE HOSPITAL SETTING: AN ESTIMATE BASED ON THE ANALYSIS OF HOSPITAL DISCHARGE RECORDS

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Background In the post-marketing setting, spontaneous reporting is an important tool for the surveillance of Adverse Drug Reactions (ADRs). However, underreporting is a major limitation of a pharmacovigilance system. Several studies showed that ADRs may cause hospitalisation resulting in an increase in hospital stays and costs.

Purpose To gather information on the extent and frequency of ADRs at Careggi University Hospital, and to identify unreported ADRs to the Pharmacovigilance Office, using the hospital discharge records.

Materials and Methods We analysed the hospital discharge records from January 2011 to June 2012. In particular, we considered those records with a Drug Related Group (DRG) classification related to allergic reactions, poisoning and toxic effects of drugs (DRGs from 447 to 451). We included in our analysis records referring to poisoning, according to the new pharmacovigilance legislation in force from July 2012. Our research gave us information about the number of suspected reactions, but it didn't provide specific information on the patients and the seriousness of the reaction.

Results We obtained 346 records related to the DRGs selected: 101 (29%) ADRs and Testing Oral Exposure to Drugs, 91 (27%) poisoning, 20 (6%) drug abuse, 7 (2%) reactions to foods and 97 (28%) unspecified events. It was possible to identify the drug involved in only 51 records: antibiotics, NSAIDs, chemotherapy agents, local anaesthetics, opioids and immunoglobulin were the agents mainly reported. Only 2 cases had been reported to the Pharmacovigilance Office and entered in the Italian National Pharmacovigilance Database.
Conclusions Our survey shows a mismatch between the ADRs documented in the hospital discharge records and those actually reported to the hospital's Pharmacovigilance Office, highlighting the problem of under-reporting. The data could be useful for implementing measures to raise awareness among health care professionals and to spread the culture of drug safety.

No conflict of interest.

GRP-189 UPGRADING A VITAMIN K ANTAGONIST CONSULTATION PROGRAMME: IDENTIFICATION OF NEW ORAL ANTICOAGULANT (NOAC) PRESCRIPTION PARTICULARITIES

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Background Our pharmacy department performs 150 Vitamin K antagonist (VKA) patient consultations annually. New oral anticoagulants (NOACs) are expected to replace VKAs in most of their indications. The variety of drugs and the different therapeutic schemes depending on the indications can be extremely hazardous. The NOAC marketing authorization (MA) came along with a European risk management plan.
Purpose To assess the prescription particularities of NOACs, further to the extension of their indication in cardiology in the management of atrial fibrillation (European Society Of Cardiology Guidelines in 2012).
Materials and Methods A retrospective study of NOAC prescriptions was performed from January 2011 till July 2012 to identify the main departments prescribing them and to evaluate the indications. Secondly, we questioned 2 cardiologists to determine the needs of patients and other healthcare practitioners for information about these treatments.
Results An increase in NOAC prescriptions was observed: 25 in 2011 and 41 in 2012 (7 months). The main prescribing departments were cardiology and orthopaedic surgery with respectively 48 and 12 patients. 18 prescriptions (2011) vs. 8 in 2012 did not match the recommendations. This was mainly due to prescription anticipating the MA in cardiology. Information needs identified by the cardiologists concerned prescription (switching from VKA-NOAC, effects of medicines altering the haemostasis and changing the dose required, perioperative management for optimal safety if the patient needs surgery or invasive procedures). The patient also needs to be informed (knowledge of the treatment, awareness of the risk of haemorrhage, self-medication and clinical surveillance of any bleeding).
Conclusions This preliminary research shows that it is necessary to supervise NOAC prescriptions and inform patients, to ensure these new treatments will be used properly. It allowed us to design a standard protocol for prescribing and monitoring NOAC. Our anticoagulant consultation programme will include these needs and NOAC patient consultation will be offered from January 2013.

No conflict of interest.

GRP-190 USE OF TRANQUILLISERS AND RESTRAINT IN A FRENCH TEACHING ACUTE CARE HOSPITAL

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Background Major and minor tranquillisers can be used to chemically restrain a patient. Use of chemical restraint (CR) has been described mainly in long care settings but there is very limited information when considering acute care hospitals.
Purpose To study the prescriptions for major and minor tranquillisers in 3 clinical wards of a French teaching hospital and to determine if they can be considered CR.
Materials and Methods This prospective study took place over 2 weeks in 3 different wards: geriatrics, pneumology and vascular surgery. Tranquilizers were defined as anxiolytics (minor) and neuroleptics (major). Prescriptions were checked daily and for each patient with a tranquilliser, medical records were screened to determine whether it was newly prescribed. For every newly-prescribed tranquilliser the practitioner was asked the indication, if he considered his prescription was a CR and if the patient was being physically restrained.
Results 45.2% of the 137 patients included had been prescribed at least 1 tranquilliser. 54.5% of the 77 tranquillisers prescribed were introduced during the hospitalisation. Among those 42 newly-introduced tranquillisers, 9 (21.4%) were considered as CR by the prescribers. 6.6% of the patients included were chemically restrained, which is comparable with previous retrospective studies of restraint in acute care wards. The most frequently prescribed CR was alprazolam (55.6%) and the most frequent indication for CR was anxiety. In addition 88.9% of the CR drugs were prescribed 'when required' leaving responsibility for administration to nurses alone. None of the patients with tranquillisers had physical restraint.
Conclusions This is the first prospective study on restraint in an acute care hospital. CR is used for a minority of patients; however it is mostly prescribed 'when required'. Hence it should be used with the utmost care and prescribed with the most precise instructions in order to avoid misuse and risk of abuse.

No conflict of interest.

GRP-191 WOULD 50ML PREFILLED SYRINGES IMPROVE PATIENT SAFETY? OBSERVATION OF 960 INFUSIONS WITH A SYRINGE PUMP IN A MULTI-CENTRIC STUDY

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Background Before infusion with a syringe pump, drug preparation requires often dilution and more steps compared to most other injection practises, thus involves risks for patients and Health Care Workers (HCWs). The literature indicates that prefilled syringes (PFSs) address these issues successfully but most data do not apply to intravenous infusions.
Purpose BD ran a multicentre study to evaluate the expected impacts of a new BD Sterifill 50 ml PFS on patient and HCW safety, comparing an infusion with a syringe pump using either the PFS or a conventional system (drug in ampoule, diluent, 50 ml syringe filled at time of use).
Materials and Methods 120 HCWs performed infusions in a randomised order, 4 with the new PFS, 4 with the conventional system, mimicking regular dobutamine preparation and infusion (250 mg/50 ml, 10 ml/h). For all 960 cases, an observer recorded any handling

errors. Results were analysed by sub-groups using FDA Human Factors guidelines. A risk score was calculated for each syringe type and for each step based on the error occurrence and its severity according to the risk class: dosing error, microbial contamination and unexpected adverse event. This Health Hazard Risk Evaluation (HHRE) method has been published by BD.

Results With PFSs the handling error rate was lower and the HHRE score was better. Dosing error and microbial contamination occurred respectively in 12.7% and 43.1% of infusions with the conventional system but only in 4.8% and 0.2% with PFSs. 6% of conventional system infusions showed a risk of needle stick injury (one injury actually happened) versus 0% for PFS.

84% of HCWs would use the new PFS in their daily practise mainly to decrease the risk of contamination and administration errors, and to save time.

Conclusions Prefilled 50 ml infusions with a syringe pump help reduce patient risks (especially dose error and contamination) and HCW injuries. PFS is also preferred by HCWs.

No conflict of interest.

Technology (including: robots for production, incompatibilities, drug production and analytics, CRS)

TCH-001 A CASE REPORT OF A WOMAN HOSPITALISED FOR SEVERE LOSS OF WEIGHT AND PSYCHOTIC DECOMPENSATION AFTER TAKING A SLIMMING PREPARATION

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Background A French pharmacovigilance centre recorded the case of a 40-year-old woman hospitalised for severe loss of weight (16 kg in 3 months) associated with hypokalaemia, inflammatory syndrome and psychotic decompensation, after taking a slimming preparation. It was sold on the internet as an herbal medicine containing natural authorised substances.

Purpose The expertise of the French Health Agency (ANSM) was requested to find, identify and measure the active substances (ASs) contained in the product.

Materials and Methods At first, the analysis strategy was a general screening method to search for ASs in the product, performed with gas chromatography–mass spectrometry [GC-MS] and high performance liquid chromatography-mass spectrometry [HPLC-MS]. Then a specific method confirmed the identification and quantified the AS using ultra performance liquid chromatography-diode array detection [UPLC-DAD].

Results The slimming preparation was presented in capsules containing a fine, brown homogeneous powder. Gas Chromatography revealed two main ASs and the mass spectrometry analysis identified them as sibutramine and phenolphthalein. The result of HPLC/MS also revealed two main ASs on chromatogram with molecular masses of 279 g.mol-1 and 318 g.mol-1. The UPLC-DAD, using the method 'search for and quantification of 34 ASs in a slimming formulation', confirmed these preliminary results and also gave a quantity of 8 mg of sibutramine and 20 mg of phenolphthalein per capsule.

Conclusions Sibutramine is the AS in Sibutral (10 and 15 mg), an anti-obesity medicine, withdrawn from the market in January 2010 because of increased cardiovascular risk and an unfavourable benefit-risk assessment. Because of its carcinogenic potential phenolphthalein (a laxative) has been forbidden in France since 1999. Sibutramine and phenolphthalein were probably responsible for the clinical symptomatology in this patient. These slimming products sold outside the pharmaceutical distribution network have not been approved by the authorities resulting in a health risk, including fatal outcomes.

No conflict of interest.

TCH-002 ANALYSIS OF DISPENSING LOGISTICS PROCESSES CARRIED OUT BY SEMIAUTOMATIC CAROUSEL SYSTEMS

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Background Hospital Pharmacy Services work hard at logistics to supply medicinal products to inpatients. This prompted the need to modernise the technical resources and logistical processes with a semiautomatic carousel system (SCS) for storing and dispensing.

Purpose To describe the logistics processes performed by our semiautomatic vertical and horizontal carousel systems (SVCS, SHCS) of the Kardex type.

Materials and Methods Descriptive observational study in a tertiary level hospital (1493 beds). Quantitative variable: 'medicines lines dispensing', defined according to the Product Catalogue and Invoicing Update from the SEFH-TECNO group (Spanish Society of Hospital Pharmacy-Evaluation Group of New Technologies). Study period: January–June 2012. Data Source: Pharmacy Service Internal Register computer application and Mercurio application version 2.12. The type of logistic process performed for dispensing is classified according to the type of order: stock in clinical unit, preparation of unidoses and replacement drugs for the Pyxis. The workload was calculated for each type of carousel according to the storage volume of each system (SVCS = 15.6 m^3, SHCS = 111.4 m^3).

Results The total number of lines dispensed during the study period was 1264751: 1235662 were prepared with SCS (97.7%). Depending on the type of order, more work corresponded to the preparation of unidoses with 1128343 lines (91.31%), followed by 83092 to prepare stock lines in clinical units (6.72%) and 24227 order lines for stocking the Pyxis (1.96%). Preparation of the unidoses was fully developed in the SVCS, while preparation of replacement stock for Pyxis and stock in clinical units were carried out in the SHCS. Depending on the type of carousel, the SVCS workload was 396.32 lines/m^3/day, compared with 5.27 lines/m^3/day for SHCS.

Conclusions Identifying and quantifying the processes undertaken by the SCS is a very useful tool that allows us to adjust the workloads of the pharmacy technicians.

No conflict of interest.

TCH-003 ASSESSMENT OF AUTOMATED DRUG DISPENSING SYSTEM PERFORMANCE INDICATORS

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Background Hospital Mateu Orfila has approximately 140 beds. Since 2007 it has operated an automated drug dispensing system (Pyxis) comprising nine units, five of them linked to the electronic prescribing system (EP).

Purpose To assess performance indicators of the automated drug dispensing system (ADS) that can be used to monitor the effectiveness of processes within the hospital quality system.

Materials and Methods We defined four performance indicators and analysed data from 2011 using the Web Reporting software supplied with ADS, and compared them with the 2008 results. Data were collected from the five EP-linked units.

1. Non-prescribed dispensing (NPD): percentage of drugs dispensed with no prescription assigned. It reflects physicians' prescription mistakes, ward dispensing mistakes, or technical problems with EP and EP-ADS interface.
2. Assigned Patient (AP): NPD with assigned patient. This indicator informs us about proper use, mainly in non EP-linked ADS units.
3. Fictional Patient (FP): NPD assigned to the fictional patient every unit has. This indicator reports us about technical problems with the hospital patient census and with the EP. It can also inform us of misuse of the ADS.
4. Discrepancies (DR): stock discrepancies as a percentage of global ADS transactions. These are related to ward dispensing mistakes or pharmacy supply mistakes.

Results NPD: 12.4% (25,820/208,957 drugs dispensed), lower than the 2008 results by 2.1 percentage points.

AP: 7.8%, 2.3 percentage point reduction.

FP: 4.6%, 0.3 percentage point increase.

DR: 3.0% (6,250/259,791 transactions), 0.3 percentage point reduction.

Conclusions ADS performance indicators have shown effectiveness in monitoring the processes. Between 2008 and 2011 we have improved in NPD, AP and DR results, but we have to work with factors that increased FP. We have found differences between some ADS units so a need for additional training in some wards has been revealed.

No conflict of interest.

TCH-004 CENTRALIZATION AND TECHNOLOGY SUPPORT THE HOSPITAL PHARMACIST IN IMPROVING SAFETY, ACCURACY AND ECONOMY IN THE MANAGEMENT OF MONOCLONAL ANTIBODIES

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Background Antineoplastic drugs are considered 'high-risk drugs' due to the increased frequency of human technical errors in their preparation. It is essential for pharmacists to be responsible for setting up, centralising and managing cytotoxic drugs (CDs). To this end, the Division of Anticancer Drugs of L'Aquila (Italy) acquired on June 2012 a Robotic System, APOTECAchemo, the first worldwide system for chemotherapy compounding in a controlled atmosphere.

Purpose To analyse the impact of centralising and automating CD preparation for all the Departments in the Hospital of L'Aquila, to avoid any possibility of human error and to optimise the use of the remainder of CDs.

Materials and Methods Three high cost monoclonal antibodies (bevacizumab, cetuximab and trastuzumab) were chosen for analysis in this study during the period June–September 2012. The criteria for product suitability were evaluated by analysing the APOTECAchemo database in which all stages of the production process are recorded (picture of the bottle used, weight, and dose accuracy). The cost analysis was evaluated by calculating the daily amounts left over of the three drugs that were previously discarded and are now fully re-used.

Results The average error was for 168 preparations of bevacizumab + 0.45% (DS = 1.85), for 67 preparations of cetuximab + 0.71% (DS = 1.13) and for 152 preparations of trastuzumab −0.57% (DS = 1.8).

In the period under review, 85.9 g of bevacizumab, 37.5 g of cetuximab and 43.8 g trastuzumab were prepared using material that would previously have been discarded. This provided considerable saving for the three drugs (€29,893) which corresponds to approximately €90,000 per year.

Conclusions The centralised system and the use of APOTECAchemo is successful both in terms of patient and operator safety and cost benefit for the Hospital.

No conflict of interest.

TCH-005 DEVELOPING A SAFE SYSTEM TO PRESCRIBE, PREPARE AND ADMINISTER CYTOSTATIC DRUGS

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Background As the cytostatic medicines are a group of drugs with a narrow therapeutic index, it is necessary to develop new mechanisms to improve safety from prescription to administration in the hospital in order to avoid fatal errors.

Purpose To develop a system that ensures that the prescription process, production and administration of cytostatic drugs meet the criteria: right patient, medicine, dosage, route of administration and time.

Materials and Methods Along with the centralization of drugs preparation in the pharmacy service, a computer system has been designed for the management of the administration of cytostatic drugs consisting of: portable digital assistant (PDA) with barcode reader, label printer for barcoded medicines, patient-identifying wristband and dedicated software for verifying and recording administration.

Results Every chemotherapy prescription is sent to the cytotoxic admixture unit mixer where it is validated by a pharmacist checking the following items: name and number from the patient history, diagnosis, stage, line of treatment, drugs, dose and route of administration. The computer programme generates drug labels containing the bar code which identifies the preparation. Each patient has a label with the bar code of the history number. Before the administration of each cycle, the responsible nurse has to read the patient bar code with the PDA. The drug and the right order for that patient will appear on the screen of the device. Nurses should read the bar code of each drug to be administered and the system cheques that it is the right medicine and order, alerting visually and acoustically if error occurs. The system records the nurse and time of each drug administration.

Conclusions The project was implemented due to the need for safety mechanisms in the management of high-risk medicines, as cancer treatments are group of drugs with a narrow therapeutic index.

The system cheques the safety in five key areas: patient, medicine, dose, route of administration and time.

No conflict of interest.

TCH-006 DEVELOPMENT AND VALIDATION OF 3 METHODS – UV SPECTROPHOTOMETRY, FLOW INJECTION ANALYSIS AND LIQUID CHROMATOGRAPHY – FOR THE CONTROL OF NYSTATIN CAPSULES.

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Background As an alternative to amphotericin B used for selective digestive decontamination, physicians asked the Hospital Pharmacy for the preparation of nystatin capsules, 500,000 IU.

Purpose Three methods were considered for routine checking: UV spectrophotometry, flow injection analysis (FIA) and high performance liquid chromatography (HPLC).
Materials and Methods Three batches (3x200 capsules) were prepared with nystatin (INRESA) and mannitol (VWR). All other reagents were of analytical grade.

Preparation of stock solutions of nystatin and capsules content was in reagent-grade methanol for FIA and HPLC (nystatin 72 μg/mL). For UV spectrophotometry, a subsequent dilution (1/50 V/V) with acetate ammonium buffer/methanol, 50:50 (V/V) was needed.

For FIA and HPLC, 10 μL were injected. In all cases, absorbance was measured at 305 nm.

UV spectrophotometry used a double beam spectrophotometer (UV mc^2 – SAFAS).

FIA used an HPLC device (Ultimate 3000 – Dionex) in which the stationary phase was replaced by a capillary flow of water (1.0 mL/min; 25°C).

HPLC equipment was an ELITE LaChrom (VWR/Hitachi). An end-capped C18 stationary phase was used (30°C). The mobile phase was a mixture of 0.05 M acetate ammonium buffer pH = 6.0/reagent-grade methanol (35/65; V/V). Flow rate was 1.0 mL/min; run time was 25 min.
Results For UV spectrophotometry and FIA, the development took into account the nystatin concentration to obtain absorbance levels suitable for the precision and the range of linearity. HPLC was developed as an isocratic stability indicating method.

The three methods were fully validated (ICH Q2R1). HPLC ruggedness was studied according the adjustments allowed by the Ph. Eur. (*2.2.46*). Nystatin content (3 batches) assayed by each method complied with the acceptance limit: 90.0–110.0%.
Conclusions For routine checking, UV spectrophotometry or FIA would be the methods of choice (rapid, easy to handle); the HPLC method could be used to perform stability studies.

No conflict of interest.

TCH-007 DEVELOPMENT OF A BETAMETHASONE (DIPROPIONATE) TOPICAL EMULSION 0.1% (W/W) (1MG/G) FOR CUTANEOUS T-CELL LYMPHOMA

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Background Cutaneous lymphomas are a heterogeneous group of lymphomas characterised by T and B clonal lymphoproliferative infiltrates that appear and remain confined to the skin without evidence of involvement of other organs/systems in the six months following diagnosis.

Some subtypes of cutaneous T epidermotropic lymphomas respond favourably to topical treatment with steroids. Betamethasone dipropionate is a synthetic high-potency glucocorticoid with anti-inflammatory and immunosuppressive action used as the main topical treatment in the early stages of LNH-T–Mycosis Fungoides, or as an adjuvant treatment in advanced stages of the disease.

In the Portuguese pharmaceutical market only a 0.05% (w/w) (0.5 mg/g) cream is available although for this therapeutic indication strengths in a range of 0.025%–0.1% (w/w) are required. This was already an off-label clinical use and a higher concentration was required due to insufficient response to the concentration available.
Purpose To prepare and characterise a topical 0.1% (w/w) (1 mg/g) betamethasone (dipropionate) cream and evaluate the overall response in cutaneous T-cell lymphomas.
Materials and Methods Several batches of a compounded W/O emulsion containing betamethasone 0.1% (w/w) (1 mg/g) were prepared and analysed for macroscopic characteristics, pH, rheological properties and microbiological quality (total germs, fungal, yeasts and E. coli).

Patients were evaluated monthly and the overall response was recorded (CR-cutaneous lesion totally disappeared; PR-partial remission – objective response >50%<100%; Stabilized disease if cutaneous lesions were similar; No response if cutaneous lesions worsened).
Results We obtained a white, homogeneous, opaque and odourless cream with a pseudoplastic behaviour. The pH of the formulations at 22 ± 3°C was 5 (±0.5). Microbiological control for non-sterile products revealed no growth of micro-organisms.

By the end of the first month one patient (11.1%) showed partial remission, the others (88.9%) had their cutaneous disease lesions stabilised.
Conclusions The topical emulsion developed has pH values and rheological characteristics suitable for drug stability and topical skin application. Clinical data is still insufficient for any conclusions.

No conflict of interest.

TCH-008 DEVELOPMENT OF A HYDROCHLOROTHIAZIDE 0.5 MG/ML ORAL SOLUTION FOR CHILDREN

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Background In The Netherlands there are no licenced medicines available with hydrochlorothiazide that are suitable for children. Lack of children's formulations in general may lead to a variety of mixtures of different quality and strength. This may cause medication errors, especially when children receive the same active substance in different formulations and strengths during their hospital stay and after discharge.
Purpose To develop a standardised hydrochlorothiazide liquid formulation with a shelf life supported by stability studies, in order to provide standardised and safe care for children.
Materials and Methods National standard procedures were applied to assess the therapeutic rationale and to design an oral solution for children. HPLC was used to develop a method of indicating stability in order to establish shelf life. A patient information leaflet was designed, also by following a standard procedure.

Nationwide, the quality of hydrochlorothiazide oral liquid preparations was determined pre- and post-introduction of the standardised formulation.
Results

- A therapeutic rationale was established for diuresis.
- A formulation for a robust hydrochlorothiazide 0.5 mg/ml oral solution was optimised for solubility, stability and taste.
- An HPLC method was developed to test stability.
- A shelf life of 6 months was established.
- Publication in the Dutch Formulary.
- A patient information leaflet was produced providing information on indication, use, precautions, interactions and storage.
- Hydrochlorothiazide formulation errors decreased nationwide from 35% to 13%.

Conclusions A robust and stable oral liquid formulation was developed containing hydrochlorothiazide 0.5 mg/ml, which remains stable for 6 months. A patient information leaflet was made available. Standardization and publication in the Dutch Formulary has demonstrably improved the quality of hydrochlorothiazide oral liquid formulations nationwide.

No conflict of interest.

TCH-009 DEVELOPMENT OF A STABLE NYSTATIN ORAL SUSPENSION TO OVERCOME SHORTAGES OF THE COMMERCIAL MEDICINE

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Background Nystatin is often used in the treatment of cutaneous, vaginal, mucosal and oesophageal Candida infections. It's widely employed in cancer and immunocompromised patients suffering from mucositis.

The unobtainability of the commercial oral suspension from July 2011 to February 2012 caused difficulties in the provision of the medicine for these types of inpatients and outpatients.

Purpose With the aim of ensuring a safe continuity of treatment, liquid formulations of nystatin 100,000 IU/ml were developed as oral suspensions, due to the insolubility of the drug in water. The suspensions obtained were studied to assess their chemical-physical stability to find the most suitable formulation.

Materials and Methods Nystatin was dispersed in water containing preservative using carboxymethyl cellulose (CMC) or tragacanth gum as suspending agents. The aqueous vehicles used were sucrose syrup or sorbitol syrup (for the treatment of diabetic or paediatric patients) flavoured with raspberry flavour. The final pH was maintained in the 7.0–7.8 range. The suspensions obtained were submitted to stability studies determining their chemical-physical properties (mean particle sizes, viscosity, Zeta potential) and the active ingredient content (HPLC analysis) over a 3-month period.

Results Stable suspensions of nystatin were obtained with mean sizes slightly greater than 1 μm, with both suspending agents and vehicles. CMC and sucrose syrup-containing suspension, however, was more resistant to microbiological attack and it was chosen as the most suitable preparation. Particle sizes, Zeta potential and viscosity remained unchanged for at least 3 months at 25 and 40°C. The nystatin content in the suspension decreased by about 16% after the first month and then remained constant over time.

Conclusions The development of a stable nystatin suspension was crucial to ensure continuity of care for patients with oral mucositis previously treated with a commercial formulation, whose temporary lack offered new formulation challenges to the hospital pharmacists.

No conflict of interest.

TCH-010 DEVELOPMENT OF A TOPICAL LIDOCAINE STERILE FORMULATION 20% (W/V)

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Background The topical use of concentrated solutions of lidocaine (4 to 20%), which are usually unavailable, has been reported for microvascular surgery. Vasospasm is known to have an adverse effect on the survival of free tissue transfers. Prolonged vasoconstriction decreases blood flow to the flap and promotes thrombosis at the anastomotic site. The wide availability and rapid effect of topically applied lidocaine is used by many surgeons to prevent and correct vasospasm.

Purpose To compound a sterile 20% (w/v) lidocaine solution physicochemically and microbiologically stable for topical application during surgery.

Materials and Methods Three batches of a 20% (w/v) sterile lidocaine solution were prepared using two sterilisation steps: autoclaving followed by filtration (0.22 μm) inside a horizontal laminar flow hood. Packaging in 10 ml dropping containers prevents intravenous administration and ensures a maximum safe dose (2 g). For physicochemical and microbiological stability studies, samples were stored in the dark at 5 ± 3°C and 22 ± 3°C, for 15 days. Sterility tests and bacterial endotoxins assays were performed (Ph. Eur.). Samples were collected and characterised on days 0 (T0), 7 (T7) and 15 (T15). Colour, odour, appearance, pH, osmolarity, density and lidocaine hydrochloride content were analysed.

Results Throughout the study, the 20% (w/v) lidocaine hydrochloride solutions remained clear, colourless, limpid and odourless. The pH of the solutions stored at 5 ± 3°C was 3.6 ± 0.04 (T0), 3.8 ± 0.08 (T7), 3.9 ± 0.02 (T15), and 3.6 ± 0.04 (T0), 3.9 ± 0.02 (T7), 4.0 ± 0.03 (T15) for the solutions maintained at 22 ± 3°C. The HPLC analyses showed that the lidocaine hydrochloride content was maintained (90–110%) after 15 days in all conditions tested. Density and osmolality remained constant, i.e. 1.0049 ± 0.0036 g/cm^3 and 1175.3 ± 20.2 mOsm/kg, respectively (n = 3). The three batches proved to be sterile and endotoxins-free during the study.

Conclusions The lidocaine hydrochloride solution proved to be physicochemically and microbiologically stable for 15 days stored in the dark.

No conflict of interest.

TCH-011 DEVELOPMENT OF PYRIDOXAL-5-PHOSPHATE HARD CAPSULES FOR PAEDIATRIC USE

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Background The active form of vitamin B6, called pyridoxal-5-phosphate (P5P), is an essential cofactor for several enzymes involved in various pathways of intermediary metabolism. PNPO is the rate-limiting enzyme in the synthesis of pyridoxal from vitamin B6 and a lack of activity causes dependency on an external source of pyridoxal. Epileptic seizure is the clinical outcome of P5P deficiency.

Purpose To provide a dosage form suitable for newborns and children. Capsules containing standardised P5P were compounded. Moreover, a fully soluble powder blend was formulated to fill the capsules and a method to determine the stability of the P5P content was developed.

Materials and Methods Dissolution assays were performed using oral syringes as nurses do. Time to complete dissolution and concentration were determined at each test. P5P content was determined by HPLC-UV (205 nm). The mobile phase consisted of phosphate buffer (0.05 M; pH 2.6) at a flow rate of 1 ml/min. The right active ingredient was tested by adding vitamin B6 to samples. Degradation by-products in stress conditions were also determined. The method was validated according to ICH recommendations.

Results Strengths were standardised at 10, 25, 50, 100 or 250 mg/capsule. The adopted blend is quickly solubilised in water and has a sweet taste. The HPLC readings were linear (r^2 = 0.9994) at the wavelength used, indicating good reproducibility and repeatability (SD = 0.46%). No matrix effect due to the diluent was observed.

Conclusions As P5P is a low toxicity compound, a test treatment with P5P is given to every newborn with idiopathic seizure before any treatment with standard antiepileptics. This method allows rapid routine assay of P5P. Stability testing of 3 compounded batches is ongoing.

No conflict of interest.

TCH-012 DIFFERENCES IN PURITY BETWEEN BIOSIMILAR FILGRASTIMS AND COPY BIOLOGICAL FILGRASTIMS

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Background Biosimilars are follow-on versions of peptide biological drugs, and differences in manufacturing and formulation can result in variations in physicochemical and clinical profiles. The European Medicines Agency (EMA) has set stringent standards (Ph Eur) that must be met for the approval of a biosimilar.
Purpose Standards of manufacture may differ between biosimilars approved via EMA pathways, and copy biologicals that lack approval pathways. Therefore, we undertook comparative characterisation tests of a range of biosimilar products from different global regions to determine if variations exist. This study is the first of its kind.
Materials and Methods Samples of Nivestim (Ni), Neupogen (Ne), Tevagrastim (T), Ratiograstim and Zarzio (Z) were obtained from the EU region; and Leucostim (L), GeSysin (G), Filgen (F) and Neukine (Nk) were obtained from the Middle East and Africa (MENA) region. All samples were within the expiry date. Samples were analysed for impurities using iso-electric focussing (IEF) to identify differences in charge, size-exclusion high-performance liquid chromatography (SEC-HPLC) to identify differences in higher molecular weight impurities, reverse phase HPLC (RP-HPLC) to identify differences in total and individual related impurities, and ion chromatography (IC) to detect differences in f-met filgrastim and related, more acidic, impurities.
Results All biosimilars met EMA standards for IEF and SEC-HPLC analysis. Total impurities (RP-HLPC) for the EU products were in the range 1.8–2.6% and within EMA requirements (≤3.5%); however, the MENA samples contained impurities in the range 5.9% (G) – 8.2% (L), which is beyond the Ph Eur range. IC analysis revealed f-met and acidic impurities to be <0.20% for most EU products (threshold 1.0%) and 0.4% for Ne. However, for MENA compounds, these impurities comprised 0.4% (Nk) – 1.7% (G) of the samples.
Conclusions Copy biologicals from MENA have higher levels of impurities than biosimilars from the EU and do not meet EMA standards for approval.

No conflict of interest.

TCH-013 DISINFECTANT EFFICACY OF ULTRAVIOLET LIGHT IRRADIATION IN AN AUTOMATED SYSTEMS FOR THE ASEPTIC COMPOUNDING.

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Background Ultraviolet (UV) light irradiation is used in a variety of applications, such as food, air and water purification. The mechanism of UV disinfection differs considerably from chemical disinfectants: UV is mutagenic to bacteria, viruses and other microorganisms by damaging nucleic acids and preventing replication. However, the effectiveness of UV disinfection depends on a number of factors: time of UV exposure; power of the UV source; presence of UV barriers like airborne particles; microorganism resistance.
Purpose To study the effectiveness of UV disinfection inside APOTECAchemo, the robot for preparing antitumour drugs in use at the University Hospital of Ancona. The Killing Rate (KR) and optimal exposure time were determined.
Materials and Methods 5 different microorganisms were chosen for the study in order to cover all the most common families of microbes: Candida albicans; Escherichia coli; Bacillus subtilis; Staphylococcus aureus; Pseudomonas aeruginosa. Different concentrations of each organism (from 107 CFU/ml to 0.5 CFU/ml) were subjected to UV radiation for different exposure times. The plates were located inside the APOTECAchemo compounding room, using the robot's UV equipment. The KR (logarithmic ratio of the concentration of microorganisms after and before irradiation) was plotted against the exposure time in order to chart the inactivation curves.
Results With a four-hour exposure, the UV irradiation kills all microorganisms at the highest concentrations. The location of the plates inside the system showed only a slight effect on the killing rate, probably thanks to the mirror effect of the stainless steel surfaces. Bacillus subtilis confirmed the strongest UV resistance, indeed 4-hour exposure was necessary to kill 107 CFU/ml. The least resistant microorganism was Escherichia coli, which required 2 hours of UV irradiation.
Conclusions UV radiation is a fundamental step in the sterilisation of workplaces. In fact, 4-hour exposure showed an effective sterilisation (KR < 7) outcome, even for very resistant microorganisms (Bacillus subtilis).

No conflict of interest.

TCH-014 EVALUATION OF LONG-TERM BIOLOGICAL ACTIVITY OF INFLIXIMAB 10 MG/ML AND 5 MG/ML IN NACL 0.9% BY ELISA

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Background Tumour necrosis factor alpha (TNF-α) is a pro-inflammatory cytokine, the main mediator in inflammatory and autoimmune diseases, as well as during various attacks on cells such infections. It is therefore involved in the course of a large number of pathologies such as rheumatoid arthritis, Crohn's disease, psoriatic arthritis, ankylosing spondylitis, plaque psoriasis and ulcerative colitis. Infliximab (Remicade) is a chimeric monoclonal antibody (75% human, 25% murine) which acts by binding to TNF-α and blocking its effect. The cost of treatment with infliximab is quite high and the stability indicated by the manufacturer once the vial is opened is 24 hours.
Purpose The purpose of this research has been to evaluate the biological activity of infliximab when reconstituted and diluted to 10.0 mg/ml and 5.0 mg/ml in NaCl 0.9% in a long term stability study up to 15 days. A study of the drug degradation has been also tackled to cheque any remaining activity.
Materials and Methods An indirect non-competitive ELISA immunoassay was developed based on the use of ELISA plates sensitised with TNF-α. The plates were incubated 'overnight' at 4°C using recombinant TNF-α from E. Coli at a concentration of 1 μg/ml. The immunoassay was validated in terms of calibration function (from 0.2 to 50.0 μg/ml), detection limit (0.06 μg/ml), precision as within-day reproducibility (relative standard deviation lesser than 10%), and accuracy as percentage of recovery (higher that 90%). The infliximab solutions of 10.0 mg/ml and 5.0 mg/ml in NaCl 0.9% were stored refrigerated at 4°C protected from daylight. The biological activity of these solutions was tested periodically up to 15 days by the ELISA method developed. The ELISA was also used to study the drug degradation in a stress study involving the exposure of samples of infliximab (50.0 mg/ml) for 24 hours to different stress conditions: basicity (NaOH 0.1M), acidity

(HCl 0.1M), oxidation (H_2O_2 1% and 10%), temperature (50°C) and ultraviolet light (250 w/m, 25°C).

Results All the samples analysed showed considerable biological activity; this biological activity was surprisingly even observed in those samples subjected to strongly stressed conditions. For the reconstituted sample of 10.0 mg/ml, a remaining activity of 52% was observed. In the case of the 5.0 mg/ml sample, the remaining activity decreased to 35%.

The biological activity measured using the samples submitted to stress conditions indicated a remaining activity at least equal to the upper concentration studied in the calibration function, i.e, 50 μg/ml. These samples were analysed directly, without dilution, because they had been expected to lose their biological activity totally.

Conclusions The biological activity of infliximab solutions of 10.0 mg/ml and 5.0 mg/ml in NaCl 0.9% when stored refrigerated at 4°C protected from the daylight was maintained at 52% and 35% respectively up to 7 days. The biological activity was also shown in infliximab samples submitted to stress conditions. More experiments are currently being conducted to confirm these results.

Acknowledgement Financial support was provided by the Project PI10/00201 (Instituto Carlos III, Ministerio de Economía y Competitividad, Spain). We also want to thank the Hospital Pharmacy Unit of the University Hospital of San Cecilio who kindly supplied all the infliximab samples.

No conflict of interest.

TCH-015 EVALUATION OF THE CHEMICAL AND PHYSICAL STABILITY OF SODIUM DICHLOROACETATE, AN ORPHAN DRUG FOR RARE METABOLIC DISEASES

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Background Sodium dichloroacetate (Na-DCA), not a patented substance, which is used in the treatment of rare diseases with congenital defects of the pyruvate-dehydrogenase complex (PDHC), produces a marked reduction in acid-base imbalance and lactic acid levels toxic to the brain parenchyma.

Purpose To evaluate the physical-chemical stability of sodium dichloroacetate in aqueous solution.

Materials and Methods Six grammes of sodium dichloroacetate were dissolved in 60 ml of water for injections (WFI). The exact concentration of the solution obtained was calculated by extrapolation from a calibration curve, recording the absorbance value at the wavelength of 198 nm of suitable standard solutions (5–50 μg/ml) of sodium dichloroacetate dissolved in water for injections (WFI). The solution was divided between 3 dark glass containers. The first container was kept at room temperature (r.t.), the second one in a refrigerator at +4°C, the third one in a freezer at –20°C. The stability of the samples, kept at different temperatures, was checked at 31, 45, 54 and 60 days; for each sample, using appropriate dilution, absorbance values were recorded ($\lambda = 198$ nm) and through the sodium dichloroacetate calibration curve made daily, the concentrations of the substance being analysed were calculated. The results were expressed as percentages of sodium dichloroacetate in solution.

Results Samples kept at +4°C were stable throughout the observation period. Samples kept at r.t. were stable until 30 days from preparation, while afterwards a slow and gradual decay could be observed. Samples kept at –20°C showed a progressive increase in concentration.

Conclusions The observed increase in samples at –20°C can be explained by the formation of a secondary species with a higher extinction coefficient than sodium dichloroacetate. Data suggest that sodium dichloroacetate solutions should not be stored at –20°C or at r.t. for more than 30 days.

No conflict of interest.

TCH-016 EXTENDED CHEMICAL-PHYSICAL STABILITY OF 25 mg/ml AZACITIDINE SUSPENSION

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Background Azacitidine is used for haematological pathologies. The summary of product characteristics (Vidaza) indicates stability of 45 minutes at room temperature and 22 hours if prepared with water for injections (WFI) at 2–8°C at reconstitution and refrigerated.

Purpose To assess the chemical-physical stability of azacitidine suspension 25 mg/ml.

Materials and Methods Analysis fofllowed an approved protocol.

The validity of the reference material (azacitidine–Sigma Aldrich-batch-SLBD1299V) was checked before starting the analysis.

100 mg of drug was reconstituted with 4 ml of refrigerated (2–8°C) WFI. The sample and standard suspension were stored at 5°C in a temperature-controlled refrigerator.

For International Conference Harmonization guideline the solution can be considered stable if the % assay of azacitidine with respect to the initial value is reduced by less than 5%.

Azacitidine concentrations were determined by a stability-indicating HPLC method under the following conditions: X-Terra RP18 column (150 × 4.6 mm, 5 μm); 4°C autosampler temperature; phosphate buffer pH = 6.5 and acetonitrile/water = 40/60 as mobile phase; 0.8 ml/min flow rate; 230 nm UV detection; 20 μl injection volume.

At these conditions the sample and a standard suspension were analysed at 0/22/24/48/72/96/168 hours.

The % assay of azacitidine was calculated at each cheque point and the results were compared with the assessed 100% values for assay at t_0.

Results The azacitidine assay (%) determined by HPLC is reported in the table below.

Average values obtained by triplicate injections at each cheque point are reported.

Conclusions The variation of the % assay of azacitidine with respect to the initial value is less than 5% for at least 48 hours.

A microbiological study on azacitidine suspension is ongoing at our hospital. Positive results will allow us to use unused azacitidine suspension within 48 hours of reconstitution with considerable cost savings.

Abstract TCH-016 Table 1

Time(hour)	% Azacitidine assay	% Azacitidine assay vs. t initial value
0 h	110.73	102.62
22 h	109.97	101.92
24 h	107.90	100.00
48 h	103.87	96.27
72 h	96.01	88.98
96 h	101.04	93.64
168 h	87.18	80.80

No conflict of interest.

TCH-017 EYE DROPS MADE FROM PLATELET-RICH PLASMA: DEVELOPMENT AND USE OF A NEW MASTER FORMULA

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Background Eye drops made from platelet-rich plasma are used in the treatment of ocular surface dysfunctions after LASIK refractive surgery, severe dry eye and corneal ulcers.
Purpose To describe the process of enriching the plasma, and the dosage used.
Materials and Methods This master formula was developed from the information obtained from a literature search in PubMed and Embase.
Results We extracted blood in 10 ml tubes containing 3.2% sodium citrate. The amount required depends on the length of treatment. From each 10 ml of blood processed, we obtained 3–4 ml of platelet-rich plasma, sufficient for one week of treatment. We received 10 tubes of blood from each patient. These were centrifuged at a speed of 1400 rpm for 10 minutes to obtain maximum concentration. The tubes were kept in an upright position, to avoid mixing the contents and waste. The eye drops were prepared in sterile conditions in a laminar flow cabinet. Using a sterile Pasteur pipette, we removed the top layer of the centrifuged blood which is the platelet-rich plasma. The plasma was collected in syringes and was then stored in sterile light-resistant containers, each containing 2–3 ml of platelet-rich plasma. It remained stable for a week in a fridge, or 3 months in a freezer. Patients were treated with a dose of 5–10 drops per day. The duration varied according to the diagnosis (between 1 week and 1 month of treatment).
Conclusions Platelet-rich plasma eye drops made in the Pharmacy Service after consulting previously published research and according to Royal Decree 1751/2001 are a new and alternative treatment for corneal ulcers, dry eye and post-LASIK dysfunction of the ocular surface.

No conflict of interest.

TCH-018 FORMULATION OF AN ORAL SOLUTION CONTAINING "POTION JOULIÈ" PHOSPHORUS TO COUNTERACT THE SHORTAGE OF PHOSPHONEUROS

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Background In October 2011 a shortage of Phosphoneuros became apparent. This oral solution containing phosphorus is prescribed in the treatment of diseases where phosphorus intake is essential. None of the available drugs was suitable for paediatric needs. Literature searches were conducted to identify formulas in national formularies and pharmacopoeias or already developed in other compounding hospitals, but no consensus 'Potion Joulié' formula was found.
Purpose To provide patients with a concentrated oral solution of phosphorus. A feasibility study was performed. The aim was to give an expiry date of 3 months.
Materials and Methods A batch of 3 bottles was produced. Visual appearance, pH, phosphorus and sodium contents were determined. At M0, M1 and M3 a microbiological assay was performed according to the Ph Eur (5.1.4).
Results The formula we adopted consists of (for 100 ml): 20.40 g of phosphoric acid 50 per cent, 16.5 g of sodium phosphate dibasic anhydrous, 50 mL of sterile water and simple syrup. The phosphorus strength of 67.4 mg/mL is close to that of Phosphoneuro. For 12 weeks, the solution appeared unchanged, clear and colourless. pH about 4.14 remained constant. Sodium and phosphorus contents were stable and the observed values were within 10% of the theoretical values. Microbiological results were in accordance with European Pharmacopeia: viable aerobic bacteria $\leq 10^3$ (CFU/ml), fungal $\leq 10^2$, no E.coli.
Conclusions Microbiological compliance and physicochemical stability were verified at 12 weeks according to the standards of the European Pharmacopeia. After users had insisted, the French Regulatory agency urged Bouchara Recordati to produce Phosphoneuros again, effective in May 2012. This is an example of the hospital pharmacist's role in compounding drugs to allow patients to continue their treatment in case of shortages of commercial products.

No conflict of interest.

TCH-019 IMPLEMENTATION OF A MONITORED INFORMATION SYSTEM PROTOCOL IN PHARMACEUTICAL MONITORING

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Background Information and communication technologies increase efficiency and safety in health systems. The SiMON protocol (Monitored Information System), developed by the R&D department of hospital's Computing Service, provides a tool for monitoring patients attending a particular consultation and is adaptable in line with the needs of each clinical service. Its main objective is to streamline care by automating patient information related to such consultation. Furthermore, it provides a record for future analysis of information collected, making it possible to export information, scorecards and predict comorbidities.
Purpose To describe the implementation of SiMON in pharmaceutical monitoring of patients with viral diseases (HIV/HCV).
Materials and Methods Review of antiretroviral technical datasheets, pegylated interferon, ribavirin and protease inhibitors (boceprevir/telaprevir) and of the necessary literature to collect criteria and general recommendations for treatment of these diseases, adverse drug effects, interactions between these drugs and others, and contraindications for use.
Results In order to implement SiMON in the pharmaceutical monitoring of patients with HIV/HCV, the Pharmacy Service reviewed 15 datasheets of antiviral drugs. Usage alerts were established as well as recommendations for each drug that depend on patient data (83 alerts), prescribed dosage (34 alerts), laboratory test results (94 alerts) and interactions between different medicinal products (484 alerts). Each of these alerts can refer to a contraindication or usage precaution, with a possible recommendation to suspend treatment, adjust the dose or change the drug involved in the interaction for an alternative. We also collected 482 adverse drug effects that had to be structured in tree form so they could be encoded by the Computing Service.
Conclusions The SiMON protocol, a tool that increases the efficiency of patient monitoring in a multidisciplinary way, makes it possible to record side effects and generate drug alerts and it may be possible to make additional use of the data stored. Collaboration between different services increases the performance of tools at our disposal.

No conflict of interest.

TCH-020 IMPROVING EFFICIENCY IN ELASTOMERIC PUMP FILLING USING DIANA ONCO PLUS, A SEMI-AUTOMATED COMPOUNDING DEVICE

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Background La Fe Universitario y Politécnico Hospital is a tertiary-care hospital with approximately 1000 beds serving a population of 210,000 people. The pharmacy department owns 4 vertical laminar flow hoods where more than 35,000 chemotherapy treatments, including the filling of 800 elastomeric pumps, are prepared per year.
Purpose To compare both the time spent and the accuracy in the filling of elastomeric pumps (EPs) with fluorouracil by two different methods: DIANA ONCO-PLUS, a semi-automated compounding system (ICU Medical Europe), and the normal manual method used in the hospital's Chemotherapy Unit (CU). The secondary endpoint was to assess user satisfaction with the two methods.
Materials and Methods For 4 consecutive weeks, EPs were filled by trained nurses two days per week. The first day DIANA ONCO-PLUS was used and the second day the EPs were filled manually. To avoid bias, every week a different nurse filled the EPs using both methods. Filling time was measured by a different nurse using a conventional chronograph and the accuracy was evaluated by weight of EP (before and after filling). Nurses' satisfaction was assessed by a questionnaire.
Results The filling of sixty-five EPs was evaluated. The filling mean time was 4.25 min with the manual method and 3.84 min with DIANA ONCO-PLUS ($p = 0.008$). If purge is considered, the mean time was 6.63 min and 5.52 min respectively ($p < 0.001$). The mean relative error in the filling was 0.735% in manual method and 0.314% in DIANA method ($p = 0.006$) without any clinical relevance. There was no user-related variability. Nurses were very satisfied using DIANA for filling EP. They considered DIANA more comfortable and safe.
Conclusions DIANA ONCO-PLUS is a more efficient and accurate method to fill EPs than the manual method. The differences found were user-independent.
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No conflict of interest.

TCH-021 INCORPORATION OF IL28B POLYMORPHISM DETERMINATION INTO THE SERVICES PORTFOLIO OF THE PHARMACY DEPARTMENT AND RESULTS OBTAINED

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Background Recent marketing authorizations for the first protease inhibitors for hepatitis C virus (HCV) have changed the management of chronic hepatitis C patients. However, it should be noted that the cost, number as well as the severity of adverse effects will increase. It is therefore reasonable to adopt criteria to ensure maximum efficiency and patient safety. IL-28B polymorphism is one of the factors associated with the treatment outcome and has been closely linked to interferon response.
Purpose To describe the implementation of the determination of the IL-28B polymorphism, rs12979860, and the results obtained, in order to personalise the treatment in HCV mono-infected patients in a tertiary hospital.
Materials and Methods We designed a standard form for HCV patients starting treatment with protease inhibitors. It includes several items that require clinical evaluation: viral load, HCV genotype, FibroScan and/or liver biopsy, response to previous treatment and polymorphism of the IL-28B genotype. Homozygous CC is the favourable genotype, predicting a good response. CT and TT genotypes are considered unfavourable.

The test was conducted in the pharmacogenetics area of the pharmacy department. To calculate the response time, we considered how long it takes to get the different responses.

The results were added to the hospital's electronic medical records programme for easy reference online.
Results A total of 26 genotypes was determined, of which 11 (42%) were requested by the department of infectious diseases (56% co-infected), 10 (38%) by the hepatology department and 5 (18%) by an external department. Results 15 (58%) were CT, 8 (31%) CC and 3 (11%) TT. 100% of patients had a score of FibroScan > 9.5 kPascal. The response for the tests was on average 3 to 7 days, with the limiting factor the sequencer availability.
Conclusions IL28B determination has been added to the hospital's services portfolio as a clinical assessment tool for the treatment of hepatitis C, with a response time of 3–7 days.

No conflict of interest.

TCH-022 INTRADIALYTIC CALCIPHYLAXIS IN RENAL PATIENTS. DEVELOPMENT OF AN INJECTABLE SOLUTION OF 25% SODIUM THIOSULFATE FOR TREATMENT

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Background Calciphylaxis (calcific uremic arteriolopathy) is the ischemic ulceration of the skin caused by the disseminated calcification of the subcutaneous tissue and small arteries as a consequence of hyperparathyroidism in uremic patients.
Purpose To describe the method of preparation and checking of an injectable solution of 25% sodium thiosulfate for the treatment of intradialytic calciphylaxis in renal patients.
Materials and Methods Sodium thiosulfate is an antioxidant, vasodilator and calcium chelator. The preparation process for the solution of 25% sodium thiosulfate is: Ingredients: Sodium thiosulfate pentahydrate: 25 g, water for injection (WFI): qs 100 ml. Preparation: Weigh the amount of sodium thiosulfate in a sterile beaker. Then, working in a horizontal laminar flow hood, boil WFI to eliminate CO_2. Dissolve the thiosulfate in about 80 ml of boiled water. Check that the pH of the solution is between 6 and 9.5, if it is not, adjust with HCl or NaOH. Flush into a 100 ml volumetric flask and make up to volume. Filter with a double 0.22 micron philtre. Finally pack with 50 ml syringe into a sterile glass bottle and label.
Results The result is a solution of 100 ml of 25% sodium thiosulfate, transparent, sterile and stable for 30 days in refrigerator. For QC a visual particulate sterility cheque is performed by sowing in aerobic and anaerobic cultures and a bubble point test to verify the integrity of the philtres.
Conclusions Proper preparation and checking of the 25% solution of sodium thiosulfate has guaranteed its parenteral administration is safe. The treatment is effective and well tolerated, helping patients and improving their quality of life.

No conflict of interest.

TCH-023 LIQUID ORAL FORMULATIONS OF PROPRANOLOL HYDROCHLORIDE FOR THE TREATMENT OF INFANTILE HAEMANGIOMAS

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Background Oral propranolol has been found successful in the treatment of infantile haemangiomas. Paediatric dosage forms of propranolol are not commercially available in our country.
Purpose To develop an extemporaneous oral dosage form of propranolol appropriate for children from 14 days to 24 months of age in hospital and an ambulatory care setting and to determinate its stability. The requirement for minimum excipients for the safety of targeted age group was considered.
Materials and Methods A solution of propranolol 2 mg/ml was prepared from the substance. We used citric acid or citrate-phosphate buffer to achieve the optimum stability of propranolol (pH about 3) and simple syrup to mask the bitter taste of the active ingredient. Two formulations (depending on the patient's age) were developed – one using sodium benzoate as preservative and one preservative-free. The preservative-free solution was prepared aseptically with a limited expiry date. The stability of the preserved solution was evaluated for 180 days at room and reduced (2–8°C) temperatures using a validated HPLC method and pH measurements.
Results The formulation preserved with sodium benzoate was stable at both temperatures for 180 days. The concentration of propranolol varied between 98.2–102.5%, the pH value did not change significantly. The efficacy of antimicrobial preservation (Ph.Eur., 5.1.3) was proven for sodium benzoate 0.05%. A risk assessment of the formulation was undertaken (<100) and an appropriate quality assurance system was developed. A glass bottle with an oral syringe enabled the dose of propranolol to be given with flexibility and accuracy.
Conclusions The preparation of propranolol solution in the pharmacy enabled 23 paediatric patients aged 0.6–20.9 months to be treated successfully for haemangiomas by our hospital.
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No conflict of interest.

TCH-024 LONG-TERM STABILITY OF INDOMETHACIN 0.2 MG/ML READY-TO-USE SOLUTION FOR INTRAVENOUS USE

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Background Indomethacin 1 mg is used in premature infants to close the patent ductus arteriosus. The commercial product Indocid PDA is no longer available in Switzerland. Nevertheless, on our paediatric ward there is a great need for an intravenous indomethacin solution that can be used at a dose of 0.1–0.2 mg/kg body weight.
Purpose To produce a parenteral ready-to-use solution containing 0.2 mg/ml indomethacin and to determine the long-term stability using a stability indicating high-pressure liquid chromatography (HPLC) method.
Materials and Methods Liometacen, containing 50 mg sterile indomethacin (as meglumine salt), was reconstituted with 2 ml water for injection and then diluted with 250 ml NaCl 0.9% to a final indomethacin concentration of 0.2 mg/ml. Finally, a 5 ml indomethacin solution was filled into 10 ml sterilised brown glass vials. The entire process took place under aseptic conditions. Sterility testing was performed before final batch release.

The vials were stored for up to 18 months frozen at –20°C, at 2–8°C or at room temperature, and the solutions were assessed by HPLC for indomethacin and its degradation products.
Results Indomethacin solutions were submitted to conditions of oxidative or heat degradation, and the HPLC method was found to indicate stability.

The stability testing revealed that the solutions retained at least 95% of their initial indomethacin concentration when they were stored at room temperature for 12 days or at 2–8°C for 23 days.

In contrast, when the solutions were stored in a deep-freezer, they were stable for at least 18 months. During this time, no degradation of indomethacin occurred and the indomethacin concentration remained stable.
Conclusions Indomethacin solutions may be prepared in advance and stocked for at least 18 months at –20°C. After thawing they can be kept at room temperature for 7 days or alternatively at 2–8°C for 14 days. This procedure is used successfully in our hospital for the treatment of the patent ductus arteriosus.

No conflict of interest.

TCH-025 LONG-TERM STUDY OF THE FORMATION OF AGGREGATES IN UNDILUTED BEVACIZUMAB 25 MG/ML

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Background Bevacizumab, the active substance of Avastin®, is a humanised monoclonal antibody that acts as angiogenesis inhibitor, a drug that slows the growth of new blood vessels. It is used to treat several cancers, including colorectal, lung, breast, kidney and ovarian. Bevacizumab binds to vascular endothelial growth factor (VEGF), the key driver of vasculogenesis and angiogenesis, and thereby inhibits the binding of VEGF to its receptors, Flt-1 (VEGFR-1) and KDR (VEGFR-2), on the surface of endothelial cells.
Purpose To evaluate the stability of bevacizumab 25 mg/ml in solution for infusion, in terms of the formation of aggregates once the vial was open. The study was carried out for 15 days since the manufacturer only indicates chemical and physical in-use stability for up to 48 hours at 2°C to 30°C in sodium chloride 9 mg/ml (0.9%) solution for injection, if the solution was prepared in validated aseptic conditions. The manufacturer also indicates that the prepared solution should not be frozen.
Materials and Methods The study of the formation of the aggregates was carried out by using a size exclusion high performance liquid chromatography method with diode array detection method (SE-HPLC-DAD). Two different storage conditions, i.e. refrigerated at 4°C and frozen at –20°C were maintained for 15 days. Samples were characterised by chromatographic analysis immediately after the vial was opened. These chromatographic data were compared with those obtained on subsequent days. A stress study was also conducted.
Results Analysis of freshly-prepared samples enabled us to characterise bevacizumab chromatographically by SE-HPLC-DAD. In the corresponding chromatograms monomers were clearly detected (main peak in the chromatogram) at 7.7 ± 0.1 min of retention

time, as was the presence of possible dimers at 6.0 ± 0.1 min (small chromatographic peak). Chromatographic analysis of the same samples stored at room temperature and protected from light in a refrigerator at 4°C indicated the absence of a peak at 6.1 ± 0.1, the shift of the main peak to 8.1 ± 0.1, and the detection of a new chromatographic peak at 9.5 ± 0.1.

Conclusions The results of this study indicated the absence of aggregate formation in bevacizumab 5 mg/ml during the period of monitoring (15 days) under the two storage conditions tested. Nevertheless, they clearly indicate some kind of break down.

Acknowledgement Financial support was provided by the Project PI10/00201 (Instituto Carlos III, Ministerio de Economía y Competitividad, Spain). We also want to thank the Hospital Pharmacy Unit of the University Hospital of San Cecilio which kindly supplied all the bevacizumab samples.

No conflict of interest.

TCH-026 LONG-TERM STUDY OF THE FORMATION OF AGGREGATES IN UNDILUTED CETUXIMAB 5 mg/ml

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Background Cetuximab (Erbitux) is a chimeric monoclonal IgG1 antibody, an epidermal growth factor receptor (EGFR) inhibitor, given by intravenous infusion for the treatment of metastatic colorectal cancer and head and neck cancer. Cetuximab is produced in a mammalian cell line (Sp2/0) by recombinant DNA technology.

Purpose To evaluate the stability of this therapeutic monoclonal antibody, i.e. cetuximab 5 mg/ml in solution for infusion, in terms of the formation of aggregates once the vial was open. The study was carried out for up to 15 days since the manufacturer only indicates chemical and physical in-use stability for up to 48 hours at 25°C, if the solution was prepared in validated aseptic conditions.

Materials and Methods The study of the formation of the aggregates was carried out by using a size exclusion high performance liquid chromatography method with a diode array detection method (SE-HPLC-DAD. Two different storage conditions, i.e. refrigerated at 4°C and frozen at –20°C, were considered up to 15 days. Samples were characterised by chromatographic analysis immediately after the vial was opened. These chromatographic data were compared with those obtained on subsequent days. A stress study was also conducted.

Results Analysis of freshly-prepared samples enabled us to characterise cetuximab chromatographically by SE-HPLC-DAD. In the corresponding chromatograms monomers were clearly detected (peak at 6.77 ± 0.05 minutes of retention time) while dimers or aggregates (peaks at retention times near to 6 minutes or smaller) were absent. Chromatographic analysis of the same samples stored at room temperature and protected from light in a refrigerator at 4°C and frozen at –20°C over a 15-day period indicate the absence of any kind of aggregates.

Conclusions The results of this study indicated the absence of the aggregate formation in cetuximab 5 mg/ml during the period of monitoring (15 days) under the two storage conditions tested.

Acknowledgment This work was supported by funds received by the Project PI10/00201 (Instituto de Salud Carlos III, Ministerio de Ciencia e Innovacion, Spain). We also thank the Pharmacy Unit of the University Hospital San Cecilio which kindly supplied all the cetuximab samples studied.

No conflict of interest.

TCH-027 MEDIA FILL TO VALIDATE THE ASEPTIC PREPARATION OF SODIUM BICARBONATE INTRAVENOUS INFUSION

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Background Sodium Bicarbonate is an alkaline agent and is indicated for treating acute or chronic metabolic acidosis. The substance is unstable and when heated in solution it gradually changes into sodium carbonate. That' s why we prepared Sodium Bicarbonate Intravenous Infusion aseptically, according to the Standard Operating Procedure.

Purpose To validate the performance of aseptic processes used to produce our sterile product and to meet Good Manufacture Practice Requirements, i.e. to comply with the 'low', twice per year we are performing media fill (process simulation studies).

Materials and Methods Media fills are simulating the whole process in order to evaluate the sterility confidence of the process. Process simulations includes formulation (compounding), filtration and filling. Important factors in the process are: personnel (number, shift changes, fatigue), sterility test for the sterilised components (bottles, stoppers), filled volume per container (sufficient to wet all surfaces of the containers), frequency, media fill sizes, acceptance criteria, environmental monitoring. We select the growth medium and prepared the bulk media as the same process as routine production including filtering process and number of units (the batches is smaller than 1000). Than all units were incubated at 20–25° C for 14 days.

Results After the incubation period of the media filled containers they were visually examined for microbial growth. The contamination rate is zero, so, the accepted contamination rate is less then 0, 1%. (Contamination rate = Upper confidence limit/Number of filled units × 100)

Conclusions With media fill we evaluate the aseptic assembly and operation of the sterile equipment, qualified the operators, and assess our technique, and demonstrate that the environmental controls are adequate to meet the basic requirements necessary to produce Sodium Bicarbonate Intravenous Infusion by aseptic procesing.

No conflict of interest.

TCH-028 NEW BULSULFAN PROCEDURE TO IMPROVE BOTH PREPARATION AND ADMINISTRATION

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Background When pharmacy staff is not available, nurses used to prepare diluted busulfan solution from commercial vials just before administration because of its low stability. Doing this without protection may cause occupational exposure to this cytotoxic drug.

Purpose To devise a new protocol and perform a preliminary evaluation.

Materials and Methods Literature and technical studies were performed to choose the best devices. Nurses and physicians performed a clinical evaluation using a 5-item satisfaction form.

Results Medical devices containing polycarbonate must be avoided because of the interaction with N,N-dimethylacetamide used as an excipient. The new protocol consists of an individual kit with the commercial solution packed in a syringe, an infusion bag with the

exact volume of diluent and a closed system transfer device (CSTD). Nurses just have to dilute the solution into the bag under a laminar air-flow hood using the CSTD. Although 2-part syringe methods were found in the literature, 3-part syringes with limited contact between the elastomeric tip and busulfan solution (reference 62.8426, Codan) were chosen because leaks were observed with the 2-part syringes during the technical study. PhaSeal devices: Injector to close the syringes and a Connector-Luer for infusion bags were selected as CSTDs. All these devices are polycarbonate free.

7 new kits were prepared for a period of 8 days without contact. The results of the evaluation show that nurses and physicians (n = 14) were overall dissatisfied by the previous protocol (neither good nor bad: 35.7%, bad: 21.4% and very bad: 35.7%) while the majority preferred the new one (very satisfied: 28.6%, satisfied: 42.9%, neither good nor bad 7.14%, no response: 21.4%). Overall nurses and physicians answered that new modalities limit the risk of dose errors (93%) and occupational exposure (86%).

Conclusions Implementing this procedure has improved handling practise with good satisfaction.

No conflict of interest.

TCH-029 OUTCOMES EVALUATION OF AN INTERNATIONAL WORKGROUP ON ROBOTICS: A MULTICENTRE STUDY

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Background The growing demand for patient and operator safety in anticancer drug compounding led to an increasing demand for automation. As 18 hospitals have now introduced APOTEC Achemo, it became necessary to set up a round table at which all users could share their knowledge and expertise. Therefore, in 2009 a workgroup on robotics (named APOTECA Community) was established. Every year its members meet to share their needs with the manufacturer and assemble new ideas. The annual system upgrade is a consequence of the meeting. 160 new requirements, merged into 4 upgrades, have been collected up to now. The requirements can be classified into the following main topics: a friendlier user interface; software integration with medical health records; higher productivity.

Purpose To assess the results in terms of productivity following the 2012 upgrade within the APOTECA Community

Materials and Methods Five oncology pharmacies were selected for this study: University Hospital of Ancona, European Institute of Oncology, Romagna Cancer Institute, S. Camillo Hospital of Rome, Cleveland Clinic. The abovementioned pharmacies were monitored before and after the upgrade, as far as the monthly productivity with APOTEC Achemo is concerned.

Results The 5 hospitals together prepared an average of 4150 preps/month before the 2012 upgrade, while 6000 preps/month was surpassed after the installation. Productivity showed an average increase of 46%, ranging from 11% to 67%. This variability is closely correlated with the best practise and has been analysed for each case.

Conclusions The creation of a round table where the APOTEC-Achemo users share experiences and discuss best practise is playing an essential role in the continuous improvement of this innovative technology. The progress recorded after the latest upgrade in terms of productivity (+46%) is only one example of this powerful tool.

No conflict of interest.

TCH-030 PET/CT IMAGING WITH [11C]CHOLINE AS A RADIOPHARMACEUTICAL FOR THE DETECTION OF RECURRENT PROSTATE CANCER: A RELIABLE PRODUCTION METHOD AND QUALITY CONTROL

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Background PET/CT Imaging with the radiopharmaceutical [11C]-choline has become a useful tool in the detection of prostate cancer, mainly used in the assessment of treated patients presenting rising PSA and negative response after conventional imaging procedures. Tracer uptake on tumoral tissues is correlated to an increased synthesis of membrane substrates: [11C]-choline is trapped by phosphorylation taking part on phosphatidylcholine turnover. The sensitivity of this diagnostic method (almost 100%) is greater than CT or PET-[18F]FDG implying the superiority of the PET-choline procedure. PET-choline was first investigated in the late 1990s although no specific monographs are included in main Pharmacopoeias. The use of this powerful tracer is now based on Clinical Trials but, on September 2012, the FDA approved the production and use of 'Choline C11 Injection' to help the detection of recurrent prostate cancer.

Purpose To define the key role the pharmacist plays in the preparation of [11C]-choline IMPD for Clinical Trials, presenting the tracer production in the details. Quality Control for characterising the final product and releasing it as 'solutio iniectabilis' are also described.

Materials and Methods

cyclotron (Eclipse, Siemens)
Automatized synthesiser (ModularLab, Eckert Ziegler)
GMP grade reagents and disposables
[11C]labelling based on 'wet' methylation chemistry

Results [11C]carbon dioxide (50 GBq) was produced by cyclotron and delivered to the synthesiser placed in our radiopharmacy. Carbon dioxide was first reduced to methyl iodide, then dimethyl-aminoethanol was [11C]-methylated. Finally the product was purified and filtered obtaining 15 GBq of sterilised [11C]-choline (16 min total time and 30% yield). Radiochemical purity was higher than 98% and other CQs were performed in accordance with EPh [18F]FDG monograph.

Conclusions Due to the short half-life decay (20 min) [11C]-choline production must be performed in PET facilities with on-site cyclotron and radiopharmacy. We presented a reliable and safe method for producing [11C]-choline for 3–4 patients' PET scans.

No conflict of interest.

TCH-031 PHARMACIST EXPERIENCE IN CONTINUING IMPROVEMENT OF THE AUTOMATIC SYSTEM

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Background An annual meeting between the manufacturer of APOTECAchemo and all the users is held to share experience and discuss suggestions for best practise. The feedback collected during the meeting forms the basis for the next system upgrade aimed at increasing performance. Some improvements that we suggested were included in the 2012 upgrade and improved our productivity: a new procedure for reconstitutions; an extemporaneous picking list; faster communication between the management software and the robot; a more efficient vision system for identifying labels.

Purpose To quantify the benefits that pharmacists reaped in the day-to-day work in terms of productivity (number of preparations/day), after the annual upgrade.
Materials and Methods The performance of the APOTECAchemo equipment was analysed before and after the 2012 upgrade. The time required for cyclophosphamide, trastuzumab and gemcitabine reconstitution was also investigated.
Results An average of 45 doses per day was prepared before the upgrade, with a maximum of 60 preparations. After the installation, an average of 75 preparations per day was recorded, with a maximum of 100. The reconstitution of stable powder drugs (cyclophosphamide, trastuzumab and gemcitabine) during 'spare time' (weekends, early mornings, lunch times) allowed an average gain of 55 (11.5%), 72 (15%) and 24 (5%) minutes per day, respectively.
Conclusions The new upgrade allowed us to increase daily productivity by 66.6%. The continuing multidisciplinary dialogue among the stakeholders (physicians, pharmacists, technicians and engineers) enables us to make better use of APOTECAchemo in the daily clinical activity and encourages the technology to develop.

No conflict of interest.

TCH-032 PHARMACY PREPARATION: RETROSPECTIVE ANALYSIS OF MORPHINE BAGS USED FOR THE PREPARATION OF ELASTOMERIC INFUSION PUMPS

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Background The Italian Law no. 38 of 15 March 2010, has considerably simplified the prescribing and dispensing of medicinal products for the treatment of pain. The law regulates all matters concerning the medical treatment that the Italian state provides to citizens through the National Health Service.

National networks are also in place for palliative care and the treatment of pain, which provide guidelines for implementing the Hospital Territory Without Pain project.
Purpose To examine whether pharmacy compounding can improve the service offered, optimise the time and resources used for preparation, and whether this will require the allocation of new resources.
Materials and Methods Since the beginning of 2011 the San Giovanni Bosco hospital pharmacy has used morphine bags at levels of 2% morphine per 100 ml to prepare elastomeric infusion pumps for analgesic treatment in addition to vials used. The aim was to monitor how the consumption of morphine was changing by comparing the quantities consumed in 2010 and 2011. This was done using data from the controlled drugs register.
Results In 2011, the quantity of morphine consumed increased by 4.5%. The amount of morphine waste from broken elastomeric infusion pumps, expired vials and bags, bags left unused due to death of the patient or change of treatment and bags with unused content increased in total by 94%. 35% of morphine destroyed was deemed outside of its validity period while 62% of elastomeric infusion pumps were returned to the pharmacy as faulty. Despite the increase in expired morphine and the increase in morphine purchased there has been a reduction in spending of approximately 28%.
Conclusions This analysis allowed us to verify that the use of morphine bags has led to a slight reduction in expenditure. It is also important to emphasise the easier fitting of the infusers by operators which leads to time savings.

No conflict of interest.

TCH-033 PHYSICOCHEMICAL STABILITY OF READY-TO-ADMINISTER EPINEPHRINE INJECTION SOLUTIONS 20 µg/ml, 50 ml

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Background In the University Medical Center Mainz standard concentrations are defined for medicinal products to be administered by continuous injection with syringe pumps in adult intensive care patients. Patient-individual doses are provided by adjusting the injection rate. Various medicines are aseptically prepared in the pharmacy department as ready–to-use products. Batch preparation of the products and keeping them in stock is only possible if stability of the products is tested using a validated method.
Purpose The purpose of this study was to test the stability of ready-to-administer epinephrine solutions for injection 20 µg/ml in 50 ml plastic syringes.
Materials and Methods Epinephrine bulk solution 20 µg/ml was prepared aseptically by diluting Suprarenin 25 mg/25 ml Sanofi-Aventis with 5% glucose infusion solution in empty infusion bags (PP/PE). The solution was filled with the NeoCare Compounder into 50 ml BD Perfusion Syringes, Luer Lock Tip, protected from light. The syringes were stored at 2–8°C in the refrigerator. Epinephrine concentration was determined by using a validated HPLC method with UV detection at 280 nm and an innovative HPLC column Nucleodur which contains sulfonyl groups.
Results The concentration of epinephrine in the 50 ml syringes remained unchanged over a period of 2 months. After 28 days and 2 months of refrigerated storage the concentration amounted to 100.5% and 100.8% of the nominal concentration, respectively. Neither adrenochrome (detection wavelength 480 nm) nor any other degradation products were detected during the study period. With regard to these results batch production is feasible. Stability over 2 months is assured.
Conclusions Epinephrine solution for injection 20 µg/ml, aseptically prepared by diluting the marketed injection concentrate with 5% glucose infusion solution in 50 ml light-protected plastic syringes, is stable under refrigerated storage conditions for at least 2 months.

No conflict of interest.

TCH-034 RECYCLING DRUGS FOR VIRAL DISEASES IN THE OUTPATIENT AREA

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Background When drugs are multidose packaged, all units must be dispensed to the same patient. Sometimes, patients don't finish their treatment and return units left to the Pharmacy Department. Units returned must be discarded, so it is a loss to the Pharmacy Department.
Purpose To evaluate how much the Pharmacy Department loses when multidose packaged drugs for viral diseases are returned to the outpatient area.
Materials and Methods A single-centre retrospective observational study was carried out in the outpatient area of the Pharmacy Service of the Hospital Clínico Universtiario de Valladolid over 10 months, between June 2011 and March 2012. The following information was collected in structured tables: name of medicine, number of units returned, price to book value per unit and total value.

Results 7,764 units of drugs for viral diseases were returned during the study period. Of these units, 90% were recovered by the Pharmacy Department to be dispensed to other patients. However, 10% cannot be reused due to multidose packaging.

The return of drugs that can be reused is a gain in economic resources of 84.6% over the total value of returned drugs (€36.371).

Furthermore, the average cost per unit of reused drugs is €4.4 vs. 7.3€ for non-reused. The combos are usually multidose packaged, when it is in these drugs where unitary repackaging would be more efficient.

Conclusions 10% of the units of drugs for viral diseases returned to the outpatient area must be discarded due to multidose packaging.

Unitary repackaging allows the Pharmacy Department to recover 84.6% of the cost of returned drugs in this area.

Combos, as well as being more expensive than other drugs, are mostly multidose packaged, preventing reuse.

No conflict of interest.

TCH-035 REPACKAGING OF DRUGS IN UNIT DOSES USING AN AUTOMATIC BLISTER PRECUTTING SYSTEM

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Background Storage conditions in the original blister guarantee certain conditions (light protection, humidity). Our hospital pharmacy has a Strokar (manual repackaging machine) and, since 2011, a Blispack (automatic repackaging). Repackaging is carried out by a pharmacy technician for 7 hours/day, from Monday to Friday.

Purpose To describe the activity of the BlisPack.

Materials and Methods Descriptive observational study. Study period: 12 months (May/2011-April/2012). Variables studied: repackaged pharmaceutical specialties, number of unit doses repackaged, number of blister packs processed, number of blister packs rejected, monthly percentage of units repackaged with BlisPack. Data source: BlisPack ADM v1.1 computer application.

Results Number of different drugs repackaged: 118. Number of unit doses repackaged with BlisPack: 333352. Number of processed/rejected blisters: 18111/2873 (15.86%). Average monthly BlisPack unit doses repackaged: 27779. Average percentage of BlisPack repackaged: 40.10%. Monthly evolution of numbers of unit doses repackaged in BlisPack and percentage of unit doses repackaged in BlisPack versus total number of unit doses repackaged: May 2011 (22787 and 30.84%), June 2011 (11350 and 24.88%), July 2011 (30675 and 38.65%), August 2011 (24178 and 37.27%), September 2011 (19502 and 29.84%), October 2011 (27942 and 47.03%), November 2011 (31894 and 40.53%) December 2011 (25722 and 41%), January 2012 (25628 and 39.26%), February 2012 (24500 and 46.08%), March 2012 (41547 and 54.34%), April 2012 (47627 and 51.58%). The 5 drugs with greatest number of unit doses repackaged in BlisPack were: Acfol, Potasion 600 mg, Limovan 7.5 mg, Lioresal 10 mg and Levothroid 50 mcg.

Conclusions This new technology allows us to repackage drugs, maintaining the conditions of the original packaging, with a precut automatic blister that simplifies the process of repackaging. There has been a growth in the use of this system compared to traditional repackaging, implying that to managethe new repackaging BlisPack requires a learning curve and the acquisition of handling skills.

No conflict of interest.

TCH-036 RESULTS OF A SYSTEMATIC LONG-TERM STABILITY STUDY FOR READY-TO-USE INJECTABLE DRUGS PRODUCED BY A CENTRALIZED INTRAVENOUS ADMIXTURE SERVICE

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Background Injectable preparations other than parenteral nutrition admixture and injectable cytotoxic drugs could be prepared by Centralised IntraVenous Admixture Service (CIVAS) if the long-term stability of the drugs is known. However, this information is not always available.

Purpose To develop a programme of chemical drug stability analysis in collaboration between the hospital pharmacy, the medical laboratory and a Biostatistics Centre to determine the long-term stability of widely-used injectable anti-infectious and non-anti-infectious drugs.

Materials and Methods After setting up the High Performance Liquid Chromatography (HPLC) method, 25 drugs (10 anti-infectives, 4 anaesthetics, 2 propulsives, 2 detoxifying agents for antineoplastic treatment and 7 drugs with other properties) were reconstituted in a laminar air flow hood. 15 of them were stored directly at 5 ± 3°C and 16 stored in the freezer at –20°C, thawed by microwave following a standardised procedure and stored at 5 ± 3°C before use. The stability of the product was evaluated by regression analysis.

Results For each drug, long-term stability varied from 11 days to 70 days. The freeze-thaw treatment by microwave may extend the stability (from 30 to 120 days) and allow batch-scale production of intravenous drugs, less expensive in term of manpower and sterile devices than drug reconstitution on the ward. The results were published by 47 posters in international congresses and by 34 publications in national and international pharmaceutical journals.

Conclusions Our findings contribute to improving the number and variety of drugs that may be take on by a CIVAS. This collaboration led to the foundation in 2009 of a drug stability research group at the University Hospital of Mont-Godinne that has already been awarded 4 prizes and nominations.

No conflict of interest.

TCH-037 RISK ASSESSMENT OF CYTOTOXIC DRUG COMPOUNDING: MANUAL VS. ROBOTIC

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Background Errors in cytotoxic drug compounding can cause serious harm to patients due to the low therapeutic ratio. Robots are intended to decrease the risk of medication errors through 100% verification and traceability of the entire production process.

Purpose This work is aimed at assessing the risk of medication errors in manual and automated compounding, taking into consideration the procedures and controls applied in both cases.

Materials and Methods The FMECA technique was applied to the procedures for the manual compounding defined in the Recommendations of the Italian Ministry of Health and to the compounding procedures of the APOTECAchemo robot. The analysis involved two Oncology Pharmacies working with automation in the daily routine since 2007 and 2011 respectively. 5 macro-failure modes for the compounding process were identified and the corresponding Priority Risk Indexes (PRIs) were calculated.

Results The failure modes that show higher benefits in risk mitigation are the wrong drug and wrong dosage with a PRI decrease of 80% (from 50 to 10). Indeed the redundant controls (vision system, scale, photocells) on the loaded vials guarantee the compounding of the right drug. In addition, the drug is dosed with a calibrated syringe pump and independently verified with the scale. The other failure modes reported a risk reduction of 50% and on the whole the total PRI passes from 186 in case of the manual activity to 63 for the robotic one.
Conclusions The FMECA analysis shows an overall reduction of the PRIs of over 66% with the robotic compounding with respect to the manual production. Automation not only decreases the occurrence of dangerous events thanks to the complete control of every single step of the compounding process, but also develops an error detection system through independent verification processes.

No conflict of interest.

TCH-038 SHORTAGE OF STERILE CALCIUM GLUCONATE STOCK SOLUTION FOR PARENTERAL NUTRITION: WHAT IS THE ALTERNATIVE AND HOW MUCH DOES IT COST?

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Background The Total Parenteral Nutrition (TPN) production facility of our children's hospital produces around 20,000 units per year with 2 Baxa EM2400 compounders. In June 2012, a shortage of the calcium source (10% sterile solution of calcium gluconate in 500 mL bottles) occurred. To overcome this problem, we first tried to import an alternative source but the administrative delay was too long. The only sources available within a month were 10 mL plastic or glass ampoules. The estimated consumption was around 300 ampoules per production day. To maintain efficiency and safety in the TPN facility, it was decided to produce calcium gluconate bags from 10 mL ampoules by sterilising filtration to maintain the safety of preparation.
Purpose To evaluate the additional cost incurred by setting up this production and the increased time required.
Materials and Methods The pharmacy prepared calcium gluconate bags (250 mL) from plastic ampoules after filtration (0.22 µm philtres (Sterivex Millipore), using a Repeater Pump (Baxter), in a laminar air flow cabinet. The cost of setting up a new procedure and of the compounding was evaluated in different categories (materials, checking, staff).
Results 228 bags were produced during the 20 days on which we could not obtain the 500 mL bottles (19 batches of 12 bags).

The cost of one 250 mL compounded bag was €44.23 (materials: 25.5, checking: €5.73, staff: €13). In addition, developing the system cost €4,237.72. The overall additional cost was therefore €155.22/L.
Conclusions Despite a major additional cost, compounding calcium gluconate bags has ensured the continued production of TPN. From a risk assessment point of view, identification of several suppliers and increasing our stocks of the raw materials would make out-of-stock situations easier to manage in future.

No conflict of interest.

TCH-039 SIX SIGMA IN HEALTHCARE: AN APPLICATION IN THE MONITORING OF ALBUMIN

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Background The high off-label use of albumin persuaded the pharmacy to introduce a request form that uses the internationals guidelines to assess whether the use of albumin is appropriate. This has resulted in a clear reduction in the costs.
Purpose To monitor the wards using six sigma methodology (a statistical concept that measures a process in terms of defects); to ensure that all procedures have been followed correctly.
Materials and Methods 696 forms for albumin prescriptions coming from 26 wards (August to December 2011) were analysed using Minitab software, which cheques the frequency of the best correct requests (type 1), partially correct requests (type 2) and incorrect requests (type 3). For each ward the β coefficient was used to connect the relationship between the ward and their requests. The wards were grouped into 4 ranges on confidence intervals for the odds ratio (OR) of a width equal to 0.3 called A,B,C,D and then a final logistic regression analysis was made.
Results The analysis showed that group A was the most efficient in terms of probability of obtaining better results, followed by groups D (OR 0.36), C (OR 0.19) and B (OR 0.09). The total number of requests received was: 43% type 1 (299/696); 26% type 2 (181/696); 31% type 3 (216/696). Group B showed the worst result with 51% type 3 requests (58% of the total requests for type 3). Using six sigma we have achieved a cost saving of about €15,000.
Conclusions The results encourage us to apply this methodology to other fields.

No conflict of interest.

TCH-040 STABILITY OF FROZEN CEFTAZIDIME SOLUTION IN POLYPROPYLENE SYRINGES FOR INTRAVITREAL INJECTION

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Background Ceftazidime is used for the treatment of endophthalmitis by intravitreal injection. For this emergency treatment, the syringes must be available immediately in the pharmacy. The stability at 2–8°C is limited and does not allow batch production.
Purpose To study the stability of ready-to-use ceftazidime solution at 20 mg/mL in 0.9% sodium chloride in polypropylene syringes after storage at –20°C, to allow preparation in advance.
Materials and Methods We used the High Performance Liquid Chromatography method published by Abdel Hamid ME *et al*, Farmaco 1998; 53: 132–138.

The analytical conditions were: Column C18 5µ 200 × 4.6 mm. Mobile phase (ammonium acetate buffer 0.1 M pH 7.5/acetonitrile 90/10), flow rate: 1 mL/mn, wavelength: 256 nm.

The HPLC method was validated according to ICH guidelines (linearity, repeatability, stability-indicating capability).

Syringes were stored at –20°C and 4°C to compare with the literature data.
Results Stability was defined according to ICH guideline Q1A: above 95% of the initial concentration of ceftazidime and concentration of degradation products less than 2%. After storage at 4°C, the ceftazidime concentration fell under 90% after 3 weeks and there was 65% of the initial concentration after 90 days.

The ceftazidime solution at 20 mg/mL was stable for 3 months at –20°C with more than 96% of the initial concentration and degradation products under 0.8%.
Conclusions Ceftazidime 20 mg/mL in 0.9% sodium chloride was stable for 3 months at –20°C. This allows batch preparation in advance and the immediate availability of the syringes to treat patients.

No conflict of interest.

TCH-041 STABILITY OF TOTAL PARENTERAL NUTRITION ADMIXTURES FOR PAEDIATRIC HOME CARE IN THE PRESENCE OF HIGH CONCENTRATIONS OF ELECTROLYTES

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Background In clinical practise electrolyte enrichment of the parenteral nutrition admixtures is a typical request, especially on the neonatal/paediatric wards. The supplementation of parenteral nutrition with high concentrations of electrolytes is an ongoing problem since the stability of lipid emulsions in nutrition admixtures is reduced by bivalent cations.
Purpose To examine the stability of 48 different paediatric admixtures designed for home parenteral nutrition. The admixtures investigated were characterised by high concentrations of electrolytes (20–61 mmol/l K^+, 9–21 mmol/l Ca^{2+}, 6–20 mmol/l Mg^{2+}).
Materials and Methods Parenteral pre-admixtures were prepared in two-chamber ethyl-vinyl-acetate bags, where a lipid emulsion was separated from the other components. Parenteral pre-admixtures (in two chambers) were stored up to 21 days at +4°C. Vitamin preparations were added only after combining the contents of two chambers of the bag.

Visual observations, globule size measurement (optical microscopy, laser diffraction (LD) and photon correlation spectroscopy (PCS)), zeta potential, pH analysis and surface measurements were performed in complete admixtures at t = 0 and after 24 h at room temperature.
Results In microscopic observation all admixtures were characterised by size of oily droplets not larger than 1 μm, which was confirmed using LD and PSC methods (Z-average was 260–310 nm). Oily droplet size did not change during the time of storage. Only in two admixtures were single particles up to 8–10 μm observed, so these admixtures were classified as unstable. The pH values of parenteral admixtures were in the range 5.6–6.7 and zeta potential was –36 to –47 mV and did not change during storage.
Conclusions Of the 48 admixtures investigated only two were problematic and the others may be stored for at least 21 days at 4°C. The completed admixtures demonstrated stability for at least 24 h at room temperature. It was possible to obtain stable admixtures despite the high concentrations of electrolytes.

No conflict of interest.

TCH-042 STABILITY STUDY OF GANCICLOVIR IN 0.9% SODIUM CHLORIDE IN DIFFERENT TYPES OF CONTAINERS: OPTIMIZATION OF RESOURCES

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Background Ganciclovir is approved for the treatment of cytomegalovirus infections in patients with complications and for its prevention in recipients of solid organ transplants. This drug must be diluted by a hospital pharmacist. To our knowledge, there are no data about ganciclovir stability in two kinds of containers: polyolefin and polyethylene.
Purpose To demonstrate the stability of ganciclovir sodium in 0.9% sodium chloride in two different types of containers: polyethylene [Ecoflac] and polyolefin [Viaflo]. It is very important to attribute a suitable expiry for this drug, prepared for infected hospital patients, in order to organise the work better and optimise the use of time and resources.
Materials and Methods Twelve admixtures were prepared, six for every concentration (4.55 and 0.8 mg/mL), of ganciclovir sodium in 0.9% sodium chloride, stored at room temperature, at 4°C and –20°C (in darkness) in two type of containers, polyethylene and polyolefin. The admixtures were evaluated for up to 21 days at the three temperature conditions. To cheque the concentrations a UPLC-PDA method was developed.
Results The method developed showed no interference peaks, and was reproducible and linear. There was no significant loss of ganciclovir during the study period. The drug at the concentrations considered showed no more than 5% of degradation during the analysis period in all the storage conditions. Moreover, there were no appreciable pH changes, and no evidence of visual incompatibility.
Conclusions Ganciclovir sodium 4.55 mg/mL and 0.8 mg/mL in 0.9% sodium chloride in two different kind of bags (Viaflo and Ecoflac 100 mL) was visually and chemically stable for at least three weeks when stored at room temperature, 4°C and –20°C.

No conflict of interest.

TCH-043 STABILITY STUDY OF SILDENAFIL CAPSULES BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

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Background Sildenafil, a phosphodiesterase V inhibitor, is used in paediatrics to treat pulmonary arterial hypertension. However no paediatric formulation was available until a recent launch announced a powder for oral suspension.
Purpose To determine the stability of sildenafil capsules for paediatric dilutions. A HPLC assay has been developed for this purpose.
Materials and Methods The sildenafil dosing method, developed from a previously published method1, is a reverse phase HPLC with UV detection at 240 nm. The column is a C18, the mobile phase composition is acetonitrile/ammonium acetate 0.2 M (50/50) with a flow set at 1 mL/min. Linearity and precision cheques (repeatability and intermediate precision) have been performed to validate the method. Capsules of 1 mg, 5 mg and 10 mg (of sildenafil base) were prepared with sildenafil citrate and corn starch. Samples wer kept at ambient temperature in transparent blister packs sealed with aluminium foil. Uniformity of mass was verified at D0. The visual appearance of the capsules, sildenafil concentrations and chromatographic profiles were checked at D0, D7, D14, D21, D35, D42, D56 and D70.
Results The method was linear up to 150 mg/mL. Repeatability and intermediate precision were demonstrated (SD < 2%). Uniformity of mass was verified, no change in visual appearance and no additional chromatographic peaks were observed. The percentages of the remaining concentrations of sildenafil in the capsules compared to initial concentrations were higher than 90% at D70.
Conclusions The method has been validated and used in a stability study which demonstrated the stability of sildenafil capsules up to ten weeks under the storage conditions studied. These results led us to apply a shelf life of eight weeks to sildenafil capsules.
Reference

1. Daragmeh N. *et al*, Determination of sildenafil citrate and related substances in the commercial products and tablet dosage form using HPLC. *J Pharm Biomed Anal*. 2001;25:483–492

No conflict of interest.

TCH-044 STERILITY TESTING USING A RAPID MICROBIOLOGICAL METHOD FOR BATCH PRODUCTION OF CYTOTOXIC DRUGS IN A HOSPITAL PHARMACY

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Background To improve the quality of sterile cytotoxic drug preparation in hospital pharmacy, we implemented batch production of standardised doses of 11 cytotoxics and 1 monoclonal antibody using the Repeater pump (Baxa, Baxter). In accordance with French good manufacturing practise for hospital pharmacies [1], physicochemical and sterility tests have to be implemented for batch release.

Purpose To investigate the possible use of a rapid microbiological method (BD Bactec) for sterility testing of batches of cytotoxic drugs.

Materials and Methods Taking into account the possible inhibition of microorganism growth with cytotoxics [2–4], we investigated the detection of microbial growth of cytotoxic bags with the Bactec system (CO_2 detection by fluorescence) when inoculated with <100 Colony-Forming Units (CFUs) of 4 microorganisms recommended in the European Pharmacopeia [5] (Staphylococcus aureus (SA), Pseudomonas aeruginosa (PA), Bacillus subtilis (BS) and Candida albicans (CA)) and 3 microorganisms usually found in clean rooms (Staphylococcus epidermidis (SE), Escherichia coli (EC) and Enterococcus faecalis (EF)).

Results All species were detected in only cyclophosphamide and trastuzumab, while conversely 5 fluorouracil (5FU) inhibited the growth of all microbial species. For 5FU, the use of an alternative device (Bact/Alert, Biomerieux) with CO_2 detection by colorimetric method or the 1/10 dilution of the 5FU solution, allowed growth to recover for Staphylococcus species, Candida albicans and Escherichia coli. For most of the remaining drugs, Pseudomonas aeruginosa and Bacillus subtilis seemed to be routinely inhibited.

Conclusions Further dilutions of cytotoxic bags or use of Bact/Alert are planned to improve the results. Moreover, the combination of sterility tests with the Bacterial Endotoxin Test [6–7] would help improve the results for Gram-negative bacteria.

Abstract TCH-044 Table 1

Drug	Device	Concentration (mg/ml)	SA	PA	BS	CA	SE	EC	EF
	Bactec	22	–	–	–	–	–	–	–
5 Fluorouracil	Bactec	2.2	–	–	–	+	–	+	–
	Bact/Alert	22	+	–	–	+	+	–	–
	Bactec	10	–	+	–	+	–	–	–
Gemcitabine	Bactec	1	–	+	–	+	–	+	–
	Bact/Alert	10	–	+	–	+	–	+	–
Carboplatin	Bactec	2	+	+	+	+	+	–	+
Cisplatin	Bactec	0.2	+	–	–	+	+	–	+
Oxaliplatin	Bactec	0.5	+	–	+	+	+	+	+
Epirubicin	Bactec	2	–	–	–	+	–	+	+
Cyclophosphamide	Bactec	4	+	+	+	+	+	+	+
Docetaxel	Bactec	0.68	+	–	–	+	+	ND	+
Paclitaxel	Bactec	0.6	+	–	–	+	+	+	+
Etoposide phosphate	Bactec	1	+	–	+	+	+	+	+
Irinotecan	Bactec	1.15	+	–	+	+	+	+	+
Trastuzumab	Bactec	2.25	+	+	+	+	+	+	+

ND: Not Determined

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No conflict of interest.

TCH-045 SUITABILITY OF A SENSOR-DRIVEN, SINGLE-USE MICRO DOSING VALVE FOR VOLUMETRIC DISPENSING IN A MODULARLY ASSEMBLED MULTI-CHANNEL COMPOUNDER

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Background Major drawbacks of commercially available compounders are expensive prices, large-scale architecture (24 channels), restricted country support, and gravimetric dosing requiring periodically defined densities and flow factors. However, total parenteral nutrition (TPN) is prescribed in weights or moles of ingredients per volume.

Purpose To evaluate the suitability of a dosing unit formerly developed for inkjet printing and biotechnology for pharmaceutical compounding applications

To perform a feasibility study of a low-cost multi-channel compounder

Materials and Methods Applicability and practicability of the device was assessed by a focus group of researchers and practitioners. Criteria were mainly dosing accuracy, material characteristics, flexibility in module assembling, and predictable cost.

Results Features of a novel modularly-assembled multi-channel dosing unit, formerly designed for inkjet and media dosing in printers and bioreactors, were appraised for suitability for compounding applications. The core of the dosing unit consists of multiple autoclavable, chemically resistant, highly precise volumetric dispensing valves. 3 integrated flow rate sensors are used to measure 2 differential pressures, which permits temperature and viscosity-independent dosing (patent P7711CH01). The pressure above the valve amounts to 500 ± 5 mbar. An electronic valve driver controls the valves to microseconds. Media are transferred as single drops of 0.5 µl by a feeder into a mixing chamber. Exact dosing is guaranteed over a wide range, from µl to dl. The valve was successfully tested in field tests with micro bioreactors (patent CH702769A2). A prototype device for preparing all-in-one TPN bags is presently under construction, together with an electronic interface to patient and administration databases. Further options under development are nanodosing, integration of valves and sensors, as well as miniaturisation to obtain an affordable single-use device.

Conclusions The sensor-driven valve is suitable for use in a compounder for individual liquid preparations. The next step of assembling a prototype compounder is ongoing and aims to increase

medicine safety of parenteral ready-to-use all-in-one mixtures, e.g. TPN bags in neonatology.

No conflict of interest.

TCH-046 THE ADVANTAGES OF UV-RAMAN SPECTROSCOPY FOR CHECKING THE STRENGTH OF NALBUPHINE PREPARATIONS

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Background A paediatric nalbuphine formulation is prepared in the hospital pharmacy of the Nouvel Hôpital Civil of Strasbourg. It was previously checked by HPLC. Following the acquisition of an UV-Raman spectrometer, a method was developed in order to improve the monitoring of nalbuphine preparation.
Purpose To cheque paediatric nalbuphine formulations with a simple, fast and reliable method by using UV-Raman spectroscopy.
Materials and Methods In order to validate a method using the QC-prep (a UV-Raman spectrometer), we prepared three concentration ranges, prepared by diluting three different samples of nalbuphine reconstituted in 0.9% NaCl. Each range was composed of 5 points of calibration. The linearity was validated from the average of the three ranges. The fidelity of the method is tested by repeatability (one solution was sampled five times by the QC-prep) and reproducibility (five different solutions were sampled at one time). The method is considered as valid if the linearity is good enough ($r^2 > 0.999$) and the coefficient of variation (CV) and relative error of repeatability and reproducibility are below 5%.
Results The QC-prep method for nalbuphine 1 mg/ml in 0.9% NaCl is valid in terms of:

- Linearity: the calibration is linear from 0.2 to 2.0 mg/mL ($r^2 = 0.9997$)
- Repeatability: the CV is less than 0.25%
- Reproducibility: the CV is less than 2.5%
- Accuracy: the relative error is less than 5%

Five different batches have been checked in routine work. No mistakes have been identified, either in the concentration of the drug (quality control and sample), or in identification of the solvent.
Conclusions Calibration of the QC-prep is simple thanks to easy-to-use software. This is a powerful tool that enables us to determine the concentration of nalbuphine more quickly, easily and safely than the HPLC method previously used. The UV-Raman spectroscopy method could be extended to the analysis of other formulations such as paediatric antibiotics preparations.

No conflict of interest.

TCH-047 THE EFFECT OF A ROBOTIC UNIT DOSE DRUG DISPENSING SYSTEM ON MEDICINES ADMINISTRATION ERRORS AND THE COST OF DRUG DISPENSING

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Background A Unit Dose Drug Dispensing System (UDDDS) by a robot (PillPick system, Swisslog) with daily pharmaceutical monitoring of medical prescriptions is being implemented in our hospital, to gradually replace the ward stock distribution system (WSDS), which allowed a low level of pharmaceutical monitoring. In 2011, UDDDS was used for 374 beds. UDDDS allows named "ready-to-use" treatments to be dispensed daily, avoiding nurse preparation of pillboxes, necessary with WSDS.
Purpose To assess the impact of a robotic UDDDS on the incidence of medicines administration errors and to assess the cost of this system.
Materials and Methods Medication errors were measured using a direct observation process in two phases, before and after implementation of the UDDDS, in a 23-bed adult cardiology unit with WSDS, computerised prescription order entry and computerised medicines administration record (CristalNet). The cost study took into account both the payroll cost (pharmaceutical staff, nurses) and the cost of the robot. A monthly cost per hospital bed supported was calculated for each system.
Results A total of 3233 medicines administrations were observed (1471 pre-implementation and 1762 post-implementation) for 185 patients (91 pre-implementation and 94 post-implementation). After the introduction of UDDDS the percentage of medicines administration discordances with the medical prescription fell (46% to 18%). The identification of drugs by nurses improved (18% to 1%). The monthly cost was estimated at €142 per bed with WSDS and at €161 per bed with UDDDS. Considering the distribution of depreciation and maintenance costs over 950 beds, we assume that the systems costs will become comparable.
Conclusions Unit Dose Drug Dispensing by a robot is comparable to WSDS in terms of cost, while being safer, thanks to automated drug picking and pharmaceutical monitoring of medical prescriptions. Barcode verification technology is advancing.

No conflict of interest.

TCH-048 THE SECURITY OF PHARMACOKINETIC INFORMATION IN ELECTRONIC HEALTH RECORDS

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Background Accurate and complete electronic health record (EHR) information is essential for patient safety, especially when drugs with a narrow therapeutic range are involved.
Purpose To evaluate the quality and quantity of information recorded in EHRs concerning pharmaceutical interventions (PIs) generated by therapeutic drug monitoring (TDM).
Materials and Methods For 6 months, all onco-haematology inpatients were evaluated who were receiving vancomycin (≥3 doses). Renal function (RF) was classified into four categories: severe, moderate and mild renal impairment (RI) and normal RF for creatinine clearance (by Cockcroft-Gault equation) <10, 10–50, 50–90, >90 ml/min, respectively. PIs were classified into three categories of importance (high, moderate and low) according to the pharmacotherapy follow-up and the relation between plasma concentration and optimal therapeutic range.

The completeness of EHRs regarding the RF and TDM process (ordering, result and PI-related parameters) was assessed.

A binary logistic regression with odds ratio (OR) was performed using SPSS v.15.0.
Results TDM was performed for 39 (81%) of 48 patients receiving vancomycin. The median age was 57 years (95%CI: 52–62); 26 were male (68%); 21(54%) had mild to moderate RI.

There were 76 PIs [median 2/patient (IQR: 2)], 51(67%), 4 (5%) and 21 (28%) of high, medium and low importance, respectively; 67(88%) were accepted.

The EHRs did not record RF evolution, TDM requests and results or PIs in 53 (70%), 23 (30%), 39 (51%) and 61 (80%) cases respectively.

OR for recorded TDM results related to highly important PIs compared to low-importance PIs, for recorded TDM ordering related to moderate RI compared to normal RF and records for RF evolution related to moderate RI compared to normal RF were 3 (95%CI: 1–9; p = 0.046), 0.3(95%CI: 0.8–0.9; p = 0.04) and 4(95%CI: 1–16; p = 0.029), respectively. A significant linear trend was observed. OR for all other variables was non-significant.

Conclusions The low percentage recording of TDM-related variables and pharmacist interventions in EHR potentially limits interprofessional communication and the decision-making process. This fact highlights the need for clinical pharmacists to safeguard the information they have discovered by recording their interventions in the EHR as a clinical episode in comprehensive patient care. This will increase the visibility of the pharmacist and the effect of his/her actions.

No conflict of interest.

TCH-049 TOPICAL MORPHINE GELS FOR PAINFUL WOUNDS

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Background The use of morphine applied topically to painful wounds has potential advantages such as a lower dose than with systemic administration and fewer side effects. Gels are known to be suitable for treating wounds.

Purpose To develop two physicochemically and microbiologically stable gels: a more viscous formulation (F1) and a fluid formulation for spraying (F2), both containing morphine hydrochloride (MH). The effect of viscosity on drug release from both gels was also investigated.

Materials and Methods Sodium carboxymethylcellulose-based aqueous gels were prepared and sterilised by autoclaving. The 0.125% w/w (F1) and 1.0% w/w (F2) gels containing MH were compounded using an injectable solution of MH and preservatives (parabens). Preparation and primary packaging were performed inside a horizontal laminar flow hood. Primary packaging consisted of single dose syringes for F1 and 10 mL amber glass bottles with pump sprays for F2. Stability studies were performed using 3 batches of each final formulation. Samples were stored at 5 ± 3°C, at 22 ± 3°C (light exposed and protected) and 40 ± 2°C/75 ± 5% RH for 98 days (samples collected at 6 time points). Organoleptic characteristics, pH, viscosity, MH and preservative content were assessed. Sterility tests, microbiological control and preservative efficacy were studied according to Ph. Eur. The MH release profile was evaluated using Franz cells.

Results Formulations were odourless, yellowish, translucent and homogeneous. The pH was 6.35 (F1) and 5.70 (F2), viscosity was 52.933 mPa.s at 6.12 s-1 (F1) and 16.7 mPa.s at 12.24 s-1 (F2). Methylparaben, propylparaben and MH contents were between 90–110%. Preservatives were effective and preparations remained sterile and stable for 60 days. MH release was slow and inversely proportional to viscosity.

Conclusions The MH gels presented suitable physicochemical and pharmaceutical characteristics for topical application to painful wounds. The slow release profile may reduce the number of applications.

No conflict of interest.

TCH-050 USE OF ELECTROENCEPHALOGRAPHY (EEG)-BASED METRICS TO TEST THE GUSTATORY PROPERTIES OF LIQUID TRIMETHOPRIM FORMULATIONS

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Background It is well known that the gustatory properties of a formulation strongly affect patient adherence to a treatment. However measuring these properties is highly subjective and difficult, especially for the paediatric population. The use of neuropsychophysiological indexes and covert behaviours in assessing the attractive properties of sensorial stimuli has a long tradition in the domain of affective neuroscience. Ways of measuring range from the use of autonomous nervous system activation patterns, to features extracted from electroencephalographic activity or simple and discriminative reaction time tasks. These measurements provide alternative means for assessing the characteristics of commercial products, overcoming the limitations of self reporting-based research, namely social desirability, and for studying populations unable to provide usable verbal responses (e.g. children).

Purpose To find out if this methodology can be used for evaluating the gustatory properties of formulations in order to enhance patient adherence.

Materials and Methods Trimethoprim formulations were prepared using NF syrup. Flavour was added afterwards. Participants were stimulated with 3 different flavoured formulations (banana, red berry and neutral) for 10 seconds each while subjected to an EEG recording. The order of presentation was fully counter-balanced between subjects. Subjects rated the different solutions for palatability and intensity. Five seconds of the EEG response for each sample were converted to the frequency domain, and the log power and inter-hemispheric asymmetry were calculated for anterior, central and parietal electrodes. Different algorithms, combining different EEG features, were tested for predictive power regarding palatability and type of formula

Results Theta inter-hemispheric activity at parietal electrodes predicted the behavioural assessment of palatability ($R2 = 0.35$). Moreover, the application of unsupervised learning methods, such as Support Vector Machines, on the log power at different bands from 0 to 12 Hz, could distinguish with up to 95.24% accuracy between flavoured and non-altered solutions.

Conclusions This technology can be used in formulation studies that are attempting to enhance the organoleptic properties of a formulation.

No conflict of interest.

TCH-051 VALIDATION OF AN AUTOMATED COMPOUNDER SET UP ONCE A WEEK FOR PARENTERAL NUTRITION SOLUTIONS

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Background Our parenteral nutrition production (PN) decreased after we introduced standard solutions. To keep just a small number of daily PN items cost-effective, we decided to validate a once a week setting up of an automated compounder device (ACD).

Purpose To test the operation and performance of an ACD (Baxa MM12) for a once a day and a once a week use.

Materials and Methods Accuracy (mean in % of the expected value) and precision (Coefficient of Variation) of the ACD was evaluated by weighing different volumes of water 10 times (0.5 to 40 mL; daily operational qualification) and different volumes of

nutrients (0.5 to 100 mL; daily performance qualification) over 3 consecutive days. The concentration of nutrients (glucose, Na and K) in PN, particulate contamination and media-fill tests were checked each day while the machine's settings were only adjusted once a week (3 consecutive weeks). Some bottles were changed during the week and other remained in place, according to a predefined protocol. The ACD was installed in a laminar airflow hood GMP Class A with a cleanroom Class B background and a temperature around 20°C.

Results Daily operational and performance results:

	0.5 mL		40 mL		100 mL	
	Accuracy	**Precision**	**Accuracy**	**Precision**	**Accuracy**	**Precision**
Water	100.9%	3.2%	98.9%	0.3%		
Nutrient	99.3–102.7*	2.7–3.9%*			100–100.4%*	0.7–1.5%*

* Depending on nutrient

The concentrations of nutrients in PN products made weekly always met the specifications (internal limits ±15% for Na, ±10% for glucose and −15% to +10% for K). No particles or microbiological contamination were detected.

Conclusions Validation proved the acceptable accuracy, precision and aseptic conditions in the course of the week. A sepsis can only be guaranteed by a strict application of GMP in a high quality compounding environment. In those conditions, PN products can be produced safely for one week with the same settings. Setting it just once a week saves technician time (300 hours/year) and money (15,000 Euro/year).

No conflict of interest.

TCH-052 VALIDATION OF AN AUTOMATED METHOD FOR COMPOUNDING MONOCLONAL ANTIBODY PATIENT DOSES: CASE STUDIES OF BEVACIZUMAB, INFLIXIMAB AND TRASTUZUMAB.

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Background Automated devices have recently come onto the market as an alternative to manual preparation of drugs for intravenous administration. Automated methods have so far been focused on rapid and time-saving procedures that might harm delicate substances such as monoclonal antibodies (mAbs). Many summaries of product characteristics (SmPCs) of mAbs state that they require gentle swirling to aid reconstitution and that drawing into a syringe should be done slowly.

Purpose To assess whether automated preparation can be performed with mAbs without affecting the aggregation state of the proteins.

Materials and Methods Three frequently used mAbs were studied: infliximab (Remicade) and trastuzumab (Herceptin) in lyophilised form, and bevacizumab (Avastin) as a liquid formulation. Brand names are mentioned because biosimilars exist. The effects of different procedures to prepare the patient doses on antibody aggregation were evaluated. Remicade and Herceptin were reconstituted both manually and by an automated arm (i.v.STATION, Health Robotics). Additionally, the effect of vigorous shaking during reconstitution was investigated. The effects of rapid aspiration and dispensing on antibody aggregation were investigated for all three mAbs. The aggregation state was assessed by UV-Vis absorbance, 90° light scatter, fluorescence spectroscopy, Nile red fluorescence microscopy, and field flow fractionation without cross and focus flow.

Results Samples reconstituted by an automated process showed similar findings compared to manual reconstitution if performed exactly according to the summary of product characteristics (SmPC). Vials that were shaken vigorously showed a significant increase in aggregates. Similarly, rapid aspiration/dispense cycles resulted in a strong increase in the number and sizes of aggregates for all three mAbs; this result was observed after just one rapid aspiration/dispense cycle.

Conclusions Our study showed that automated preparation of mAbs is feasible if the machine is programmed exactly according to the SmPC, indicating that automated preparation can be used to achieve reproducible high-quality preparation for delicate formulations.

No conflict of interest.

Drug supply/logistics (including: computer-aided drug dispatching and ward pharmacies)

DSL-001 A MULTIDISCIPLINARY APPROACH TO FURTHER IMPROVEMENTS IN PATIENT SAFETY IN A HOSPITAL WITH COMPUTERISED MEDICAL RECORDS

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Background Antineoplastic treatments administered at the Medical Day Hospital Unit (MDHU) are high risk for the patient because of their toxicity and mutagenicity and complex pharmacotherapeutic processes. In our hospital medical records are fully computerised and all prescriptions are electronic. So, it is desirable to standardise criteria in a consensus document that minimises variability among professionals to maximise the safety and clinical effectiveness for oncology patients.

Purpose To identify the key points of information that should appear in the consensus document to ensure the correct administration of antineoplastic treatments.

Materials and Methods A multidisciplinary group was created (two physicians, one pharmacist, one nurse and quality mangers). The initial criteria for determining the key points to be imparted were patient safety, clinical effectiveness, organisational coordination and traceability in the Information System. These criteria led to the establishment of 12 key points of information to develop a standard operating procedure (SOP) for each antineoplastic treatment.

Results The 12 key points that were agreed to establish SOPs for each treatment were: indications and usage; prescription form in the Electronic Health Record; pharmaceutical validation to ensure correct indication, dose, volume and type of diluent and infusion time; general and specific nursing indications; contraindications; monitoring of vital signs and anthropometric measures necessary; premedication and time spent on it; preparation of the medicine; possible adverse reactions to the infusion and their management; causes of suspension of treatment; patient information; responsibilities of each professional.

Conclusions The development of SOPs to standardise the pharmacotherapeutic process in the MDHU contribute to improving the safety and efficiency of antineoplastic treatments. In addition, in a hospital with medical records and where all prescribing is electronic, SOPs contributes to improving the organisation of a complex nursing unit such as the MDHU.

No conflict of interest.

DSL-002 A PHARMACOECONOMIC COMPARISON BETWEEN A COUNTY HOSPITAL IN CHANIA AND A CENTRAL HOSPITAL IN ATHENS, GREECE

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Background 'Agios Georgios' Chania General Hospital (CGH) on the island of Crete has 460 beds and Sismanoglio General Hospital (SGH), in the capital of Greece, Athens, has 439 beds. In the Greek National Health System the uninsured poor patients receive their dugs free of charge from the hospital pharmacies.
Purpose To compare the pharmacoeconomic profiles of the two hospitals.
Materials and Methods We examined the pharmacoeconomic data for the first half of 2011. Data were extracted from the Hospital Information Systems.
Results 14,998 patients were hospitalised in CGH and 15,520 patients in SGH with a mean number of nursing days 3.99 vs. 3.55.

The total cost of drugs was €6,705,297 vs. €4,933,028 ($P < 0.05$) respectively.

The drugs cost for the inpatients was €5,034,701 vs. €3,965,127 and the mean cost per impatient per nursing day was €77.67 vs. €67.23.

The drugs cost for the insured outpatients was €1,452,668 vs. €713,203 (1,595 prescriptions vs. 1,152, $P < 0.05$), and the mean cost per prescription was €909.42 vs. €619.10 ($P < 0.05$).

For the uninsured outpatients the drugs bill was €217,928 vs. €254,694 (3,506 prescriptions vs. 2,016 $P < 0.05$) and the mean prescription cost was €62.16 vs. €126.34 ($P < 0.05$).

The percentage cost for the main categories of drugs were: cytostatics 16.50% vs. 10.65%, antibiotics 21.65% vs. 24.51%, antirheumatics 7.54% vs. 4.55%, cardiovascular 5.57% vs. 3.98% and erythropoietins 11.45% vs. 3.11% ($P < 0.05$).

The ratio of generics to patented medicines was 40.32%:59.68% and 39.14%:60.86%
Conclusions We found statistical differences among the pharmacoeconomic data of the two hospitals. In SGH, HIV+ patients are served (27.47% of uninsured and 47.35% of insured outpatients) and this is reflected in the increased cost of the outpatients while erythropoietins and cytostatics cost differences are related to the hospital departments (Oncology, Haematology, Pulmonary clinics), the different DRGs and treatment protocols followed in each hospital.

No conflict of interest.

DSL-003 AUTOMATION OF DRUG DISTRIBUTION: IMPACT ON ERROR RATE AND DISTRIBUTION SPEED

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Background Human reliability is limited and information technology has the potential to improve the safety of the medication process. In July 2011, a robot (ROWA/ARX) was implemented in our hospital pharmacy to reduce error rates and improve the efficiency of our global drug distribution.
Purpose To evaluate the impact of this automation on distribution errors and workload efficiency.
Materials and Methods Approximately 52% of the dispensary stock (1126 articles, 50,000 boxes) is managed by the robot.

1. Distribution errors: content accuracy of random orders was verified before and after the implementation of the robot. Errors were classified in three categories: wrong drug, missing drug/quantity or additional quantity.
2. Workload efficiency: time to prepare a sequence of orders manually or with the robot was measured.

Results

1. Manual dispensing error rate was 0.93% (n = 5805 ordered lines; wrong drug: 0.36%, missing drug/quantity: 0.31%, additional quantity: 0.26%). By decreasing this error rate to 0.27% (n = 5840; only conveyor errors leading to missing drug/quantity and additional quantity), the automation avoided more than 4500 errors each year.
2. With the distribution of 880 boxes of drugs/hour (reduced to 630 when the automated 'Pro-log' filling system was working simultaneously), the robot significantly increased the distribution speed in comparison with the manual picking (303 boxes/hour).

Conclusions This reorganisation contributed to safer and more efficient distribution of drugs. No more incorrect picking of medicines occurred thanks to the high reliability of the robot. Remaining errors could still be reduced by improving the conveyor software. With one single person operating the robot, 2 full-time equivalents were saved, leading to an estimated return on investment in 4.5 years. For medicines remaining outside the robot (i.e. controlled drugs, cold chain drugs or those with an unusual size, shape or weight), a scanning system will be introduced and evaluated by the same protocol.

No conflict of interest.

DSL-004 AUTOMATION OF STORAGE AND DISPENSING: WHAT SYSTEM SHOULD WE IMPLEMENT?

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Background Innovation and new technologies help reduce the rate of medication errors and maximise efficiency in the drug administration system thus improving the safety and quality of patient care. In the market there are various automation systems, all of which are costly.
Purpose To analyse two storage and dispensing automation systems in order to make a decision to improve the safety, efficiency and quality of medicines use in our hospital.
Materials and Methods Review of two systems: A) fully integrated robotic automation (fully enclosed storage modules that automatically generate individual dosage units (DUs) grouped into rings per patient), and B) system with different components (semi-automatic storage and cart-filling system, plus storage tanks filling, automatic dispensing systems (DAS) in inpatient units, plus outpatient medicines automation and repackaging). We analysed the resources currently available and the benefits of the two systems. DUs consumed in 2011 were examined and classified by pharmaceutical form, volume, storage conditions and whether they can be dispensed to outpatients or not. High volume solutions and enteral nutrition were excluded. The costs used in the analysis are the sum of the quotes received from suppliers, excluding maintenance costs. The same level of human resources was assumed. Costs were expressed as additional costs per number of DUs dispensed under each system.
Results 16.213.352 DUs were dispensed in 2011 in connexion with 2971 drugs (40% could be dispensed to outpatients). Advantages and disadvantages of the two systems are listed in the Table.
Conclusions The integrated robotics system (system A) appears to be a safer, more versatile and more efficient system providing more information than system B, which provides greater accessibility for nursing. The cost analysis is slightly favours system A. One

limitation of the study is that the costs of maintenance and the human resources reengineering required need to be further explored.

Abstract DSL-004 Table 1

	Advantages and disadvantages of the two systems	
	System A	**System B**
SAFETY	All DUs can be unequivocally identified with batch expiry date	Partial identification with batch barcode and expiry date
	Complete record, including batch, administration by scanner	Record drug administration with bar code without batch
	Closed system	Partially open systems, error risks
EFFICIENCY	Entire integrated system including outpatients and elderly residences	Immediate availability of nursery doses needed to the patient
	Full return of unmanaged DUs	
	Allows automatic checking of expiry dates	Full expiry date control is difficult
	High cost	High cost
QUALITY	Complete record of all movements of both drugs and users	Partial recording of users, batches, drugs in drug use chain
Additional cost per DU (euros)	0.19	0.20

No conflict of interest.

DSL-005 COMPARATIVE STUDY OF THE COST OF ERYTHROPOIETIC FACTORS, ORIGINAL MEDICINES AND BIOSIMILARS IN FRENCH CARE FACILITIES

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Background The patent expiries of leading biological products and the development of biosimilars create opportunities for cost savings. No studies have been carried out in the French hospital market.
Purpose To perform a cost saving modelling analysis and investigate the potential factors that could affect the price of drugs.
Materials and Methods We carried out a comparative study in French healthcare facilities, representing about 65% of national hospital beds, of the price of erythropoietic factors. The data were collected on procurement procedures operative as of 1 January 2012.
Results 25 care facilities agreed to participate in the study. The overall sales turnover reached €15 M. Biosimilars represent less than 1% market share. All the establishments granted a discount of between 5% and 69% on the prices fixed by negotiation between the Comité Economique des Produits de Santé and the manufacturers, depending on the category (drugs, biosimilars or original biopharmaceuticals). The average discounts ranged from 11% to 73%. Binocrit, the main biosimilar represented was 25.6% less expensive than its original medicine Eprex. Based on French hospital financing, we show a 24.7% cost saving if a high interchangeability rate is adopted. Some participants could save up to 50% of their budget.

We identified and analysed three criteria known to have a far-reaching effect on the drugs price. We observe no or little effect of the type of procurement procedure and specified quantity of medicine. The starting date of the contract is the primary criterion when purchasing drugs. The impact of these criteria varied depending on the drug in question and no general conclusions about medicines could be drawn.
Conclusions The market for biosimilars is growing at a faster rate than the global prescription-drug market. Many top-selling biologicals are due to lose patent protection over the next few years. The great potential for cost savings apparent in our study could be investigated in other countries.

No conflict of interest.

DSL-006 COST ANALYSIS OF ADULT PARENTERAL NUTRITION SYSTEMS: THREE-COMPARTMENT BAG VERSUS CUSTOMISED

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Background Parenteral nutrition (PN) is a costly technology used widely to provide nutrition to patients who have an inaccessible or non-functioning intestine. Two all-in-one systems currently being used are customised formulations, prepared by hospital pharmacies, and three-compartment bags.
Purpose To provide a systematic cost comparison of the two all-in-one PN systems: individualised (made from nutrient solutions) versus manufactured (made from three-compartment bag), both prepared in hospital pharmacies.
Materials and Methods We conducted a prospective study to analyse the total cost of PN bags, accounting for all of the processes involved in preparing and delivering them (the cost of manpower, nutrition solutions, medical supplies and quality controls) in three different healthcare settings. To compare therapeutic alternatives of equivalent nutritional value, the study was performed for the most frequently-employed formulation, which was similar to commercial preparations. A univariate sensitivity analysis was performed to evaluate the impact of different rates of use of three-compartment PN bags.
Results 157 routine acts of PN bag preparation (65 hospital compounded and 92 three-compartment) were observed and timed over 9 days. Total costs of the 157 PN bags were included in the study. Mean costs of hospital-compounded bags were higher than three-compartment bags, 51.16 ± 5.63€ versus 39.69 ± 3.00€ respectively ($p < 0.01$). Manpower costs were responsible for the majority of the differences found (70%). In scenarios using a three-compartment system for 30%, 70% and 90% of PN provision, a cost savings of 4.3%, 10.1% and 12.9% respectively could be achieved. Greatest rates of changing from hospital compounded bags (70% and 90%), in a hospital with 1,800 PN bags/year, might reduce the annual budget by 9306€ and 11,964.8€, respectively. Meanwhile, in a large facility the savings for 8,000 TPN days would be 64,248€ and 82,605€, respectively.
Conclusions Since we need to reduce the costs of effective treatments, three-compartment bags could be used for standard adult PN to save money.

No conflict of interest.

DSL-007 DOES PHARMACY CONTRIBUTE TO DELAYS IN HOSPITAL DISCHARGE?

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Background Efficient management of patient flow including timely discharge from hospitals is vital. Patients in UK hospitals are commonly given individually labelled medicines to take home (TTOs). It is perceived by the multidisciplinary team at our hospital that waiting for these medicines is a significant rate-limiting step in the discharge process.
Purpose We examined the timeframes around TTO prescribing, dispensing and patient discharge in order to identify delays and any negative impact of the pharmacy processes involved.
Materials and Methods All TTO prescriptions entered into the pharmacy electronic log on one day in May 2012 were examined

retrospectively. Once dispensed, TTOs are logged 'off' and sent by pneumatic chute system direct to the ward. This log and the hospital electronic prescribing system store relevant data including the time a TTO is written, dispensed and the patient discharged.

Results A total of 65 TTOs were dispensed in the pharmacy. (Others are prepared in a satellite unit, not included in this study). Only 18% were prescribed more than 24 hours before discharge. Writing of TTOs clustered around 11am–4pm whereas patient discharges were around 12–1pm and 2–6pm. Nearly 90% of TTOs were ready within 2 hours of the prescription being written. The average time from writing a TTO to the patient's discharge was 2.5 hours. The average dispensing time per patient was 1.2 hours. The Pharmacy element accounted for less than half the time patients were waiting for TTOs.

Conclusions The perception that dispensing of TTOs is responsible for significant delays in patient discharge is unfounded. There is a lag time between TTOs being ready and the patient going home which merits further investigation. The clustering of TTO writing infers that very few are written until the morning ward rounds are finished. Options are being explored to encourage earlier writing times such as including TTO-transcribing pharmacists on consultants' rounds.

No conflict of interest.

DSL-008 DRUG SHORTAGES IN THE NETHERLANDS: MONITORED BY FARMANCO

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Background Internationally, drug shortages cause increasing concern. For patients it may impose a significant effect on their safe use of medicines. For pharmacists it is time-consuming to get trustworthy information.

Purpose With a central approach on the investigation of drug shortages, pharmacists get reliable and up-to-date information. Besides, solutions can be suggested. If there is a shortage of a necessary drug, proper action can be taken by all pharmacies.

With the data, trends in drug shortages can be signalled.

Materials and Methods In 2004 the Royal Dutch Pharmacists Association (KNMP) launched the website Farmanco: www.farmanco.knmp.nl. It provides pharmacists with up-to-date information on drug shortages in The Netherlands. Drug shortages are reported early and proper action can be taken. It provides information about the cause and duration of the shortage and a possible solution such as substitution or a pharmaceutical alternative.

Farmanco data from 2004 till 2011 were analysed to get an overview of the scale of the problem and more insight into the causes and solutions.

Results Through the years, the Farmanco website has become relevant to all concerned parties for up-to-date information. Visits to the website have increased to about 600 visitors on a weekday.

From 2004 till 2011 the Farmanco website published information on more than 1400 products.

Drug shortages have increased in frequency from 91 reported shortages in 2004 up to 242 in 2011.

The duration of a shortage has increased from 139 days (2004) to 254 days (2010).

Temporarily shortages are mainly caused by production problems (52%), whereas permanent shortages usually have an economic reason (69%).

The solutions have mainly been substitution (62%), a pharmaceutical alternative (25%) or pharmaceutical compounding (2%). In 1% of the cases a solution was impossible.

Conclusions Farmanco gives pharmacists up-to-date information on drug shortages in The Netherlands.

Finally, trends in drug shortages can be signalled.

No conflict of interest.

DSL-009 DRUG SHORTAGES: THE CHALLENGE OF IMPORTING

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Background Drug shortage has been reported since several years but has recently reached critical levels. Shortage occurs not only in Europe but worldwide, in all healthcare practise settings and affects potentially all drug classes, raw materials and medical devices. This combination of factors leads undoubtedly to medication overpricing and higher costs to the healthcare system, suboptimal clinical care, more medication errors and adverse events and the loss of patients' lives. Rational and effective procurement of medicines in foreign countries can be a challenge for hospital pharmacists.

Purpose The objective is to present a framework on medicines importation, with a special focus on European countries.

Materials and Methods Web search on governmental healthcare institutions (i.e. medicines' agencies), wholesalers, manufactures and other legal suppliers. This work was designed considering the Portuguese drug shortage.

Results A standard operation methodology was designed for searching for new suppliers for special medicines, not marketed or sold out. Search methodology on medicines' agencies is presented. A short framework for suppliers was filled considering regulatory issues, current good manufacturing practises, place in the drug supply chain, logistics, packaging, pricing, taxes, expedition costs and payment conditions. Web links to suppliers' websites are included.

Conclusions Importation of medicines at the hospital level is more often part of the daily tasks of pharmacists. When treating critical health conditions, shortages in essential medicines can cause disruptions in patients' safety and quality of pharmacological treatment.

No conflict of interest.

DSL-010 ECONOMIC IMPACT OF AUTOMATED DRUG DISPENSING SYSTEMS IMPLEMENTATION

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Background The distribution, management and control of drug stocks in clinical units is a responsibility of the pharmacy department, but this control is difficult to perform manually, resulting in a loss of important information about drug use.

Purpose To analyse the economic impact of automated drug dispensing systems (ADSs) implemented in the Intensive Care Unit (ICU) and the emergency department (ED).

Materials and Methods A total of 5 Omnicell cabinets were installed in August 2008: 3 in ICU and 2 in ED. The average cost of implementation for each one was about 60,000 euros. Nevertheless, the Hospital did not have to invest in them since they were donated by a national foundation.

The ICU is comprised of a total of 42 dedicated critical care beds located in 3 different modules, and ED has 2 modules with a total of 22 beds and 9 chairs.

The ADSs are connected to hospital admission software and to the pharmacy management software.

Medication costs in ICU and ED were examined, comparing one year prior to installation with the years after implantation of the ADS. These data were obtained from the management software of the pharmacy department.

Results Drugs dispensed by ADSs represent 60% and 71.6% respectively of total medicines consumed in ICU and ED.

Four years after implantation:

- The quantity of drugs dispensed and drug stock has decreased in both units.
- The pharmacy department knows the type and amount of medicines to be found in each unit and in real time.
- The information it provides has helped to improve patient safety in relation to a better quality of prescription.

Since the implementation of ADSs, consumption has decreased compared to 2007:

Reduction in consumption in the Intensive Care Unit from 2007 to:			
2008	2009	2010	2011
–12.52%	–16.86%	–20.25%	–40.65%
Consume reduction in the emergency department from 2007 to:			
2008	2009	2010	2011
–1.49%	–14.94%	–29.18%	–40.79%

Conclusions The implementation of ADS has meant an estimated saving of 938,330€.

The ADSs have increased drug control by the pharmacy department, have achieved a better rationalisation of resources and have improved efficiency in drugs use.

No conflict of interest.

DSL-011 EFFICACY AND SAFETY OF EPOETIN ZETA IN DIALYSIS PATIENTS

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Background Anaemia in chronic kidney disease (CKD) remains one of the predictable and modifiable non-traditional cardiovascular risk factors. Epoetin zeta, which is a biosimilar product, is used in the treatment of anaemia associated with chronic kidney disease.
Purpose This study was performed to evaluate the efficacy and safety of the biosimilar product epoetin zeta to maintain stable haemoglobin levels in dialysis patients.
Materials and Methods This study was conducted in 2 dialysis centres with 33 patients. Before the study 30 of the 33 patients were on various erythropoiesis-stimulating agents (ESA). After a run-in period of 2 months, all patients were switched to epoetin zeta and were followed for 6 months. The initial weekly doses as well as the frequency of use per week were kept constant (1–3 times/week). During the follow-up, haemoglobin levels, iron status, dialysis efficiency, body weight and adverse events were monitored at least once a month.
Results 33 patients were treated with biosimilar Epoetin zeta (27 men and 6 women); average age 59.1 (28–76) years; the frequency of used was 1–3 doses/week subcutaneously, over a period of 6 months. Dosing was to be adjusted to keep the Hb levels within 10.5–12 g/dl. Anaemia management and iron supplementation were at the discretion of the investigator and was to be in compliance with the current label. Throughout this study epoetin zeta was within the target range for Hb levels (10.5–11.5 g/dl ± 0.5 g/dl). The main AEs (adverse events) were in 1 patient hypotension (3%), in 1 patient in-dialyzer clotting (3%) and SAE (serious adverse event) was in 1 patient thrombosis of arteriovenous fistula (AVF) (3%). No anti-epoetin antibodies and no clinical signs of pure red cell aplasia (PRCA) were observed in any patients on the study.
Conclusions Treatment of anaemia with Epoetin zeta was shown to be effective and safe. The mean Epoetin zeta doses remained stable in patients switched from all pre-study ESAs. The observed adverse events profile was in line with expectations for the study population.

No conflict of interest.

DSL-012 EVALUATING THE STANDARDS OF HOSPITAL PHARMACIES IN THERAPEUTIC CENTRES AFFILIATED WITH OF KERMANSHAH UNIVERSITY OF MEDICAL SCIENCES, IRAN

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Background Nowadays pharmaceutical care departments located in hospitals are amongst the important pillars of the healthcare system.
Purpose To evaluate the quality of hospital pharmacies affiliated to the Kermanshah University of Medical Sciences.
Materials and Methods In this cross-sectional study a validated questionnaire was used which enquired about all the necessary and standard requirements of an ideal hospital pharmacy. The questionnaire was filled in by the one of the researchers in all seventeen hospital pharmacies located in the teaching and non-teaching hospitals affiliated to the Kermanshah University of Medical Sciences. Data analysis was done using SPSS (version 17).
Results The results shows that in the hospitals observed, 24% of pharmacy environments, 25% of pharmacy store and storage conditions, 49% of storage procedures, 25% of drugs ordering and supplies, 73% of supplies reception (proper procedures followed for receiving supplies), 35% of supplies reception (prompt action taken if deterioration of drugs received is suspected), 23.35% of drugs supplied to patients and finally 0% of stock cards used for inventory control met these standards in full. Several instances of incorrect processes of ordering, receiving, storing and delivering medicines to the patient were detected that have led to wasted money in hospitals and considerable decrease in the quality of medical services.
Conclusions Non-standard space allocation, incorrect ordering, receiving, storing processes and delivery of medicines to the patient were revealed by the questionnaire. These issues may reduce the efficiency and safety of pharmaceutical services and drug administration in hospitals.

No conflict of interest.

DSL-013 EVALUATION OF THE LIMITS OF AUTOMATION AND IMPACT ON DRUG MANAGEMENT AT MOHAMMED V MILITARY TEACHING HOSPITAL PHARMACY, RABAT, MOROCCO

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Background Nowadays, hospitals tend to automate medicines management to increase quality, efficiency and safety of drug dispensing. At Mohammed V Military Teaching Hospital (MVMTH), a centralised Automated Drug Dispensing System (ADDS) was installed at the duty pharmacy. We expect this experience will be decentralised to all hospital services.

Purpose To evaluate the impact of automation on medicines management at our duty pharmacy, and to determine its limits in order to improve them.
Materials and Methods We analysed the organisational aspects from the database of the ADDS deposited at the MVMTH duty pharmacy. The study lasted one year (2010). We also used a questionnaire completed at the end of the study period by the 12 Pharmacy Technicians (PharmTs) working at our hospital pharmacy (6 juniors with less than 5 years of professional experience and 6 seniors with more than 10 years of professional experience, all performing the same tasks during duty hours), in order to evaluate their view of automation.
Results

- 5444 transactions were accomplished (63% by juniors and 37% by seniors);
- injection forms were the most delivered (68%) followed by oral forms (29%);
- anti-inflammatories, analgesics and antispasmodics were the most required on duty hours (26%) followed by antibiotics and antiviral drugs (25%);
- according to PharmTs:

- the main advantages were:
  - saving time in locating medicines (≈83 minutes saved per week, reallocated to other tasks): 8 PharmTs;
  - limiting personal drug use: 5 PharmTs.

- the main constraints were:
  - the irregular machine resupply (poorly done or not done at all) by the technician on duty whose job it is to replenish drugs consumed during the previous day: 10 PharmTs;
  - the reduced capacity for storing all medicines, especially refrigerated and oversized ones: 6 PharmTs.

Conclusions The automated drug dispensing system offers many advantages. However, there are still things to improve concerning machine resupply, storage capacity and storage conditions before decentralisation to hospital services.

No conflict of interest.

DSL-014 FINANCIAL EVALUATION OF THE SURPLUS GENERATED BY THE DISPENSING OF SUNITINIB IN THE LOCAL HEALTH SERVICE OF REGGIO EMILIA

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Background Oral cancer treatment has revolutionised the approach to the disease, as invasive procedures are no longer required, and patients can continue their daily life with practical and psychological benefits.
Purpose To cheque whether the packaging of Sutent (sunitinib), an oral cancer drug monitored by the Italian Medicines Agency (AIFA), dispensed by two District Pharmaceutical Units (UFD) of the Local Health Service (LHS) of Reggio Emilia, is suitable in terms of dosage units, to ensure coverage of the treatment plan prescribed to cancer patients. The marketing packaging authorised contains 30 capsules.
Materials and Methods From September 2007 to September 2012, patients included in this study were dispensed Sutent at least once. We used the record of oncology drugs monitored closely by AIFA to obtain information about patients:

- number of prescriptions dispensed
- dose/day prescribed (e.g. 50 mg);
- total dose prescribed (e.g. 1400 mg);
- total dose dispensed (e.g. 1500 mg);

The total dose of medicine prescribed, corresponding to one treatment cycle (i.e. 28 capsules) is less than the total dose of drug dispensed, corresponding to 30 capsules. For each cycle, there is a predictable surplus of 2 capsules.

Results More was paid than was necessary, for surplus Sutent, reported for 31 patients.

The overall cost of treatment provided in the study period was €492,278. The excess Sutent capsules represent 6.67% of the total cost of treatment, i.e. €32,819.
Conclusions In order to save money, it would help to dispense to the patient the exact number of dosage units required by the prescription.

This idea is supported by an analysis of the savings made for Xeloda. All patients received the exact number of dosage units in all UFD of the LHS of Reggio Emilia. From January 2010 to June 2012 savings were made by the Health Authority of €57,602.

No conflict of interest.

DSL-015 FINANCIAL IMPACT OF ANTI-VEGF IN OPHTHALMOLOGY

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Background The use of drugs with active ingredients produced through genetic engineering is often associated with oncology, rheumatology, dermatology and gastroenterology treatment although today there is wider use in cardiology (canakimumab) for certain products for the treatment of ocular pathologies, with particular reference to the retinal pathologies.

Currently the active principles used in ophthalmology are ranibizumab, pegaptanib and bevacizumab. The first two active ingredients are marketed in syringes ready for intravitreal use, but bevacizumab does not have a formulation different from that for use in oncology.

Ranibizumab is a fragment derived from the immunised antibody bevacizumab that exerts its anti-neogenic and vascular permeability-reducing actions by blocking VEGF (endothelial growth factors) with particular reference to isoforms VEGF165, VEGF121 and VEGF110. It is able to penetrate all the layers of the retina and enter the subretinal space.
Purpose To evaluate the economic impact of anti-VEGF drugs on the budget of the ophthalmology department and the average cost of treatment with ranibizumab considering a series of patients treated for age-related macular degeneration (AMD) at the Ophthalmology department in the Paolo Giaccone Hospital, Palermo.
Materials and Methods The consumption data were obtained from the accounting system of the integrated Polyclinic company, data on doses were obtained from a selection of patients who have had treatment from one to four years, and data were extracted from the AIFA monitoring log for ophthalmic medicines.
Results During the years 2007 to 2011 the share of the budget absorbed by anti-VEGF increased from €58,375.1 (45% of annual expenditure) to 246,592.71 (84% of expenditure).

Given that the administration characteristics cannot be standardised we recorded the number of administrations for the patients treated.

8 patients that have been identified for a year's treatment received 3 to 4 administrations at an average cost per patient of Euro 4,023.25.

19 patients were treated for 2 years with average spending Euro 6,776 (4–9 doses) and a total cost 128,774 euros.

8 patients were treated for 3 years, average Euro 10,201.81 (6–13 doses) total expenditure Euro 81,614.5; Finally

5 patients were treated for 4 years, average Euro 13,334.2 (9–17 doses) total spending Euro 66,671.

It was possible to note that as the years of treatment increased the gap between of administrations widened.
Results In the near future the ageing population will increasingly request good treatment of AMD. The latest ISTAT data indicate an increase in population over the age of 65 years (18.5% of the population). Evaluating the incidence of AMD at 3.68% (EUREYE study)

of which 20% is wet AMD forces us to consider the need to revise our opinion of the sustainability of the treatment of the disease.

No conflict of interest.

DSL-016 HOW WOULD PHYSICIANS AND NURSES HANDLE THE PROBLEM OF DRUG SHORTAGES?

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Background We have all experienced drug shortages for different reasons, such as licence withdrawals, lack of raw materials, etc. Following internal suggestions in cooperation with the Vienna Health Association an alteration list of drug changes was introduced as a standard process. This chart is updated daily and is posted on the opening intranet website of a 720-bed hospital.
Purpose To find out via a survey how health care professionals are affected by such drug supply interruptions, what ideas they have to reduce the harm to their patients, what suggestions and management they expect from the pharmacy and the manufacturer.
Materials and Methods This survey was done on different wards covering the following aspects:

- recognition level/benefit of the up-to-date drug changes list
- use/knowledge of various pharmaceutical services
- requests/solutions in the recurrent cases of certain drug shortages in our hospital.

Results 77 people (23 physicians and 54 nurses) answered the survey. Half of them were conscious of varying drug shortages (rating scale 0–5) being a worldwide problem. Only 50% recognised the data provided on the hospital in-house homepage.

The survey focused on proposals to cope with missing drugs. It noted two essential categories:

- importance of pharmaceutical services on the wards
- logistics: the responsibility manufacturers and the pharmacy to immediately inform them of drug shortages, optimal cooperation with other health care providers
- cooperation and teaching of the patient

Conclusions The ward staff are not at all aware of the worldwide drug shortages. The positive impact of the clinical pharmacy service was mentioned by nearly everyone.

No conflict of interest.

DSL-017 IMPORTING MEDICINES – REVIEW OF FIVE YEARS IN A PORTUGUESE HOSPITAL

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Background The pharmaceutical market has always faced several constraints over the years. Nowadays, more than ever, drug shortages have reached critical levels in European countries. Importing medicines usually implies more paper work, different logistics, higher pricing and higher storage costs. Shortages occur not only because the medicine may be sold out but also because there is no marketing authorization. This may affect potentially all drug classes, raw materials and medical devices. Importation procedures in Portugal require annual authorization from the National Medicines' Agency. Rational and cost-effective procurement of medicines in foreign countries can be a challenge for hospital pharmacists.
Purpose The objective is to analyse, classify and evaluate the consumption and costs of medicines imported over the last five years.
Materials and Methods Retrospective analysis of the importation processes and records of imported medicines during the period of 2007 to 2012.
Results During the period of study 577 importation processes were developed (115 processes a year). About 80% of these medicines are recommended by the Portuguese National Hospital Pharmacy Formulary and the drug classes most involved were central nervous system, antimicrobial and cardiovascular drugs. The mean price per unit rose 1.2% since 2007. In 2012 suppliers are mainly industry/manufacturers while in 2007 there were wholesalers and legal representatives in Portugal. The process of procurement and regulatory issues regarding the importation takes about 14 pharmaceutical hours/week.
Conclusions Importation of medicines at the hospital level is today more often part of the daily tasks of pharmacists. Because the legal framework and logistics are different it is helpful if pharmacists have experience in this matter. The increase in the mean pricing of only 1.2% was possible specifically because intermediates in the supply chain were reduced.

No conflict of interest.

DSL-018 OPTIMIZATION OF A DRUG REPACKAGING AREA THROUGH THE DEVELOPMENT OF A PROTOCOL IN A TERTIARY HOSPITAL

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Background The Pharmacy Service includes a unit dose medicines dispensing section. Drug repackaging consists of repackaging drugs which are not within the unit dose system. This process consumes much of the time of the pharmacy technician.
Purpose To establish a working protocol in the repackaging section and measure the work done in the area after the establishment thereof.
Materials and Methods We developed and distributed working protocols. Later, we distributed them to the technical personnel working exclusively in the repackaging area. We performed a prospective observational study (2011). The variables were: repackaging volume (total drugs repackaged, repackaged tablets/month, repackaged tablets/year), repackaging time (total repacking time, lighting and heating time of the repackaging and cutting machine, repackaging and annotation time) and classification of drugs according to the expiry date.
Results The repackaging process steps set out in the protocol were: lighting the repackaging machine, medicines preparation, cleaning of the repackaging area. Completion of the quality control repackaging sheet. Repackaged drugs must be fully identified. The total volume of the repackaged drugs was 300, 39,498 tablets/month, 479,979 tablets/year, and the time devoted to packaging: cutting time 2 seconds, heating time of 2 seconds, cutting time 1 min/12 blisters, repackaging time 8.5 min/120 packs. 24% of the drugs had an expiry >3 years.
Conclusions Repackaging is 25% of the workload of the pharmacy technicians. The new system enables the staff to work more efficiently, decreasing the repackaging time with a high volume of drugs repackaged/year. The expiry date of the repackaged drugs must be extended in order to obtain a better use of resources.

No conflict of interest.

DSL-019 OPTIMIZATION OF INFLIXIMAB USE CAN SAVE MONEY

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Background Intravenous mixtures with low physicochemical stability vials could generate economic loss by wasted medication in

the case of expensive drugs with individualised dosing if we treated only a few patients on different days. This is the case of infliximab.

Purpose The aim of this study was to retrospectively examine the pattern of utilisation in clinical practise (clustering patients at the same day of the week or not) and the saving costs associated with the optimization of infliximab use in the treatment of rheumatoid arthritis or Crohn's disease.

Materials and Methods We collected data of patients treated whit infliximab during the first two months of 2012. We clustered patients by weeks, so we calculated the total weekly dose by adding the dose of each patient and total number of vials required of infliximab (clustering patients or not). Infliximab was given at dose of 3–5 mg/kg every 6–8 weeks. We calculated treatment costs between two alternatives.

Results Eighteen patients received at least one infliximab infusion during a selected observation period were studied. The mean infliximab dose administered to all the patients was 342 ± 80 mg per patient. The number of vials used was 67, if we cluster patients, and 71 without cluster patients Infliximab vial optimization allows us, for the whole year, to reduce the amount of vials from 486 to 458, with a significant saving of 13612€ by year.

Conclusions Clustering patients in a agreed day of week allows significant cost savings in the context of a regional hospital. The cost of treatment could be reduced by using infliximab vial optimization. These results could be applied for the vial optimization of some monoclonal antibodies and cytostatic agents.

No conflict of interest.

DSL-020 PILOT STUDY OF THE CHANGES IN THE COST OF ADULT KIDNEY TRANSPLANT TREASTMENT FOR PATIENTS IN BULGARIA

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Background There are several studies at the international level analysing the cost of immunosuppressive treatment of kidney transplant patients. In Bulgaria pharmacotherapy of kidney transplant patients is provided by the hospital pharmacy and therefore it is important to know the amount paid for immunosuppression by the hospital providing the treatment.

Purpose To analyse the changes in the cost of pharmacotherapy for kidney transplant patients in Bulgaria during the period 2006–2011.

Materials and Methods A prospective cost study of the changes in pharmacotherapy of all adult kidney transplant patients in Bulgaria during the specified period. An analysis of prescribing practise was performed, cost of pharmacotherapy was calculated. Descriptive statistics and t-test analysis were performed to evaluate the changes in the prescribing practise and the cost of pharmacotherapy.

Results In total 21 therapeutic schemes were found prescribed. The number of patients on treatment varied for each year of the observation period because of patients dropping out of treatment. The total observed population for the period was 589 individuals. Most often, the prescribed therapeutic scheme was ciclosporin + mycophenolate; in 38% to 39% of all cases. A slow increase in the average monthly costs of pharmacotherapy was observed for the period 2007–2009, after which the cost declined from 172 EUR to 138 EUR per patient per month in 2010–2011. Those variations are mostly due to changes of pharmacotherapy. During the period 2007–2009 two new substances were introduced, tacrolimus and everolimus, which led to the increase in prescribing costs. For the period 2010–2011 generic immunosuppressants were introduced and the prescribing costs declined. The drug costs of kidney transplantation vary between 17.43% and 30.66% of the hospital's drugs budget.

Conclusions To our knowledge this is the first Bulgarian study of prescribing practise and changes in the cost of drugs for kidney transplant patients. It reveals that prescribing costs are varying and dependent on the introduction of new molecules or generic products. The study shows that the introduction of the new immunosuppressive molecules leads to an increase in pharmacotherapy costs, while the introduction of generic products significantly reduces drug costs.

No conflict of interest.

DSL-021 RISK ANALYSIS OF MEDICINES PRODUCED IN HOSPITAL PHARMACY – A TOOL FOR ENSURING OPTIMAL SUPPLY

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Background The hospital pharmacy unit for the preparation of licenced sterile medicines manufactures 110 different extemporaneous preparations and licenced medicines for injection or infusion. This unit needs a tool for production planning i.e. an assessment of which medicines are critical and hence must always be in stock.

Purpose To create a tool for risk assessments for all medicines manufactured in the unit, enabling appropriate prioritising of resources from a treatment perspective.

Materials and Methods All risk assessments are executed and stored in SAID (National question and answer database). The advantages of this method are that each risk assessment is quality assured and acts as a dynamic document that can be updated regularly.

Risk assessments are based on relevant literature (e.g. Summary of Product Characteristics and Micromedex).

For each risk assessment the following is examined as a minimum:

- Which patient group will benefit from the medicine?
- Therapeutic indications and administration
- Are there any alternative treatments?
- Does a synonymous/analogous medicine exist? Any safety concerns regarding method of administration? Can the manufacturers maintain the flow of supply?

Based on the above the risk assessments are allocated a score 1 to 5, which indicates the severity of a back order.

Results The risk assessments were distributed as follows:

18% scored 5 (no alternative medicine exists)
38% scored 4 (analogous medicine exists)
24% scored 3 (synonymous extemporaneous or non-licenced medicine exists)
9% scored 2 (synonymous medicine exists)
11% scored 1 (more than one analogue/synonym exists)

The risk assessments showed that none of the medicines could be dispensed from a treatment perspective. Shorter periods of back order of some medicines can be tolerated with no effect of patient care and safety, if alternative synonyms/analogous medicines are supplied from other manufacturers.

Conclusions Risk assessments have given the unit a tool for production planning and prioritising the manufacturing of medicines.

No conflict of interest.

DSL-022 SIMPLIFICATION OF ANTIRETROVIRAL TREATMENT WITH DARUNAVIR/RITONAVIR. THE FINANCIAL IMPACT OF MONOTHERAPY

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Background Currently, drugs for HIV treatment have an important financial impact in our hospital Pharmacy Department. Protease Inhibitor (PI) monotherapy is a useful tool that can be used for selected patients

Purpose To determine the proportion of patients on antiretroviral therapy (ART) who could benefit from simplification to Darunavir/Ritonavir (DRV/r) and evaluate its financial impact

Materials and Methods Retrospective study conducted in a primary hospital between September 2011 and September 2012. Patients included were those being treated for HIV infection. Simplification criteria [1] (CS) for DRV/r were the following: patients without a history of failure of Protease Inhibitors (PIs), undetectable viral load (VL < 50 c/mL) over the last 6 months, adherence to treatment >95% and/or intolerance to Nucleoside Reverse Transcriptase Inhibitors (NRTIs). We excluded HIV-2 patients, those co-infected with chronic hepatitis B virus or already treated with PI monotherapy (DRV/r). Clinical data were collected from medical and dispensing records from outpatients.

Results Patients on ART: 346. Of those, 34 patients met the CS. Their previous ARTs were: 18 with 2 NRTI+ 1 PI, 7 with 2 NRTI + 1 Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTI) and 9 with other ART. The most prevalent NRTIs, PIs and NNRTIs were tenofovir (76%), lopinavir (38%) and efavirenz (14%). There were 14 patients with no response to PIs, 68 with detectable VL, 89 with adherence <95% and 69 with intolerance to NRTIs. Average savings per patient/year: €3,246. Total savings: €110,378 per year (4.7% of the total HIV cost)

Conclusions Almost 10% of patients treated with HIV drugs could be on simplified treatment. 73% of previous ARTs were 2 NRTI plus 1 PI or NNRTI, which is consistent with reference clinical studies. Simplifying the treatment could improve adherence and tolerance in patients as well as cost effectiveness in the ambulatory management of these drugs.

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No conflict of interest.

DSL-023 THE COST ANALYSIS OF INTRODUCING THE TWO-BIN REPLENISHMENT SYSTEM FOR MEDICAL DEVICES, ANTISEPTICS AND INTRAVENOUS FLUIDS IN A GERIATRIC HOSPITAL

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Background The two-bin replenishment system has been launched in some public hospitals of Lyon for medical devices, antiseptics and intravenous fluids.

Purpose To make a cost analysis of setting up the two-bin system in a hospital that has eleven wards.

Materials and Methods We identified the cost differences between the new two-bin replenishment system and the previous one from the perspective of the hospital.

Self-assessment questionnaires aimed to gather the following information:

- the time spent using the original system and the new one over a period of one week,
- the time spent setting up the new system.

The questionnaires were carried out on the wards, pharmacy and with the staff in charge of the setting up. Then we gave a value to the times collected using the amount charged for salaries in 2011.

The amount of products returned to the pharmacy was used as an indicator of the cost savings between the two systems. We also collected the cost of furniture.

We finally made an amortisation schedule of the collected costs.

Results Eight out of the eleven wards answered the self-assessment questionnaire. The value of staff time saved with the two bin replenishment system was found to be €13,800 per year. The difference in cost between the new and the original stock was around €7600. We compared these savings with the cost of setting up the new system. It cost €24,500 in manual labour expenses and €35,600 for the furniture and renovation works.

The amortisation schedule shows a return on investment in 3 years.

Conclusions This study reinforced our wish to develop this type of replenishment in our other public hospitals as its safety benefit has been published in a previous report (MEAH report – September 2006).

No conflict of interest.

Drug information (i. anti-infectives, ii. cytostatics, iii. others)

DGI-001 A SYSTEMATIC REVIEW OF PERCEPTIONS OF EHEALTH AND SHARED CARE

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Background The World Health Organization (WHO) defines eHealth as 'the combined use of information and communications technologies for health' [1]. eHealth strategies worldwide aim to promote quality, safety and efficiency by underpinning shared healthcare provision with technology. The Scottish eHealth Strategy incorporates an ePharmacy programme to support pharmacists' increasing role in shared care [2]. It acknowledges organisational development and training for core and optional eHealth services as key.

Purpose To explore and report methodologies, findings and gaps in research related to healthcare professionals' perceptions of the adoption of eHealth technologies for shared care.

Materials and Methods A systematic review was conducted using a meta-narrative approach [3]. Articles published post-2004 in English were included; articles on Internet searches for health information or email were excluded. Data were extracted, synthesised and summarised. Ethical approval was not required.

Results Screening reduced the initial 327 papers identified to 12 which included three reviews, four qualitative, two mixed-methods and three quantitative studies. Data were collected using questionnaires (3), case study (1), group (2) and individual (6) interviews, observation (3) and extraction of data from records (1). Practice settings were remote rural or urban featuring primary care, secondary care or both. The focus was on electronic records (7), telemedicine (2) or general eHealth implementation (3) from the perspective of doctors, nurses, IT developers, policy makers and managers. One study included the views of a hospital pharmacist. Acceptance of eHealth technologies is reported but with cost effectiveness, resourcing and training questioned. Emerging themes are organisational, social and technical.

Conclusions Strategists worldwide believe technology has the potential to promote quality, safety and efficiency in shared care where organisational, social and technical issues are addressed. However, evidence of hospital pharmacists' views, their perceptions of eHealth and shared care, organisational development and training needs remain under-researched.

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No conflict of interest.

DGI-002 ADRENAL INSUFFICIENCY INDUCED BY A CHINESE HERBAL MEDICINE

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Background Chinese herbal medicines have a history, dating back to 1974, of containing strong prescription drugs [1]. In the United States (US), Food and Drug Authority (FDA) analysis of Chinese herbal preparations has found prednisolone, diazepam, paracetamol, indomethacin and hydrochlorothiazide [1].

During a routine review for type 2 diabetes, a MMUH patient reported new-onset fatigue. In view of the presenting complaint, a Synacthen test and thyroid function tests were performed. The patient's Synacthen test reported positive for adrenal insufficiency, despite an absence of other clinical symptoms. Repeat testing and external analysis confirmed the result.

Potential causes of the positive Synacthen test were investigated. On further questioning the patient admitted to taking a 'vitamin-type' tablet, which was a Chinese herbal medicine, Cow's Head Brand, Tung Shueh Pills. It was a suspected that the Tung Shueh Pills may have contained corticosteroids, which suppressed the patient's endogenous corticosteroid production, producing a positive Synacthen test.

Purpose To find out whether Cow's Head Brand, Tung Shueh Pills contained corticosteroids.

Materials and Methods Literature review for reports on Cow's Head Brand, Tung Shueh Pills.

Analysis of Cow's Head Brand, Tung Shueh Pills in collaboration with the Irish Medicines Board (IMB)

Results Cow's Head Brand, Tung Shueh Pills manufactured by the Ta Ang Pharmaceutical Company are included on a FDA list of products that require detention when being imported into the US [1]. There is also a case report of Tung Shueh Pills causing acute interstitial nephritis [2].

Review of the listed ingredients of the Tung Shueh pills did not identify any agents known to suppress endogenous corticosteroid production.

The IMB analysis of the agent reported that the product contained betamethasone, arsenic, lead, cadmium and antimony

The patient is currently receiving oral hydrocortisone, which is being tapered in accordance with Synacthen test results.

Conclusions Cow's Head Brand, Tung Shueh pills were found to contain a corticosteroid and heavy metals. Regular administration resulted in suppression of endogenous corticosteroid production, producing drug-induced adrenal insufficiency in a patient.

This case report highlights the importance of including herbal medicines in patients' medicines histories. It also highlights that a lack of regulation of Chinese Herbal Medicines enables inclusion of prescription agents, not included in the product ingredients, which may have significant pharmacological effects on patients.

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No conflict of interest.

DGI-003 ANALYSIS OF CLINICAL EFFECTIVENESS OF TREATMENT WITH PEGINTERFERON PLUS RIBAVIRIN IN CHRONIC HEPATITIS C MONO-INFECTED PATIENTS

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Background Pegylated interferon (Peg-INF) in combination with ribavirin (RBV) is currently the gold standard treatment in chronic hepatitis C (HCV) patients, achieving viral eradication in approximately 50–60% of patients in published data.

Purpose To assess the clinical effectiveness of Peg-INF plus RBV for the treatment of chronic HCV mono-infected patients.

Materials and Methods Retrospective observational study involving 152 patients treated from October 2006 to July 2010. We collected demographic data (age, gender), laboratory reports (genotype, viral load), clinical characteristics, type of Peg-INF and RBV and Peg-INF doses. The primary end point was a sustained virological response (SVR). Secondary end points included rapid virological response (RVR), early virological response (EVR) (complete or partial), final viral response (FVR) and virological relapse. Exclusion criteria were: coinfection, haemodialysis and patients with insufficient data to analyse. Data were obtained from the pharmacy database and medical records.

Results 152 patients (mean age 46 years) were analysed and 84 were included. 65.5% were male. 67.1% with genotype 1–4. 51.2% were treated with Peg-INF α-2a. The average viral load was 1.9 × 1010 IU/ml and 40% of the patients had more than 600,000 IU/ml HCV RNA. The METAVIR liver fibrosis stage was F3–F4 in 36.6% of patients. 62.5% (50/80) achieved SVR, 72.0% in those with genotype 2–3 and 60.8% in 1–4. RVR was achieved in 31.7% of patients with genotype 1–4, and 73.9% in genotype 2–3. 69.2% of patients with genotype 1–4 achieved a complete EVR versus 92.3% in 2–3. 11.5% of patients with genotype 1–4 and 7.7% of those with 2–3 achieved a partial EVR. Relapse rates (18.2%) were lower in genotype 2–3 than in 1–4 (75% of them).

Conclusions The overall SVR rates observed were in accordance with published data, as well as the higher proportion of patients with genotype 2–3 that achieved a RVR and the highest rate of relapse observed in those with genotype 1–4.

No conflict of interest.

DGI-004 ANALYSIS OF CONSULTATIONS MADE BY PATIENTS IN AN OUTPATIENT SERVICE

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Background hospital pharmacists interview all outpatients with a new prescription, including medication changes, and those who are suspected of not having good compliance. However, patients sometimes voluntarily demand to talk to the pharmacist.

Purpose The objective of this work was to evaluate the features of consultations made by patients in these situations.
Materials and Methods observational prospective study performed in all outpatients who demanded an interview with the pharmacist from 01/03/12 to 31/05/12. Data collected: sex, age, pathology, type of question, resolution (yes/no), and whether the patient was sent to another health professional or not.
Results 48 patients were included (56.25% male; mean age 47.25 years). Pathology: 29 HIV; 4 hepatitis C; 3 multiple sclerosis; 3 hepatitis B, and 9 others (one each): lung cancer, renal impairment, rheumatoid arthritis, multiple myeloma, myosarcoma, growth disorder, pulmonary hypertension, glaucoma, and aspergillus infection. Consultations were classified into 9 types showing in brackets the number of each: 1-Drug-drug interactions (14); 2-Apply for extra medication (9); 3-Side effects (8); 4-Dosage and administering(6); 5-Missed or wrong doses(6); 6-Prescription renewal(2); 7-Drug storage(1); 8-Faulty drug(1) and 9-Misunderstanding medical prescription(1). Forty-three consultations were solved by the pharmacist (89.58%). In the other 5 cases, patients were sent to the physician: two were taking the treatment incorrectly and needed a special cheque, two needed to renew the prescription and one was suffering severe side effects.
Conclusions The most common consultations were related to pharmacology except for 18,75% of patients who applied for extra medication (often not possible because of the hospital policy). The pharmacist was able to solve almost 90% of consultations, sending the patients to their doctors just in cases where their health was compromised or new prescriptions were needed.

No conflict of interest.

DGI-005 ANALYSIS OF LEVOFLOXACIN USE IN GERIATRIC UNITS AT A UNIVERSITY HOSPITAL

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Background Overuse of antibiotics, such as fluoroquinolones and third-generation cephalosporins, is a major cause of the emergence of extended-spectrum beta lactamase producing enterobacteriaceae. The use of levofloxacin in elderly inpatients is widespread.
Purpose We investigated the conditions in which this drug was prescribed.
Materials and Methods From 1st January to 31st March 2012, information was recorded on every new levofloxacin prescription from the geriatric units: indication, dose, duration, patient's medical history, renal function and previous antibiotic. In parallel, levofloxacin consumption was assessed and expressed in terms of the number of Defined Daily Doses (DDD) per 1000 patient-days (PD). The consumption was compared with the data from the French antibiotic network "RAISIN".
Results 87 patients had a levofloxacin prescription: 55% for community-acquired pneumonia, 20% for nursing-associated pneumonia, 16% for nosocomial pneumonia, and 9% for others indications. 77% of the patients had previously received another antibiotic (47 amoxicillin/clavulanic acid, 20 ceftriaxone). Among patients without signs of gravity (tachycardia, tachypnea, hypotension), 1 in every 2 received levofloxacin associated with ceftriaxone, although this combination is only for intensive care patients according to the French Society of Infectious Diseases. The mean duration of treatment was 10 days. In 1 in every 2 cases, dosage was too high according to the renal function. As a result, the exposure to levofloxacin was 49 DDD per 1000 PD in acute-care units, and 37 DDD per 1000 PD in skilled units. These results are 4 to 7 times higher than those recorded in the "RAISIN" network. For 20% of the patients, levofloxacin was ineffective and another line of antibiotic was prescribed.
Conclusions Our results suggest that to reduce exposure to fluoroquinolones we should avoid systematic association with ceftriaxone, prescribe levofloxacin as the second line after amoxicillin/clavulanic acid and reduce dose and duration.

No conflict of interest.

DGI-006 ANALYSIS OF SAVINGS IF THE TREATMENT OF COMMUNITY-ACQUIRED PNEUMONIA (CAP) IS SWITCHED

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Background Levofloxacin exhibits excellent bioavailability as well as pharmacokinetic equivalence between the oral and the parenteral form and is one of the medicines most used in the treatment of CAP.
Purpose The purpose of this study is to evaluate the savings that may be achieved by treating patients affected with CAP with sequential treatment (switching from intravenous to oral treatment).
Materials and Methods Both the cost and duration of treatment with levofloxacin were considered. The cost was given by: unitary cost of levofloxacin, cost of the nursing staff, cost of the material for parenteral infusion, cost of the hospitalisation. The duration was considered to be 5 days for patients without complications, 20 days for patients with complications and 10 days as the average in common clinical practise. This model was applied to reality in the S.C. Pneumologia of the ASO S. Croce and Carle of Cuneo. The patients hospitalised for CAP and treated with levofloxacin were individualised through the A.S.400 computerised applications.
Results In 2011 351 patients were hospitalised and treated with levofloxacin tablets and/or vials in the Pneumology ward; 90% of them were suffering from CAP.

For 10 days of treatment the sequential treatment would enable savings equal to 85€/patient. This saving would allow us to treat 12 more patients in a switched treatment regime. For 20 days of treatment the difference would be equal to 205€/patient quantifiable as 14 more patients with CAP treated in hospital without affecting the budget.
Conclusions Oral treatment, as it is equally effective, turns out to be the best therapeutic alternative in terms of savings. In future we will analyse the discharge letters of these patients under the model used in this study, thus assessing the real savings.

No conflict of interest.

DGI-007 ANALYSIS OF THE PRESCRIPTIONS OF ANTIBIOTICS AS LAST RESORT

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Background The composite index on proper use of antibiotics (ICATB) includes surveillance of the ATBs used, evaluation of ATB prescriptions and the existence of an ATB list associated with checking dispensing with limited duration.
Purpose To examine the conformity of ATBs as last resort prescriptions and to promote their proper use.
Materials and Methods 1988 prescriptions emanating from 7 units were investigated between 2009 and 2011, by taking into account 7 criteria: re-evaluation of the need to continue the treatment, conformity with administrative (AR), clinical/biological (CR), pharmaceutical (PR) requirements, the relevance of the

prescription, the number of phone calls made by pharmacists to physicians and the number of changes made after these phone calls.
Results In 2011, prescriptions were re-evaluated in 69% of the cases, with a statistically significant increase ($p < 0.01$) between 2010 and 2011. Compliance with the AR was 75%, CR was 86%, the PR was 72% and the relevance of the prescription reached 70%. Compliance with these last criteria increased in 2010, but decreased again in 2011. 15% of the prescriptions required a phone call, of which 47% were followed by a change in the prescription.
Conclusions The continuation of ATB treatment requires re-evaluation according to the antibiogram or the clinical evolution. The improvements achieved in 2010 in prescription conformity and in the proper use of ATBs as last resort can be attributed to the distribution of the guide to proper use of anti-infectious drugs and changes in the presentation of prescriptions. Nevertheless, the significant decrease in 2011 requires physicians who are prolific prescribers to be sensitised. The active involvement of pharmacists in the anti-infectious drugs committee contributes to promoting the proper use of ATBs. Pharmacists called less than last year but their phone calls were more targeted and relevant.

No conflict of interest.

DGI-008 ANALYSIS OF THE USE OF CARBOXYMALTOSE IRON IN A UNIVERSITY HOSPITAL

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Background Recently the use of IV carboxymaltose iron at doses of 500–1000 mg has increased in our hospital, even though it is not included in the formulary and it should be only used to avoid blood transfusions.
Purpose To evaluate the use of carboxymaltose iron in a university hospital.
Materials and Methods A longitudinal, descriptive study was carried out in patients treated with iron carboxymaltose from January 2011 to June 2012 in a university hospital. Data was collected from special orders of non-formulary drugs. Variables recorded: sex, age, prescribing service, indication, haemoglobin (Hb) prior to and after the administration of iron, dose of iron and number of administrations in each patient. Safety was also considered by analysing any adverse effects (AEs) reported to the Pharmacy Department.
Results 85 patients were included (60.0% female; median age 50.1 [SD:19.2]). Prescribing services were: Gynaecology and Obstetrics (30.6%), Haematology (29.4%), Nephrology (17.6%), Digestive (12.9%) and others (9.5%). Main indications were: anaemia secondary to chronic kidney disease (CKD) (20.0%), postpartum anaemia (17.6%), undetermined anaemia (14.1%), iron deficiency anaemia (12.9%), gastrointestinal bleeding (8.2%), post-surgical anaemia (8.2%), pre-surgical anaemia (5.9%), others (10.7%) and unspecified indication (2.4%). Mean Hb prior to the iron administration was 9.5 (SD = 2.0) g/dl and 11.5 (SD = 1.7) g/dl after the treatment. Mean dose of carboxymaltose iron used was 754 mg (SD = 251) mg. 71.8% patients received a single iron dose during the study period, 14.1% received two administrations, 5.9% received three administrations and 8.3% received four or more administrations. No AEs associated with the drug were reported to the Pharmacy Department.
Conclusions The main uses of carboxymaltose iron were anaemia secondary to CKD and postpartum anaemia. A third of the prescriptions corresponded to surgical patients. However, 16.5% orders specified neither the indication nor the type of anaemia. Our data has shown effectiveness and safety in the use of carboxymaltose iron.

No conflict of interest.

DGI-009 ANALYSIS OF THE USE OF ERYTHROPOIESIS-STIMULATING AGENTS IN A UNIVERSITY HOSPITAL

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Background The use of erythropoiesis-stimulating agents (ESA) in the treatment of anaemia due to chronic kidney disease (CKD) is highly variable regarding patient characteristics and doses, including the equivalence among ESAs stated in the label product.
Purpose To evaluate the use of ESAs for anaemia due to CKD in a university hospital.
Materials and Methods A descriptive, transversal study was performed in patients treated with ESAs for anaemia secondary to CKD in a university hospital over a month. The principle variable was monthly dose of ESA. Secondary aims were to assess: efficacy (defined in terms of haemoglobin levels [Hb]) and safety (defined in terms of percentage of patients with Hb >13 g/dl). Variables collected were: demographic characteristics, ESA type and dose, prescribing Service, Hb, serum creatinine (Cr), C-reactive protein, albumin, ferritin, transferrin saturation index, folate, vitamin B12 and parathyroid hormone (PTH).
Results 333 patients were included (52.6% female; median age 75.2 years). 69.1% patients were on pre-dialysis, 27.6% on haemodialysis and 3.3% on peritoneal dialysis. The prescription profile was: 23.4% epoetin, 41.4% darbepoetin α and 35.1% CERA. 97.0% prescriptions from Nephrology Service. Median [p25, p75] dose/month was: epoetin (12857 [8571, 25714] IU), darbepoetin α (86 [43, 129] mcg), CERA (75 [50, 100] mcg). Hb levels: epoetin (11.9 [11.3, 12.5] g/dl), darbepoetin α (11.9 [11.1, 12.8] g/dl), CERA (12.1 [11.0, 12.8] g/dl); $p = 0.860$. Patients with Hb> 13 g/dl: 11.5% epoetin, 19.6% darbepoetin α, 22.2% CERA; $p = 0.639$. Patients treated with CERA had more favourable levels of Cr, albumin and PTH than those treated with epoetin and darbepoetin α ($p < 0.05$).
Conclusions Efficacy and safety were similar for different types of ESAs. CERA dose was lower than the recommended equivalence stated in the label product for the doses of epoetin and darbepoetin α obtained, although patients treated with CERA had a better kidney function.

No conflict of interest.

DGI-010 ANALYSIS OF THE USE OF FINGOLIMOD IN PATIENTS WITH MULTIPLE SCLEROSIS IN A UNIVERSITY HOSPITAL

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Background Multiple Sclerosis (MS) is a chronic, inflammatory and degenerative disease, which affects the Central Nervous System [1].

Fingolimod (FTY) is a medicine indicated in the treatment of MS patients with active exacerbation/remitting episodes. Being an expensive, innovative treatment it has been the subject of careful monitoring.
Purpose To evaluate the use of FTY between May 2011 and September 2012. To evaluate the benefits in reducing disease progression.
Materials and Methods Retrospective analysis of FTY use in MS patients in outpatient care, followed in Demyelinating Diseases Consultation. The number of outbreaks and Kurtzke Expanded Disability Status Scale (EDSS) scores, blood pressure and heart rate were examined using a pharmacy database and patients' medical records.

Results Twenty six patients were investigated:

- Previous treatment: 10 patients with natalizumab (4 for over 2 years), 8 with interferon beta (IFNβ) (6 of them for more than 1 year), 3 with glatiramer acetate (GA), 3 with azathioprine with mycophenolate mofetil and 1 with methotrexate.
- FTY treatment periods: 4 patients had started <1 month ago; 18 between 1–6 months; 3 between 6–12 months and one >1 year.
- Vital parameters: mean arterial pressure (MAP): 121.29 mmHg/70.41 mmHg and 113.06 mmHg/68.31 mmHg after 6 h of administration. The mean heart rate (MHR): 71.06 beats/min and 62.53 beats/min after 6 h.
- Disease progression: 1 patient suffered only one flare-up. Nine patients had a mean decrease of 0.72 in the EDSS scale and 4 maintained the values. There was no increase in lesion extension in Nuclear Magnetic Resonance.
- Average monthly costs: FTY €1,872.5; INFβ/GA (1st line) €843.91; natalizumab €1,923.90 (costs related to the route of administration were not counted).

Conclusions There was no worsening of symptoms after introduction of FTY and there was only one recrudescence episode, requiring long-term assessment.

Despite costing more than first-line medicines, FTY was the best option because it is an oral formulation, so is more convenient for patients.

Reference

1. Portuguese Society of Multiple Sclerosis

No conflict of interest.

DGI-011 ANTI-TUMOR NECROSIS FACTOR REAL-WORLD DOSES: FOUR-YEAR RETROSPECTIVE STUDY IN RHEUMATOID ARTHRITIS PATIENTS IN TWO HOSPITALS IN SPAIN

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Background Achieving minimum clinically effective doses offers major advantages in safety and efficiency.

Purpose To evaluate mean dosage in rheumatoid arthritis (RA) patients treated with adalimumab (ADA), etanercept (ETN) and infliximab (IFX). To correlate these dose strategies with the patient's disease activity. To estimate annual costs associated.

Materials and Methods Observational, retrospective study. RA patients who received ADA, ETN or IFX for at least 6 months during 2006–2010 were included. Patients could receive different sequential treatments. Mean drug consumption was analysed based on hospital pharmacy service claims and presented as a percentage of the standard RA dose. Escalated and reduced doses were defined as those higher and lower than standard doses. Demographic data, concomitant treatment, disease activity (DAS28-ESR) and antiTNF dosage were analysed. The therapeutic objective was defined as DAS28 < 3.2. Associated annual costs were estimated based on public ex-factory prices including tax (2011 Euros).

Results 198 patients (mean age 60.5 years [±13.06], 80% female, baseline DAS28 = 4.38 [±1.52]). 215 cases: ADA (66 first line, 7 second line), ETN (71 first line, 9 second line, 1 third line), IFX (61 first line).

Conclusions There were no statistical differences regarding baseline disease activity ($p > 0.05$). Patients in the ADA or IFX groups increased doses above standard doses more frequently than ETN patients ($p < 0.05$).

There were no differences between groups in percentage of patients with DAS28 < 3.2 ($P = 0.927$).

AntiTNF real-world data shows significant differences compared to recommended doses, which directly affect treatment costs and efficiency. Measuring efficiency in clinical practise is key for optimization and rational use of biological medicines.

Abstract DGI-011 Table 1

	ADA N = 73	ETN N = 81	IFX* N = 61
Concomitant DMARDs (%)	80.83%	74.07%	90.16%
Study real doses†	93.02%† (37.21 mg/biw)	81.00%† (40.5 mg/week)	135.73%† (4.07 mg/kg/8 weeks)
Mean reduced doses	32.88%	46.91%	8.2%
Mean increased doses	9.58%	3.7%	75.41%
DAS28 < 3.2 (%)	67.12%	65.43%	62.30%
Patient-year cost (standard doses)	12,859.79€	11,845.93€	7,566.27€
Patient-year cost (clinical practise)‡	11,962.58€‡	9,594.73€	10,094.53€
Patient-year cost differences†	−897.22€†	−2,251.20€†	+2,528.26€†

*IFX: 110.93€/infusion, 0.89% waste optimising vials. Mean weight: 68.04 kg.
†:$p < 0.05$ between groups
‡:$p < 0.05$ ADA vs. ETN, ADA vs. INF

No conflict of interest.

DGI-012 ANTIBIOTICS MONITORING: THE EXPERIENCE OF LIGURIA REGION, ITALY

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Background The Health Department of Regione Liguria has introduced the obligation, for every hospital department to motivate the request to obtain certain kinds of antibiotics, because their use is restricted to serious infections and in consideration of their high cost.

Purpose The aim is to restrict the phenomenon of resistance to antibiotics and reduce the rising consumption of these drugs, guaranteeing a correct prescription.

Materials and Methods The request for the drugs in question must be made using the appropriate form containing the clinical data of the patients, including personal details, diagnosis and the characteristics of the infection.

The pharmacist verifies the administration dosage and the conformity of the diagnosis with the approved health authority indications and with prophylaxis guidelines. The pharmacist will then decide whether to dispense the drug.

Some hospitals make use of written applications, others have created specific software for this purpose, others have included the application in the software for the management of the hospital admissions and patients records. Furthermore, where necessary, it has been possible also to include specialist advice, in the software.

Results In the 2011 the Local Health Board of Genoa (ASL3) received and monitored 2274 specific forms, that is 100% of the requests. The intervention of the pharmacist led to a reduction of 90% in the use of Tigecycline and prevented, in 31 cases, an overdose of Vancomycin hydrochloride on Clostridium Difficile Infection. Administration of oral vancomycin in Clostridium difficile infection was 500 mg qid orally for at least 10 days instead of 125 mg qid orally stated in the international guidelines.

The control of reasoned request by the pharmacist allowed to use the appropriate dosage.

In the Galliera Hospital, 2100 specific forms were filled out (70% of the total requests). Antibiotics non requiring a specific request like ciprofloxacin, ceftriaxone, ceftazidime were used more than in 2009. (2009: 20872units; 2011:25508 units)

The Local Health Board of Chiavari (ASL4) received 1525 applications (59% on-line).
Conclusions This method has led to an increase in appropriate prescriptions and to better collaboration among medical staff.

No conflict of interest.

DGI-013 ANTIRETROVIRAL TREATMENT SWITCHING IN VIROLOGICALLY UNSUPPRESSED HIV-INFECTED PATIENTS

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Background Antiretroviral treatment (ART) has markedly decreased the morbidity and mortality due to HIV; however, in a percentage of patients a change of treatment is needed.
Purpose To determine the rates of treatment switching in HIV virologically unsuppressed patients, the reasons for changing treatment, to estimate adherence levels and to find the profiles of drug-resistant mutations.
Materials and Methods Retrospective study involving patients switching ART with HIV RNA values >20 copies/ml in 2011. Patients under 18 and those who had been on their first-line treatment no longer than 24 weeks, were excluded. Data collected: gender, age, ART and HIV RNA values before and after switching, cause of changing, adherence level (dispensing records for the last three months) and resistance testing. Data source: medical records and pharmacy database.
Results Of 1103 patients receiving ART, a total of 16% (177) of regimens were switched, 102 cases met the inclusion criteria (57.6%), 62% males, average age 44 ± 9.5 years. In patients switching treatment, viral load was <500 copies/ml in 57.8% (59/102) (<200 in 51 of them (84%)). Drug-resistant mutations were assessed in 40.2% (41/102), and mutations were found in 41.5% of them, the more frequent mutations were: M184V (6/17), K103N (6/17), Y181C (5/17) and K65R (3/17). The main reasons for switching treatment were toxicity (52.9%) and treatment failure (29.3%), other reasons were regimen simplification, drug interactions and pregnancy (17.7%). The average adherence level was 70.4%, but only 38.4% of patients had high levels of adherence (>95%). The rate of adherent patients (>95%) was 55.9% in patients with viral load <500 copies/ml versus 14.1% with viral load >500 ($p < 0.05$).
Conclusions Toxicity was the main reason for changing ART. The percentage of 'well-adherent' patients was very low in virologically unsuppressed HIV-infected patients, especially in those patients with high viral loads; therefore adequate adherence to treatment is a key factor in viral suppression.

No conflict of interest.

DGI-014 APPROPRIATENESS OF TREATMENT AND COST ANALYSIS IN THE TREATMENT OF SYSTEMIC FUNGAL INFECTIONS IN A TRANSPLANT CENTRE

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Background Invasive fungal infections (IFIs) increase morbidity and mortality in immunocompromised patients (IPs).Controlling antifungal use is fundamental in avoiding drug resistance and containing costs.
Purpose To identify risk factors associated with IFIs in IPs, and monitor appropriateness and cost of antifungal treatment.
Materials and Methods A retrospective analysis was done at ISMETT, a 78-bed transplant centre in Palermo, Italy, from 1 January to 31 December 2010. One hundred and one IPs received intravenous antifungal treatment with fluconazole (F), liposomal amphotericin-B (A), caspofungin (C), itraconazole (I) for 4 or more days. Patient treatment was divided into three groups: prophylactic, empirical and target. Immunosuppressive treatment (IT), total parenteral nutrition (TPN), dialysis, central line, steroid treatment, stent use, neutropenia, and mechanical ventilation were evaluated. Variables were treatment duration, DDD (defined-daily-dose) consumption and DDD average cost.
Results Main risk factors were central line (65.3%), TPN (56.4%), dialysis (46.5%), IT (42.6%), mechanical ventilation (32.7%), neutropenia (24.8%), steroid treatment (23.8%), and stent use (14.9%). Average duration of prophylactic treatment was 7 days, F (61%), A (26%), C (13%) were used. Average duration of empirical treatment was 8 days, and F (52.9%), A (26.5%), C (8.8%), I (2.9%), and in association A+C, A+F, C+F (8.9%) were used. Average duration of target treatment was 9 days, and F (40.4%), A (23.1%), C (15.4%), I (7.7%), and in association A+C, A+F, C+F (13.4%) were used. DDD consumption and DDD average cost were, respectively, C 50 mg vial: 273 DDD, €381.1; C 70 mg vial: 33.6 DDD, €389.6; F 200 mg vial: 768 DDD, €11.8; F 100 mg vial: 89 DDD, €10.6; I 250 mg vial: 62.5 DDD, €68.8; and A 50 mg vial: 2200 DDD, €93.4.
Conclusions Data showed appropriate use of antifungals. The best treatment alternative (cheaper antifungal) was prescribed for most patients. The high cost of A and C was justified by resolution of the IFI.

No conflict of interest.

DGI-015 ASSESSMENT OF THE TREATMENT WITH A TWO-DRUG ANTIRETROVIRAL REGIMEN

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Background Antiretroviral treatment with a three drug-regimen is the initial treatment recommended for chronic HIV infection. For various reasons, the combination of three drugs can be modified to a two-drug regimen.
Purpose To analyse the change from a three-drug antiretroviral treatment regimen (HAART) to a two-drug regimen in HIV+ patients: reason for change and effectiveness.
Materials and Methods Cross-sectional retrospective study of HIV-infected patients in treatment with two active antiretroviral drugs from January 2010 to April 2012. The data was obtained from the medical history and the Farmatools application for external patients. Effectiveness was evaluated by the viral plasma load (VPL) and the CD4 cell count, measured at 24 weeks. Viral load suppression (VLS) was defined as less than 50 copies/ml.
Results A total of 30 patients were studied, with the following two-drug regimens: 5 patients with boosted Atazanavir (ATZr)/Maraviroc (MRV); 4 patients with boosted Darunavir (DRVr)/Etravirina (ETV); 13 patients with DRVr/MRV; 6 patients with DRVr/Raltegravir (RAL); 1 patient RAL/MRV and 1 patient with boosted Fosamprenavir (FPVr)/RAL. The reasons for the change to a two-drug regimen were the following: 12 changes were determined by drug resistance tests, 6 due to side effects of previous HAART treatment and 12 to simplify their antiretroviral treatment. The answers obtained are shown in table 1. Patients who did not reach viral load suppression at 24 weeks were taking a regimen composed of ATZr/MRV (2 patients) and DRVr/MRV (1 patient).

Conclusions The main reasons for changing from HAART to two-drug regimens were drug resistance tests and simplification of the antiretroviral treatment. Taking into account the limitation of the study due to its short follow-up and the limited number of patients, we can say that in our study, the change to a treatment with two active antiretroviral drugs seems to be at least as effective as the three-drug HAART regimen.

Abstract DGI-015 Table 1

	VPL at start of two-drug regimen	CD4 at start of two-drug regimen	VPL 24 weeks	CD4 24 weeks
Change due to drug resistance test 12 patients	2 patients VLS 10 patients Medium VPL 5449 c/ml	433/ml	9 patients VLS 3 patients Medium VPL 44388 c/ml	461/ml
Change due to side effects 6 patients	4 patients VLS 2 patients Medium VPL 142515 c/ml	306/ml	6 patients VLS	336/ml
Change for simplification 12 patients	12 patients VLS	589/ml	12 patients VLS	427/ml

No conflict of interest.

DGI-016 ASSESSMENT OF TOCILIZUMAB PRESCRIPTIONS AT A UNIVERSITY HOSPITAL

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Background Tocilizumab (TCZ) is an anti-IL-6 agent given as second-line biotherapy in the treatment of rheumatoid arthritis (RA). Guidelines for the prescription of TCZ indicate that it must be administered after anti-TNF-α failure at the University Hospital of Montpellier (UHM).
Purpose To assess the prescriptions for TCZ and cheque them against the existing guidelines since an increasing number of patients are treated at the UHM.
Materials and Methods The study was conducted over a period of 20 months, from January 2010 (marketing of TCZ) to July 2011. Patients treated with TCZ were identified thanks to the hospital information database. Data collected were: indications, previous treatment, number of anti-TNF-α drugs used before TCZ, association with conventional treatment, and biotherapy implemented if TCZ fails.
Results 149 patients were treated with TCZ: RA 93.4%, juvenile idiopathic arthritis 3.7%, Still's disease and ankylosing spondylitis 2.9% (off-label).

All patients had previously been treated with methotrexate (MTX).

TCZ was administered after failure of anti-TNF-α in 79.2% of the cases. 13.4% received TCZ as first-line biotherapy.

For 59.1% of patients, TCZ was associated with the conventional treatment. 62.6% were treated with MTX.

We evaluated the effectiveness of TCZ in 88 patients (patients who had not started their treatment in clinical trials in the last 6 months of the study): the treatment was successful for 67 of them (76.1%). TCZ was not effective in 23.9% with a mean treatment duration of 7.1 months. For these patients, TCZ was switched to abatacept (anti-CTLA4) 47.6%, anti-TNF-α 33.3% or rituximab (anti-CD20) 19.1%.
Conclusions TCZ is an active molecule in the treatment of RA. Our guidelines are not always respected since TCZ was used as first-line biotherapy in 13.4% of patients. Further evaluation of this early use is needed to understand the practise of the prescribers.

No conflict of interest.

DGI-017 BEVACIZUMAB PLUS IRINOTECAN IN MALIGNANT GLIOMAS

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Background Malignant gliomas (MG) comprise the most common types of primary central nervous system tumours.
Purpose An observational study to evaluate the efficacy and safety of bevacizumab plus irinotecan used off-label in recurrent malignant gliomas.
Materials and Methods Pharmacy records were reviewed to identify patients with histologically proven MG who had been treated with bevacizumab plus irinotecan as second- or third-line chemotherapy. Eligible patients: radiological evidence of tumour recurrence or progression prior to initiation of chemotherapy and STUPP regimen as first line. Patients were treated with IV bevacizumab (10 mg/kg) on days 1, 15 and 29 every 6 weeks and IV irinotecan (340 mg/m^2 if concomitant enzyme-inducing antiepileptic drugs (EIAEDs) or 125 mg/m^2 if no EIAEDs) on days 1, 15 and 29 every 6 weeks. Treatment was continued until disease progression or unacceptable toxicity. Tumours were evaluated by brain MRIs. Response to treatment was assessed at baseline and every 3 cycles or whenever progression was clinically suspected. The Macdonald criteria were used to evaluate the response. Toxicity was assessed before each cycle by medical history, haematology and biochemistry. Adverse events were graded according to NCI-CTCAEv4. Antiepileptics were administered as medically indicated.
Results Seven patients (5 men, 2 women) were evaluated. Mean age was 52.4 years and glioblastoma multiforme (GBM) was the major histotype (71%). 71.4% of patients had had a total resection as primary surgery and 14.3% of patients had undergone second surgery at disease recurrence. The median number of cycles administered was 4. Overall activity comprised 3 partial responses (42.86%); and 1 (14.28%) disease stabilisation for a Disease Control Rate of 57.14%. Three patients (42.86%) experienced disease progression. The median progression-free survival was 8.2 months (95% confidence interval (CI): 5.4–10.9) and the median overall survival was 11.8 months (95% CI: 6.1–17.5). No central nervous system haemorrhages occurred, but one patient developed deep venous thromboses.
Conclusions The combination of bevacizumab and irinotecan seems to run as an alternative and active regimen for recurrent MG with acceptable toxicity but it is necessary to expand the study population to draw definitive conclusions.

No conflict of interest.

DGI-018 BUDGET IMPACT ANALYSIS ON NEW 3-YEAR IMATINIB ADJUVANT TREATMENT FOR PATIENTS WITH OPERABLE GIST AT HIGH RISK OF RECURRENCE

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Background The results of Phase III of the (SSG)XVIII/AIO clinical study on imatinib (IM) in adjuvant treatment of GIST show that, after five years of follow up, 3 years of treatment lead to 66%

of patients free of recurrence compared to 48% who received IM for only one year, with a 18% relative risk reduction. This result will determine the new standard of 3 years of adjuvant IM treatment in GIST patients at high risk of recurrence.

Purpose To analyse the budget impact on Piedmont Region, over 3 years, after the approval by the Italian National Regulatory Agency of 3 years' adjuvant treatment in high-risk GIST.

Materials and Methods The analysis was performed considering the estimated incidence of 60 new cases of GIST in Piedmont: 28 patients are at very low/low risk of relapse and don't need IM; 8 patients are at intermediate risk of recurrence and should receive IM only for 1 year; 12 patients are at very high/high risk and are treated with adjuvant IM for 3 years; 12 patients are metastatic at diagnosis and require lifelong treatment (5–13 years). The price of IM considered in this study was fixed (6–2011) in the regional competition in Piedmont (at 16.7305€/100 mg capsule).

Results The annual expenditure for 12 very high/high risk patients is 293,118.6€ which adds up to a total of 879,355.08€ in 3 years. Given the stability of GIST incidence (5 cases/1,000,000 people) and 30% drop off from treatment for intolerance as reported in the SSG/AIO study, the result of our study was: in the first year 12 patients were treated at a total cost of 293,118.36€. The second year for 20 patients (8 from the first year + 12 new) the expenditure was 488,530.6€ (+66.66%). The third year there were 27 patients (7 from the first year, 8 from the second year, 12 new) and a total amount of 659,516.31€ (+35% compared to the second year). The total expenditure on very high/high risk patients at the end of 3 years of observational study was 1,441,165.27€ and the overall incremental cost was +125%.

Conclusions The cost of health interventions in rare tumours should be carefully planned with a specific cancer and pharmacological registry. The availability of comprehensive databases or regional registries of these treatments would allow a more accurate analysis that takes into account both the cost of medicines and ambulatory treatment and follow-up cost. Even though data on current costs are alarming it is important to consider that in 2014 IM will lose the Novartis patent and costs will drop about 30–40%.

No conflict of interest.

DGI-019 CISPLATIN DESENSITISATION PROTOCOL

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Background Hypersensitivity reactions are adverse events that represent a challenge, because in some cases there isn't an alternative treatment. Consequently, the only option is to desensitise the patient.

Purpose To describe a cisplatin desensitisation protocol (CDP) in a patient with a previous anaphylactic reaction.

Materials and Methods Male diagnosed with lung cancer, who started chemotherapy with cisplatin 75 mg/m^2 and oral vinorelbine 60 mg/m^2. During the cisplatin infusion, he suffered an anaphylactic reaction, so it was decided to perform skin tests, to confirm the possible association with the cytostatic.

Due to the cross-reactivity between platinum salts, these tests were performed with all similar substances. Stock solutions used: cisplatin 1 mg/ml, carboplatin 5 mg/ml and oxaliplatin 10 mg/ml. Dilutions prepared for intradermal administration: 1/10000, 1/1000, 1/100 and 1/10.

Results Cisplatin skin tests were positive for the stock solution and negative for the other dilutions. All the other platinum salts were negative, so we developed a protocol for administering the next cycle of cisplatin.

The CDP consisted of 12 stages in which to administer the total dose (140 mg).Three solutions (250 ml) were prepared with dilutions 1/100, 1/10 and 1/1. The 1/100 solution (0.0056 mg/ml) was administered at 9.25 ml in 1 hour in 4 stages (administration rate increments every 15 minutes: 2 ml/h, 5 ml/h, 10 ml/h and 20 ml/h). The 1/10 solution (0.056 mg/ml) was administered at 18.75 ml in 1 hour in 4 steps (starting with 5 ml/h and doubling the rate every 15 minutes until 40 ml/h). Solution 1/1 (0.56 mg/ml) was administered completely, starting with 10 ml/h and increasing every 15 min to 20, 40 and 80 ml/h, being the final perfusion rate. It was performed under medical supervision, taking in total 5 hours and 37 minutes. The patient didn't have any complications.

Conclusions In this patient, the CDP developed enabled the chemotherapy to be given safely. All this was possible by the interdisciplinary collaboration of allergy, oncology and pharmacy services.

No conflict of interest.

DGI-020 COST AND EFFECTIVENESS OF TARGETED TREATMENT WITH CETUXIMAB OR BEVACIZUMAB AS MAINTENANCE TREATMENT IN PATIENTS WITH COLORECTAL CANCER

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Background The addition of targeted treatment to chemotherapy and first and second line treatment significantly improves patient outcomes, raising the response rate with an increase of resectability in patients with metastasis and improving the long-term survival, as demonstrated by several randomised clinical trials.

Purpose To evaluate the cost and effectiveness of treatment with bevacizumab or cetuximab in patients with metastatic colorectal cancer, in particular in maintenance treatment.

Materials and Methods A retrospective analysis was conducted in two Sicilian cancer centres, in patients treated between 01/01/2008 and 30/06/2012, to assess the median time to progression (TTP) and the corresponding cost of maintenance treatment with bevacizumab and cetuximab. Results were compared using the log-rank test.

Results Of 167 patients treated with bevacizumab plus chemotherapy, 41 (24.5%) responded and continued with maintenance treatment: 36 patients on first-line treatment (TTP 412.5 days) and 5 patients on second-line treatment (TTP 314.7 days). Of 71 patients treated with cetuximab plus chemotherapy, 15 (21.1%) responded and continued with maintenance treatment: 9 patients on first-line treatment (TTP 271.2 days), 6 patients on second-line treatment (TTP 366.5 days). Maintenance treatment showed an increase in TTP of 258.2 and 159.3 days on first-line treatment, 188.1 and 243 days on second-line treatment for bevacizumab and cetuximab, respectively. The additional cost of maintenance treatment with bevacizumab and cetuximab, for a standard 70 kg, 1.7 m^2 patient is €84/day and €118/day for each day of progression-free survival, respectively.

Conclusions In patients responding to maintenance treatment, bevacizumab is more advantageous as TTP in first-line treatment gains about 100 days vs. cetuximab, while cetuximab is more advantageous as second-line treatment, with a gain of about 55 days in TTP vs. bevacizumab. From the economic analysis the most advantageous is bevacizumab, costing €34/day less than cetuximab. A study is in progress to consider the use of targeted treatment with different chemotherapy regimens.

No conflict of interest.

DGI-021 COST-EFFICACY ANALYSIS OF ABIRATERONE FOR THE TREATMENT OF HORMONE-REFRACTORY METASTATIC PROSTATE CANCER PATIENTS

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Background In combination with prednisone or prednisolone, abiraterone is indicated for the treatment of patients with hormone-refractory metastatic prostate cancer (mHRPC) previously treated with a docetaxel-containing regimen. Abiraterone was evaluated in a phase 3, randomised, double-blind, placebo-controlled study.
Purpose To evaluate the cost-efficacy of abiraterone for the treatment of patients with mHRPC previously treated with a docetaxel-containing regimen, using best supportive care as a comparator.
Materials and Methods Abiraterone efficacy and safety data were sourced directly from the above-mentioned phase 3 study. Two different efficacy parameters were considered: overall survival (OS) and progression free survival (PFS). The costs of the therapeutic options were calculated based on the direct cost of the drugs and the treatment duration described in the study. This study was conducted from an institutional perspective – the hospital perspective.
Results In the phase III trial considered, the median OS was 14.8 months with abiraterone and 10.9 months with placebo. The median PFS was 10.2 months in the abiraterone group and 6.6 months in the placebo group. Median treatment duration was eight months for abiraterone and four months for placebo. The marginal efficacy for abiraterone is 3.9 months for OS and 3.6 months for PFS. Considering OS as efficacy parameter, the incremental cost-efficacy ratio (ICER) calculated for the two treatments is €89.848. When PFS is considered, the ICER calculated is €97.336.
Conclusions Based on this analysis, the ICERs calculated for abiraterone are too high for it to be considered a cost-effective option in the treatment of mHRPC when compared with mitoxantrone, in patients patients previously treated with a docetaxel-containing regimen.

No conflict of interest.

DGI-022 COST-EFFICACY ANALYSIS OF CABAZITAXEL FOR THE TREATMENT OF HORMONE-REFRACTORY METASTATIC PROSTATE CANCER PATIENTS

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Background In combination with prednisone or prednisolone, cabazitaxel is indicated for the treatment of patients with hormone-refractory metastatic prostate cancer (mHRPC) previously treated with a docetaxel-containing regimen. Cabazitaxel was evaluated versus mitoxantrone in an open-label randomised phase III trial, the TROPIC study.
Purpose To evaluate the cost-efficacy of cabazitaxel for the treatment of patients with mHRPC previously treated with a docetaxel-containing regimen, using mitoxantrone as a comparator.
Materials and Methods Cabazitaxel and mitoxantrone efficacy and safety data were sourced directly from the TROPIC trial. Two different efficacy parameters were considered: overall survival (OS) and progression free survival (PFS). The costs of the two therapeutic options were calculated based on the direct cost of the drugs, treatment duration and the probability of using granulocyte colony-stimulating factors (filgrastim). This study was conducted from an institutional perspective – the hospital perspective.
Results In the TROPIC trial, the median OS was 15.1 months with cabazitaxel and 12.7 months with mitoxantrone, and median PFS was 2.8 months in the cabazitaxel group and 1.4 months in the mitoxantrone group. Median number of treatment cycles was six for cabazitaxel and four for mitoxantrone. The most frequent clinically significant grade 3/4 adverse events were neutropenia (cabazitaxel (82%) vs. mitoxantrone (58%)). The marginal efficacy of cabazitaxel vs. mitoxantrone is 2.4 months for OS and 1.4 months for PFS. Considering OS as efficacy parameter, the incremental cost-efficacy ratio (ICER) calculated for the two treatments is €147.389. When PFS is considered, the ICER calculated is €248.871.
Conclusions Based on this analysis, the ICERs calculated for cabazitaxel are too high for it to be considered a cost-effective option in the treatment of mHRPC, when compared with mitoxantrone, in patients previously treated with a docetaxel-containing regimen.

No conflict of interest.

DGI-023 DESCRIPTION OF OMALIZUMAB USE FOR THE TREATMENT OF ASTHMA AFTER FOUR YEARS OF EXPERIENCE

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Background Omalizumab's labelled indication is the treatment of IgE-mediated asthma. It has been used in our hospital since 2008. In 2011 it became necessary to develop a protocol that clarified patient selection and criteria for withholding treatment.
Purpose To describe the patients treated with omalizumab, focusing on whether they match our protocol's use criteria or not.
Materials and Methods All patients treated with omalizumab for asthma in our hospital were included. Data were obtained in October 2012 from electronic clinical records: treatment period, patient smoker or not, other medicines for asthma, basal IgE, adherence to treatment, omalizumab dosage and hospitalizations and emergency department visits before and after treatment.

Our omalizumab use protocol states these patient selection criteria: uncontrolled severe asthma with previous optimised therapy, basal IgE > 76 IU/mL and at least three emergency department visits or one hospitalisation in the previous year. Treatment withholding criteria are: evaluation after 16 weeks and stop if treatment shows no benefit.

Two different pharmacists examined each patient's information to establish if treatment was being effective and whether the hospital's protocol was being followed.
Results 31 patients were studied, 7 children and 24 adults. Treatment was stopped in 9 patients, due to lack of efficacy in 8 of them and to adverse effects in the other (diarrhoea, fever and skin reaction). Previous treatments included montelukast or theophylline in 19 patients (61%). Basal IgE was below 76 IU/mL in one patient. Median duration of treatment was 637 days (72–1624). Regarding patients' adherence to treatment, 23% of patients missed a dose, 13% missed two and 6% missed three or more. 13 patients had had no pre-treatment hospitalizations or emergency department visits.

Treatment was evaluated as effective in 14 of the 22 patients who continued receiving omalizumab (64%).
Conclusions Our patients still need to be selected better. Protocol compliance is lower than desirable.

No conflict of interest.

DGI-024 DEVELOPMENT OF A GUIDE FOR ADMINISTERING ANTIVIRAL DRUGS BY GASTROSTOMY OR NASOGASTRIC TUBE

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Background The number of patients infected by HIV and hepatitis has increased over the years. Some of them have swallowing difficulties that require the placement of nasogastric or gastrostomy tubes. These chronic treatments need high compliance rates to avoid antiviral drug resistance and, eventually, treatment failure.
Purpose To review the existing antiviral drugs literature and develop administration recommendations for patients with swallowing problems.
Materials and Methods Formulations and recommendations were obtained directly from the manufacturers, or by a PubMed search and a search on the Micromedex database, when information was not available. A guide published by SENPE with physicochemical and formulation properties of drugs was also checked.
Results Table 1 shows the results. Extensive administration recommendations were found during literature searches but are not included in the present abstract. There was no information about the administration of adefovir, maraviroc or saquinavir through gastrostomy or nasogastric tube.
Conclusions Treatment compliance is key to ensuring the success of chronic antiviral treatments and it is important to consider special situations, such as swallowing problems. This guide for nasogastric or enteral administration helps clinicians to choose the most appropriate treatment. Further research is needed to determine specific bioavailability data.

Abstact DGI-024 Table 1 Antiviral Drug Formulations and Administration

Drug	Solution available (mg/ml solution)	Can be crushed/ sprinkled
abacavir	20	Yes
didanosine	2 g/ml solution powder	Use tablets, not capsules
emtricitabine	10	Discouraged
lamivudine	10, 5	Yes
stavudine	1	Yes
tenofovir		Yes
zidovudine	50	Discouraged
efavirenz	30*	Use capsules
etravirine		Yes
nevirapine	10	Discouraged
atazanavir	50 mg/1.5 g solution powder *	Discouraged
darunavir		Yes
fosamprenavir	50	
indinavir		Discouraged
lopinavir/ritonavir	80/20	Discouraged
nelfinavir		Yes
ritonavir	80	Discouraged
tipranavir	100	
raltegravir		Yes
abacavir/lamivudine	**	
abacavir/lamivudine/zidovudine	**	
zidovudine/lamivudine	**	Yes
tenofovir/emtricitabine		Yes
tenofovir/emtricitabine/efavirenz		Discouraged
boceprevir		Discouraged
telaprevir		Discouraged
ribavirin	40	Discouraged
entecavir	0.05*	
telbivudine	20*	Discouraged

* Not in Spain
** Individual drugs available in solution

No conflict of interest.

DGI-025 DEVELOPMENT OF A PROTOCOL FOR THE TREATMENT OF VITAMIN D DEFICIENCY/INSUFFICIENCY IN ADULTS

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Background Recent medical research has highlighted that vitamin D deficiency/insufficiency is a significant public health problem. A UK study found that more than 50% of the adult population had insufficiency and 16% had deficiency. [1] Low vitamin D levels have been linked to rickets, malignancies, cardiovascular disease, type 2 diabetes and some autoimmune diseases. [1] Therefore, appropriate management of Vitamin D deficiency/insufficiency is essential.

This increased awareness among prescribers of treating vitamin D deficiency was apparent in the Mater Misericordiae University Hospital (MMUH):

- Medicines Information enquiries regarding treatment of vitamin D deficiency had increased.
- Biochemistry assay numbers for vitamin D (25-hydroxy-vitamin D) had increased.
- Requests to the endocrinology service for guidance on the treatment of vitamin D deficiency had increased.

MMUH clinicians were experiencing difficulty treating patients with vitamin D deficiency/insufficiency as:

- There were no definitive guidelines for the treatment of vitamin D deficiency/insufficiency.
- There is no licenced preparation containing cholecalciferol or ergocalciferol as a single drug formulation in Ireland.

Guidance for MMUH clinicians was therefore necessary.
Purpose To develop a protocol for the treatment of vitamin D deficiency/insufficiency.
Materials and Methods Review of treatment algorithms for treatment of vitamin D deficiency/insufficiency in the literature.

Compilation of vitamin D products currently available in Ireland.

Liaison with MMUH clinical staff to ensure production of a protocol that is applicable to all disciplines.
Results A treatment algorithm was prepared detailing two specific guidelines for the treatment of:

- Vitamin D deficiency (serum 25-hydroxy-vitamin D <25 nmol/L)
- Vitamin D insufficiency (serum 25-hydroxy-vitamin D 25–50 nmol/L)

The protocol recommends vitamin D preparations, including one unlicensed preparation, which are available in the MMUH and accessible in the community.

The protocol also recognises the limitation of giving guidance on treating a condition that may be affected by numerous clinical scenarios or that may require input from specialist physicians. Where applicable, consultation with the relevant medical team(s) is recommended.
Conclusions MMUH patients diagnosed with vitamin D deficiency/insufficiency are treated in a standardised manner in accordance with available clinical evidence. The protocol ensures delays in treatment are minimised and physicians are aware of the particular considerations involved in the management of vitamin D deficiency/insufficiency.

No conflict of interest.

DGI-026 DRUG USE IN PATIENTS WITH METASTATIC BREAST CANCER

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Background The historic poor prognosis and survival of metastatic breast cancer (MBC) patients has been improved in the last decades by the introduction of multimodal treatment.
Purpose To analyse the MBC population and describe the prescription profile used.

Materials and Methods We conducted a retrospective observational study. We included all patients with MBC in 2007. Using the digital history, sociodemographic variables (age, sex), clinical (histologic type, oestrogen receptor, ER, progesterone receptor, PR, human epidermal growth factor receptor 2, HER-2, progression from primary tumour, appearance and location of metastases, lymph node involvement, survival, deceased) and therapeutic histories (radiotherapy, hormone therapy, chemotherapy) were collected.
Results We included 43 patients with a mean age of 54.5 years (100% female). The most common histological types were infiltrating ductal (60%) and lobular (24.4%) tumours. ER and PR were positive in 75.6% and 50%, respectively. Overexpression of Her-2 was negative in 73.7%. 69.2% of patients with MBC had progressed from primary tumour. The metastization appeared at an average of 44.1 months since diagnosis. The most common sites of metastases were bone (34.06%), lung (16.48%) and liver (20.86%). 93.9% of patients had lymph node involvement and 77.6% were in the terminal phase. 95.3% of patients had received radiotherapy. Endocrine therapy used was fulvestrant (22.97%), anastrozole (21.62%), tamoxifen (20.27%). All patients received chemotherapy, the most used first-line schemes being: epirubicin/cyclophosphamide/docetaxel (30.6%), cyclophosphamide/epirubicin/fluorouracil (20.4%) and cyclophosphamide/methotrexate/fluorouracil (16.6%) in combination with trastuzumab or not. In successive lines, combinations of vinorelbine, docetaxel, capecitabine, carboplatin, gemcitabine were prescribed. Lapatinib and bevacizumab were used from the fourth-line treatment.
Conclusions Radiotherapy, not indicated in MBC, was used in early stages of the disease. Due to the variability of patients, treatment regimens are diverse and a predefined schema is not appropriate. Bevacizumab and lapatinib were used in late-stage treatment in patients who had not responded to standard treatment.

No conflict of interest.

DGI-027 EFFECTIVENESS AND SAFETY OF CLOFARABINE IN PAEDIATRIC PATIENTS WITH ACUTE LEUKAEMIA

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Background Clofarabine is a purine nucleoside antimetabolite, a second-generation antineoplastic indicated for the treatment of acute lymphoblastic leukaemia in paediatric patients (≤ 21 years) who have relapsed or are refractory after receiving at least two prior regimens and who have no other treatment options that provide a durable response.

Despite progress in leukaemia treatment, most children who relapse have a dismal prognosis. New approaches are needed.
Purpose To assess the effectiveness and safety of clofarabine in paediatric patients with refractory or relapsed acute leukaemia.
Materials and Methods This was an observational retrospective study. We included all paediatric patients diagnosed with acute leukaemia who received clofarabine as antineoplastic treatment during 2007–2011.

We used the computer programme Oncofarm for prescribing, preparation and validation of chemotherapy treatments and collected data for number of patients, age, sex, weight, height and treatment schemes lines administered prior to clofarabine.

In addition, we used medical records as a source of safety data regarding potential adverse reactions due to clofarabine.
Results During the study period clofarabine was administered to a total of six paediatric patients (4 boys and 2 girls) with a median age of 11.5 years (5–16 years).

They had received a median of 2 prior lines of treatment. Later treatment schedules used in 83.3% of these patients included 40 mg/m^2 clofarabine in combination with other chemotherapy drugs with a median of 2 administered cycles. In the rest (1/6) clofarabine was used at 52 mg/m^2 as monotherapy.

66.6% of patients achieved complete remission and 50% were transplanted.

Mucositis grade IV and pancytopenia were detected in two patients and palmar erythema in one patient. All patients had a transient transaminase increase.
Conclusions The administration of clofarabine allowed the team to reach transplantation in 50% of patients with acceptable toxicity, making it possible to expect durable responses.

No conflict of interest.

DGI-028 EFFECTIVENESS AND SAFETY OF RITUXIMAB IN IDIOPATHIC THROMBOCYTOPENIC PURPURA

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Background Idiopathic thrombocytopenic purpura (ITP) is an autoimmune disorder characterised by low platelet count and may be responsible for episodes of mucocutaneous bleeding of varying severity.
Purpose The study evaluates the effectiveness and safety of rituximab in patients who have not responded to first-line treatment.
Materials and Methods We performed a retrospective observational study, between 2009–2011, in adult patients who had not responded to first-line treatment (high-dose corticosteroids or non-specific IV immunoglobulins), or who were intolerant to such alternatives. Both splenectomised and non-splenectomised patients were included. The dose employed was 375 mg/m^2 q7d for four weeks. We considered it a partial response if the platelet count exceeded 50 × 109 cells/L, and a complete response if the count was greater than 100 × 109 cells/L. Previous duration of thrombocytopenia, platelet counts before treatment and after 4 weeks, percentage of patients having a satisfactory response, median time to response, duration, occurrence of petechiae and mucocutaneous bleeding and tolerability of the infusion were examined.
Results We recruited 22 patients, 12 men and 10 women. The mean age of the sample was 55.6 years (range: 19–88) and a previous mean duration of ITP of 7.5 years (range 0.35 to 41). The mean platelet count before treatment was 32.8 × 109 cells/L (range: 6–70), and increased to 120x109 cells/L (range: 23–591) after completion within four weeks.

10 patients (45.5%) experienced a complete response and in 8 patients (36.3%) the response was partial, while 4 (18.2%) patients experienced no response. The mean time to get some response was 2.3 weeks (range 1–4 weeks), and it continued a median of 10.5 months (range: 1–25). Among patients who had some response, in 2 cases petechiae and bleeding were detected again, while in 3 the platelet count fell below 50x10^9 cells/L. The other 13 patients who responded continue today with a platelet count within the target range and without clinical symptoms. The infusion was well tolerated in all cases.
Conclusions Rituximab seems an effective and well-tolerated alternative in patients with refractory ITP who require chronic treatment. This study and literature show that more than 50% of patients respond to treatment, and it may be an alternative to splenectomy. However, further prospective studies are required to define the optimal position of rituximab in the treatment of ITP.

No conflict of interest.

DGI-029 EFFICACY AND SAFETY OF PROPRANOLOL IN INFANTILE HAEMANGIOMA

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Background Infantile haemangiomas are common vascular tumours in children. Only 10–15% should be treated due to any vital, functional or aesthetic complication. Oral corticosteroids have been the primary treatment of choice. However, excellent outcomes have been reported with propranolol, and using it as first-line treatment is still a matter of debate.
Purpose To evaluate the short-term efficacy and safety of propranolol in the treatment of infantile haemangioma.
Materials and Methods A retrospective study was carried out in the Pharmacy Service of the Hospital Clínico Universitario de Valladolid between June 2009 and August 2012. All patients with infantile haemangioma treated with propranolol during the study period were included.
Results 32 patients (20 female) were treated with propranolol for an average of 9 months. Patients started treatment at an average age of 6 months (1–15). 9/32 of the haemangiomas had segmental distribution and 23/32 were located in the head and neck. 4/32 patients were previously been treated with oral corticosteroids with little improvement. 8/32 of patients achieved complete remission after 11 ± 5 months of treatment. One of these patients had to discontinue treatment due to an increase in the size of the lesion. In the remaining patients the use of propranolol accelerated the involution of the haemangiomas and decreased colour, brightness and growth. Adverse events were mild and self-limiting. Only 2 patient discontinued treatment due to hypotension.
Conclusions Only a quarter of patients achieved complete remission.

The average duration of treatment until complete remission was 11 months.

Only one patient didn't achieve any improvement.

The use of propranolol is a safe alternative for treating haemangiomas.

No conflict of interest.

DGI-030 EFFICACY AND SAFETY OF TELAPREVIR IN PATIENTS WITH CHRONIC HEPATITIS C VIRUS GENOTYPE 1

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Background The addition of telaprevir to standard treatment considerably improves response rates and allows the duration of treatment to be reduced in a significant number of patients.
Purpose To assess the efficacy and safety of telaprevir in combination with peginterferon alfa-2b and ribavirin (RBV) in patients with hepatitis C virus genotype 1 (HCV).
Materials and Methods Retrospective observational study of patients mono-infected with HCV genotype 1, treatment-naive and pretreated, who started treatment with telaprevir. The follow-up period was 24 weeks. Relapsed patients were defined as those with undetectable viral load at the end of treatment but detectable at 24 weeks' follow-up, partial responders as ≥2log10 decline in viral RNA at week 12 but without undetectable viral load at week 24 and null responders as <2log10 decline in viral RNA at week 12. Some of the variables were: degree of fibrosis, basal viral load, at week 4 and at week 12 (IU/ml), duration of treatment (weeks), basal dose of RBV (mg/day), basal haemoglobin at week 4 and at week 12 (mg/dl), need for blood transfusions and support with erythropoietin and skin toxicity (mild/moderate/severe).
Results We included 16 patients (81.3% men and 18.8% women). 15 patients presented undetectable viral load at weeks 4 and 12, reducing the duration of treatment to 24 weeks. RBV dose was reduced in 6 patients and 2 patients started with a dose of 600 mg, in both cases without compromising treatment success. 7 patients had anaemia, of whom 2 required transfusions and erythropoietin. 12 cases had skin toxicity (8 mild, 3 moderate and 1 severe with subsequent interruption of treatment at week 4).
Conclusions The data confirm those reported in the ILLUMINATE study, with high rates of rapid virological response and reduction of treatment from 48 to 24 weeks, but with a higher rate of skin toxicity although mostly mild to moderate.

No conflict of interest.

DGI-031 EFFICACY OF ORAL THALIDOMIDE IN PATIENTS WITH RECURRENT GASTROINTESTINAL BLEEDING

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Background Recurrent gastrointestinal bleeding caused by angiodysplasia, and not responding to standard treatment, currently lacks effective medical treatment.
Purpose To evaluate the efficacy of oral thalidomide in patients with gastrointestinal bleeding from angiodysplasia refractory to other treatments.
Materials and Methods Retrospective study for a year including all patients with recurrent gastrointestinal bleeding treated with oral thalidomide manufactured in the pharmacotechnic unit of a tertiary level hospital.

The information was obtained from the outpatient dispensing programme Farmatools, the Paracelso pharmacotechnics programme, and by reviewing medical records from the hospital 1, Archinet.

For each patient we extracted the diagnosis, treatments used for gastrointestinal bleeding, line and duration of treatment with thalidomide and transfusion requirements after treatment.
Results In the study period were identified 3 patients for whom the Digestive Service ordered thalidomide capsules 100 mg. The patients had not responded to standard treatments such as argon gas sessions and octreotide. They were introduced to thalidomide 100 mg daily for 4 months. One of them discontinued treatment for intolerance and the other 2 completed the course. There was a decrease in the number of transfusions after treatment with thalidomide in all 3 cases.
Conclusions Thalidomide appears to be a therapeutic alternative to consider when treating gastrointestinal bleeding caused by angiodysplasia in cases where there is no response to conventional treatments. One impediment to this treatment option is intolerance in some patients, leading to treatment discontinuation. Thalidomide is less aggressive than other drugs used and appears to decrease patients' transfusion requirements.

No conflict of interest.

DGI-032 EPIDEMIOLOGICAL MONITORING OF PEMETREXED USE IN MALIGNANT PLEURAL MESOTHELIOMA: A TOOL OF LOCAL DECISION MAKING

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Background Pemetrexed is an expensive oncological drug, used in combination with platinum derivatives (cisplatin/carboplatin) in the first line treatment of unresectable malignant pleural mesothelioma. In Italy, this indication is no longer subject to web-based monitoring (Onco-AIFA Register) to ensure its use appropriateness.
Purpose To assess the effectiveness in patients treated at the Istituto Oncologico Veneto (IOV) compared to the pivotal trial.
Materials and Methods This observational analysis was performed on all patients with pleural mesothelioma treated at the IOV from 01/12/2006 to 30/04/2011; the data were extracted from both paper and computerised medical records. The median Overall Survival (OS) and Time To Progression (TTP) were calculated as updated on 31/05/2012 according to the intention to treat.
Results All 46 patients (32 males and 14 females) were evaluated in terms of OS. TTP was calculated only for the 41 evaluable patients (29 males and 12 females); 5 patients lost owing to lack of information at follow-up.

The median OS/TTP values were respectively 14.2/8.9 months (vs. pivotal trial 12.1/5.7 months).

The majority of patients received the less toxic protocol pemetrexed+carboplatin, which contributed to the better OS/TTP. Better OS/TTP might be related to the use in a neoadjuvant regimen (16 patients: 10 males and 6 females); a specific stratified analysis showed TTP/OS median of 27.8/18.6 months.
Conclusions To confirm the better effectiveness of the carboplatin+pemetrexed protocol, further data on a greater number of patients, neoadjuvant treatment, treatment toxicity and patient performance status are needed.

Since the effectiveness of this high-cost oncological drug is not monitored at the national level, local monitoring is required to ensure appropriateness.

The computerised medical record is a pre-requisite for protocol standardisation and a tool of information standardisation/updating.

This work represents an easy, versatile methodological model with significant health implications.

A widely shared computerised medical record is a powerful tool for epidemiological investigations; an established network allowing benchmarking is a valid and independent decision-making tool.

No conflict of interest.

DGI-033 EVALUATION OF CRIZOTINIB TREATMENT IN PATIENTS WITH NON-SMALL CELL LUNG CANCER

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Background Crizotinib is a cytostatic oral ALK inhibitor, a newly-introduced oral cytostatic to treat non-small cell lung cancer (NSCLC) that has been accessible through an expanded use programme prior to marketing authorization.
Purpose To analyse the effectiveness and safety of crizotinib treatment in patients with NSCLC in a tertiary hospital.
Materials and Methods A retrospective descriptive study of patients taking crizotinib from August 2011 to July 2012. The following information was collected: demographic (gender and age), background (smoker/non-smoker), basal situation (Performance Status (PS), ALK-positive or negative), diagnosis and staging, dose of crizotinib, results (progress and current status) and adverse reactions. The average length of survival was determined using SPSS 20. The information sources were the electronic health records.
Results 4 patients were recruited. 3 (75%) were women. The mean age was 47. All the patients were non-smokers. Initial situation: 3 patients had a PS of 1 and the other one had 2. All of them were ALK-positive and were diagnosed with stage IV NSCLC. 2 patients received crizotinib 250 mg/12 h and the other 2 200 mg/12 h. Evolution: in 2 (50%) patients the tumour mass in the lungs did not change. In 1 (25%) the lung tumour shrank slightly. To sum up: 3 (75%) patients presented stable disease and 1 died. Adverse reactions: 3 (75%) patients had gastrointestinal reactions (diarrhoea and mucositis), 2 (50%) patients presented asthenia and 1 (25%) visual disturbances. Lastly, the average length of survival was 6 months (IC95%, 2.33–9.66).
Conclusions Due to the low number of patients recruited the effectiveness of the treatment cannot be demonstrated. Nevertheless, it is important to highlight that the disease stabilised in 3 out of 4 patients. Gastrointestinal problems were the most frequent adverse reactions. It is important to detect ophthalmological adverse reactions in time to begin patient tracking. This treatment is well tolerated in patients with a bad prognosis and few treatment options.

No conflict of interest.

DGI-034 EVALUATION OF THE EFFICACY AND SAFETY OF MIFAMURTIDE IN OSTEOGENIC SARCOMA TREATMENT IN PAEDIATRIC PATIENTS

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Background Osteosarcoma is a relatively common bone tumour; with an incidence of 0.2 to 3/100 000, it is an orphan disease. Mifamurtide has managed to increase survival without increasing side effects.
Purpose To evaluate the safety and efficacy of mifamurtide in two paediatric patients diagnosed with osteogenic sarcoma.
Materials and Methods We conducted a prospective study of two paediatric patients diagnosed with osteogenic sarcoma. Weekly, we attended the oncology sessions and we tracked them during the chemotherapy, and after that, through the electronic clinical history.

Mifamurtide is indicated in children, adolescents and young adults for the treatment of high-grade resectable non-metastatic osteosarcoma after surgical resection. It is used in combination with post-operative chemotherapy.

In the two cases, the treatment followed the SEOP-SO-2010 guidelines of the Spanish Society of Paediatric Oncology for 37 weeks.

After surgery (week 15) mifamurtide was started as adjuvant treatment: 2 mg/m^2 twice weekly for the first 12 weeks and followed by once-weekly for an additional 24 weeks, for a total of 48 infusions in 36 weeks.
Results Chemotherapy started according to protocol, the patients were aged 12 and 15 years (July and November 2010, respectively).

One patient had a flu-like reaction after the first dose of mifamurtide, so the following doses were administered with premedication (acetaminophen and dexchlorpheniramine). Other side effects: anaemia and thrombocytopenia, requiring human stimulating factors and platelet concentrates; vomiting was treated with aprepitant.

When chemotherapy finished, the patients were in complete remission, this situation continues today, 10 and 13 months later.
Conclusions The SEOP protocol plus mifamurtide achieved complete remission in both cases.

The use of mifamurtide can be considered safe and it did not increase side effects, we observed only a flu-like reaction attributed to mifamurtide which resolved with premedication.

The effectiveness of mifamurtide in osteogenic sarcoma treatment cannot be considered as assessed due to the small sample size.

No conflict of interest.

DGI-035 EVALUATION OF THE SYSTEMIC TOXICITY OF DOXORUBICIN AFTER HEPATIC IODIZED OIL CHEMOEMBOLIZATION IN HEPATOCELLULAR CARCINOMA PATIENTS

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Background Chemoembolization of iodized oil into a hepatic tumour (hioCE) is a locoregional medical technique that consists of delivering selectively into tumour-feeding arteries, an anticancer drug emulsified in iodized oil followed by an occlusive agent (embolization agent). It enables higher intra-tumour drug concentrations to be obtained compared to intravenous treatment, with blood vessel occlusion causing local necrosis. hioCE using doxorubicin at 50 mg/m^2 is effective in the palliative treatment of hepatocellular carcinoma (HCC) with significant survival benefit compared with best supportive care. To our knowledge, no study has evaluated systemic doxorubicin toxicity after hioCE.

Purpose To evaluate systemic doxorubicin toxicity in HCC patients treated by hioCE.

Materials and Methods A 3-year retrospective study was performed in the Radiology and Pharmacy departments. Toxicity was assessed using WHO criteria. Data were collected from Chimio software and patient medical records. Mann Whitney and Chi2 tests were used.

Results 94 HCC patients were treated with hioCE using doxorubicin. Median age was 64 years [28–89]. Toxicity occurred in 69 patients (73%). Main toxicities were digestive disorders (34 patients; 16 grade 3–4), cardiotoxicity (16 patients; 10 grade 3–4) and alopecia (13 patients; 8 grade 3–4). No statistical relationship was found between patient characteristics (age, sex, body mass index, medical and surgical history), HCC aetiology or characteristics, Child-Pugh score or hioCE practise and the occurrence or gravity of doxorubicin toxicity.

Conclusions More than half of the patients suffered doxorubicin toxicity after hioCE suggesting doxorubicin passed into the systemic circulation. Studies showed that the doxorubicin-iodized oil mixture was unstable. Although hioCE with doxorubicin is effective in HCC and doxorubicin toxicity occurring in our patients was less severe than that of intravenous doxorubicin administration, doxorubicin tolerance after hioCE is debatable. The use of an anticancer drug that was more stable with iodized oil could decrease the passage of the drug into the systemic circulation. The use of doxorubicin-eluting beads for chemoembolization is much more expensive but could also be an alternative.

No conflict of interest.

DGI-036 EVOLUTION OF ANTIFUNGAL CONSUMPTION IN A GENERAL HOSPITAL

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Background Antifungal treatment is an important part of global expenditure. A significant increase in the use of these drugs does entail a higher cost.

It is hoped that the use of these drugs will continue to increase each year. It is important to know the drug use distribution through the different units and the monetary cost in order to put forward pharmacist interventions.

Purpose To describe the evolution of expenditure on, and consumption of, caspofungin, voriconazole, amphotericin B and fluconazole and significant fungaemia from 2009 to 2011.

Materials and Methods Observational, retrospective study, carried out in a General Hospital.

The consumption for every single patient of caspofungin, voriconazole, liposomal amphotericin B and fluconazole, from 2009 to 2011, were obtained from the Pharmacy Department Software databases (*Langtools*). Average prices were used to calculate the financial impact. In the microbiology department, blood cultures were done for every patient treated with these drugs for fungal isolates.

Results Pharmaceutical spending on these four drugs versus general expenditure was 1.53%, 1.04% and 1.00% for the years 2009, 2010 and 2011 respectively. The evolution of consumption in units (including all presentations) and expenditure is shown in the following table (table 1).

The total consumption of the main services in the study period is shown in the following table (table 2).

The number of yeasts isolated from blood cultures was 20, 19 and 21 for the years 2009, 2010 and 2011 respectively, representing 2.48% of all positive blood cultures.

Abstract DGI-036 Table 1

	Units 2009	Spending 2009 (€)	Units 2010	Spending 2010 (€)	Units 2011	Spending 2011(€)
Caspofungin 50 mg vial	426	198,935.95	218	94,934.03	148	64.714,53
Voriconazole 200 mg vial	541	41,914.25	468	37,146.39	731	44.453,75
Liposomal Amphotericin B 50 mg vial	1456	142,091.04	1353	132,042.78	1792	174.885,93
Fluconazole 400 mg vial	2759	4,566.79	2701	4,799.73	2623	4.711,38
Total	5182	387,508.03	4740	268,922.93	5294	288,765.59
Total pharmaceutical expenditure		25,310,713		25,824,331		28,771,067

Abstract DGI-036 Table 2

	Units 2009	Spending 2009 (€)	Units 2010	Spending 2010 (€)	Units 2011	Spending 2011(€)
Caspofungin 50 mg vial	426	198,935.95	218	94,934.03	148	64,714.53
Voriconazole 200 mg vial	541	41,914.25	468	37,146.39	731	44,453,.75
Liposomal Amphotericin B 50 mg vial	1456	142,091.04	1353	132,042.78	1792	174,885.93
Fluconazole 400 mg vial	2759	4,566.79	2701	4,799.73	2623	4,711.38
Total	5182	387,508.03	4740	268,922.93	5294	288,765.59
Total pharmaceutical expenditure		25,310,713		25,824,331		28,771,067

Conclusions Antifungal spending is disproportionately high considering the low number of fungal isolates, and entails a high use of empirical and prophylactic treatment.

Haematology is, by far, the main department responsible for the use of antifungal treatment. Consumption of voriconazole and liposomal amphotericin B are increasing, meanwhile caspofungin is decreasing in recent years.

No conflict of interest.

DGI-037 FINGOLIMOD IN RELAPSING REMITTING MULTIPLE SCLEROSIS: A CASE REPORT

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Background Fingolimod has recently been authorised in our country (April 2011). It is the first orally administered disease-modifying drug that has been approved for highly active relapsing remitting multiple sclerosis. So far, only one patient has been treated with it in our hospital, so we have limited experience in its use.
Purpose The case report relates to relapsing remitting multiple sclerosis (RRMS) patient with high disease activity under treatment with Fingolimod. We aim to describe the evolution of this patient during the treatment period.
Materials and Methods It was an observational, six-month prospective study.

The patient, a 32-year-old female, was diagnosed with RRMS in February 2004 after an episode of sensory deficits.
Results At first, she was treated with interferon b-1a, which was stopped in February 2006 and switched to mitoxantrone IV. The patient continued to have several relapses during the treatment with this immunosuppressant; one of these relapses required plasma exchange therapy. Her Expanded Disability Status Scale (EDSS) worsened to 6 points. Assuming a lack of efficacy, the patient started treatment with natalizumab in April 2007. During four years of treatment with natalizumab she showed remarkable clinical improvement and did not experience any new relapses. Her EDSS improved to 2.5. After this time and due to the high risk of developing progressive multifocal leukoencephalopathy (PML), she switched to fingolimod (December 2011).

Ten days after initiation, she developed a severe relapse that required hospital admission, high dose IV steroids and 3 cycles of plasma exchange therapy. Doctors concluded this relapse was in fact a rebound effect due to stopping natalizumab.

In February 2012 she restarted fingolimod; one month later she developed a new relapse, treated with high dose steroids.

In April and May 2012 she had two more relapses, with severe EDSS worsening and again managed with high dose steroids.

In May 2012, it was decided to stop treatment with fingolimod, and despite the risk of PML (JC virus +), natalizumab was restarted.
Conclusions During six months of fingolimod treatment, the patient's condition further deteriorated (four relapses in six months), her EDSS worsened and showed a high disease activity. We conclude that the treatment was not effective in this patient.

No conflict of interest.

DGI-038 GEMTUZUMAB OZOGAMICIN AS SALVAGE TREATMENT IN CHILDREN WITH ACUTE MYELOID LEUKAEMIA RELAPSE: A RETROSPECTIVE STUDY

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Background Gemtuzumab ozogamicin (GO) is a humanised anti-CD33 monoclonal antibody conjugated with calicheamicin. Several studies show its safety and efficacy in refractory/relapsed acute myeloid leukaemia (AML). Nevertheless in July 2010 it was withdrawn from the US market after a study failed to confirm the clinical benefits of GO.
Purpose Following this controversy, we conducted a retrospective study to evaluate its efficacy and safety in children with refractory/relapsed AML.
Materials and Methods The study focused on the 19 children treated after approval by the French drug safety agency, between October 2006 and June 2012.
Results The median age at initial diagnosis was 6.7 years (0.5–15.3). Three patients were refractory to first-line treatment, one patient was in refractory first relapse, three were in first relapse after stem cell transplantation (SCT), three in second relapse after SCT, one in third relapse after SCT, seven were in first relapse and one in second relapse. Patients received: one dose of 3 mg/m^2 with cytarabine (day 1 to 7); or 9 mg/m^2 fractionated dose (on days 1, 4, 7) in monotherapy or associated with cytarabine (day 1 to 7); or 4.5 mg/m^2 on day 6 associated with fludarabine and daunorubicin liposomal. Nine complete remissions were obtained (48%) in 32 days, leading to further curative treatment. The one year overall survival was 26% (5 patients). For the others complete remission was maintained for 6–9 months before relapse or death. Grade 3–4 haematological adverse events were identified in all children including severe thrombocytopenia requiring transfusion. Sepsis (n = 2), fever (n = 3), vomiting (n = 6) were documented. One case of sinusoidal obstruction syndrome was reported.
Conclusions Children with refractory/relapsed AML have a dismal outcome and there is a lack of effective treatments. In our cohort GO led to nearly 50% of CRs and even if the long term survival is still unsatisfactory it should remain available in this indication.

No conflict of interest.

DGI-039 GUIDE TO THE PREPARATION AND ADMINISTRATION OF INJECTABLE CYTOTOXIC DRUGS

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Background The preparation of injectable cytotoxics is a key activity of many hospital pharmaceutical services. Due to the increasing availability of cytotoxic medicines, either branded or generic, the time spent by hospital pharmacists in search of information about reconstitution and/or dilution, storage and stability of these drugs has increased. In order to effectively respond to this need for information, it would be useful to have a database that holds all that information for all cytotoxic medicines currently available in Portugal.
Purpose To prepare a guide to the preparation and administration of all parenterally administered cytotoxics available in Portugal, which provides information on the reconstitution and/or dilution, storage and stability, routes of administration, infusion rate, as well as other relevant observations.
Materials and Methods Review of the summary of product characteristics (SPC) of all injectable cytotoxic drugs currently available in Portugal; consultation with the pharmaceutical manufacturers and analysis of the responses received.
Results A total of 153 injectable cytotoxic medicines were investigated (88 branded and 65 generic), comprising a total of 40 active substances. Of this total, 145 have marketing authorization in Portugal and 8 are used under special-use authorization. Significant variability in the information available about the reconstitution,

dilution, storage, administration and stability was observed, when considering the different formulations of the same active substance, which depend on the manufacturer. In all, 32 manufacturers were asked to add additional relevant information that was not present in the SPC. The guide is available in electronic format and in A5 print format (handbook), which has proved to be very practical, fast and effective to use.

Conclusions The published guide is a valuable tool for all Portuguese hospital pharmacists who prepare parenterally administered chemotherapy, answering to most information needs on reconstitution, dilution, storage, stability and administration of injectable cytotoxic drugs.

No conflict of interest.

DGI-040 HUMAN LUNG CARCINOMA SENSITIVITY TO PACLITAXEL: WHICH ROLE FOR BIM?

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Background Deregulation of apoptosis is one of the causes of cancer developing. The Bcl-2 family are central regulators of apoptosis. They are subdivided into two classes, the proapoptotic members (which include Bim) and antiapoptotic members (like Bcl-2). The overexpression of Bcl-2 is generally associated with many cancers and resistance to chemotherapy, including microtubule-targeting agents (MTAs). Therefore several anti-Bcl-2 strategies are in development. Unexpectedly, several studies show that a decrease in Bcl-2 may be associated with resistance to MTAs. This paradoxical role of Bcl-2 has not yet found a clear explanation.

Purpose To show that overexpression of Bcl-2 leads to overexpression of Bim, which is responsible for increasing sensitivity to MTAs. Bim is a potential biomarker which may be included in tests to predict the response to paclitaxel treatment in human lung carcinoma. Our work also enables a better understanding of how Bim regulates genes.

Materials and Methods The techniques used to study the sensitivity of cells to MTAs are the Western Blot and immunofluorescence. To study Bim's regulation of genes, we used the technique of a reporter gene.

Results Firstly, we showed that overexpression of Bcl-2 in human lung carcinoma cells (A549 Bcl-2) in turn triggers the overexpression of Bim. Apoptosis is detected after treatment with paclitaxel at 20 nM, after 24 hours. For this, we used the anti-caspase 9 antibody to show it was being cleaved and to signal the release of the apoptosis mitochondrial pathway. To confirm this, we used immunofluorescence staining to objectify the release of cytochrome c from the mitochondria. So we showed that the overexpression of Bim in cells that overexpress Bcl-2 accounts for their increased sensitivity to paclitaxel.

We also conducted a study of gene regulation by Bim in A549 cells overexpressing Bcl-2. We highlighted the increasing transcriptional activity of Bim promoter by a factor of 2.3 ± 0.2 compared to control cells. The Bim protein level seems to be a better determinant of MTAs sensitivity than Bcl-2 status in pulmonary epithelial tumours. Thus, it appears that Bim expression may be an effective biomarker in predicting the efficiency of MTA treatment. We are currently evaluating the involvement of various transcription factors, especially by DNA microarray.

Conclusions These data suggest that Bim is a more reliable marker of the sensitivity to MTAs than Bcl-2. A test showing the level of Bim expression may be able to predict therapeutic efficacy and/or resistance based on molecular profiling of the tumours. However, the induction of Bim alone cannot be sufficient for significant cell death. Indeed, it is more likely that Bim acts in unison with the other pro-apoptotic proteins. So the development of targeted therapies, on the Bcl-2 family in particular, must await a better understanding of the molecular mechanism involved in the regulation of apoptosis.

No conflict of interest.

DGI-041 HYPOMAGNESEMIA AS A POSSIBLE MARKER OF EFFECTIVENESS IN PATIENTS TREATED WITH PANITUMUMAB

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Background Panitumumab is a human monoclonal antibody indicated in the treatment of colorectal carcinoma (CRC) that is currently being tested in otolaryngology (ENT) tumours. Recent studies suggest that hypomagnesaemia (<1.7 mg/dL) during treatment with panitumumab may be related to greater anti-tumour efficacy.

Purpose To review the effectiveness of panitumumab and its possible relationship with hypomagnesaemia.

Materials and Methods Retrospective observational study that included all patients treated with panitumumab in a tertiary hospital. The primary endpoint of effectiveness was overall survival (OS), calculated using the Kaplan Meier method. We examined anthropometric data, diagnosis, treatment duration and, in patients whose magnesium had been determined during panitumumab treatment, we also studied the causes of termination and adverse reactions.

Results During the study period (August 2008–October 2012) 72 patients were treated, who had an average baseline age of 63 (SD:11) years and were mostly male (56%). At the end of the study 47% of patients were alive and 44% of them are still being treated with panitumumab. Diagnosis of 89% of patients was CRC, while 8 ENT cancer patients were enrolled in a clinical trial. The average length of treatment was 4.9 (SD:5.7) months and 7.7 (SD:6.4) cycles/patient were administered.

Magnesium levels were only determined in 13 patients, hypomagnesaemia being detected in 6 patients (ENT:3, CCR:3) and normomagnesaemia in the remaining 7 (ENT:5, CCR:2). Treatment with panitumumab was stopped in 6 patients due to disease progression. Two patients had to reduce the dose due to severe skin toxicity. The OS was calculated in all patients [hypomagnesaemia: 9.5 (95CI:4.9–14.0) vs. normomagnesaemia 8.2 (95CI:4.2–12.3) months (p:0.703)] and in the ENT tumours subgroup [hypomagnesaemia: 13 (95CI:9.3–16.7) vs. normomagnesaemia 4.8 (95CI:2.9–6.8) months (p:0.127)].

Conclusions Despite the low magnesium determinations we observed a trend to greater OS in hypomagnesaemic patients. Further studies are needed to confirm this trend.

Abstract DGI-041 Table 1

	n	Dead/alive	OS (95CI)	p
All patients	72	38/34	17.0(13.2–20.7)	
CRC	64	34/30	17.0(13.1–20.9)	0.952
ENT	8	4/4	9.3(5.2–13.3)	

No conflict of interest.

DGI-042 HYPOMAGNESEMIA AS A POSSIBLE MARKER OF EFFICACY IN PATIENTS WITH HEAD AND NECK CARCINOMA IN FIRST-LINE TREATMENT WITH CETUXIMAB

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Background It has been reported that the determination of magnesium levels could be used as a surrogate marker of efficacy in chemotherapy regimens with cetuximab.
Purpose To investigate the hypomagnesemia caused by cetuximab as a predictor of efficacy and outcome in patients affected by head and neck cancer in first-line treatment.
Materials and Methods Retrospective observational study (Study period: November 2008–October 2012). We analysed patients with head and neck carcinoma treated with cetuximab in first-line treatment, who had magnesium determinations from the start of treatment until one month after the end of treatment with cetuximab. Patients with magnesium determinations were stratified into two groups: Patients who presented hypomagnesemia during the treatment (<1.7 mg/dL) and patients who didn't present hypomagnesemia. The primary outcome was to compare remission rate, progression-free survival (PFS) and overall survival (OS) in the two groups. PFS and OS were both determined by the Kaplan-Meier product-limit method.
Results We collected a total of 14 patients (92.8% male). The median age at onset of treatment was 61 years (range: 21–86). Six patients developed hypomagnesemia during treatment. The most common diagnosis was carcinoma of the oral cavity (28.6%) followed by laryngeal carcinoma (21.4%). The group of patients who presented hypomagnesemia showed a higher remission rate (66.7% vs. 37.5% patients), OS [mean: 34.8 (18.8 to 50.9)) vs. 22.4 (95% CI: 11.9 to 32.9 months, p = 0.532] and PFS [34.5 months (18.11 to 50.9), vs. 19.7 (7.8–31.5) p = 0.456] in comparison with the group in which hypomagnesaemia was not detected.
Conclusions Despite the small number of patients studied, hypomagnesemia could be a marker of cetuximab efficacy in first-line treatment in patients with head and neck cancer. Magnesium levels should be determined routinely in patients treated with cetuximab.

No conflict of interest.

DGI-043 INCREASED COST OF ERYTHROPOIESIS-STIMULATING AGENTS IN SOME SPECIAL SITUATIONS

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Background Situations such as a previous kidney transplant or dialysis may increase the dose requirement of erythropoiesis-stimulating agents (ESAs), which is associated with a higher cost.
Purpose To examine the difference in cost between the use of ESAs for pre-dialysis and dialysis (peritoneal dialysis or haemodialysis) patients and for patients with or without a kidney transplant.
Materials and Methods A descriptive, transversal study was carried out in patients treated with ESAs for anaemia secondary to chronic kidney disease in a tertiary hospital over a month in 2011. ESAs used were: epoetin (α or β), darbepoetin α and continuous erythropoietin receptor activator (CERA). The principal variable was patient-month cost, calculated as the cost of the dose unit for each ESA type (IU or mcg) multiplied by the monthly dose per patient.
Results 333 patients were included. 26.2% had previously had a kidney transplant (10.3% epoetin, 33.3% darbepoetin α, 56.3% CERA). Median [p25, p75] patient-month cost for patients with kidney transplant vs. patients who had not had a kidney transplant was: epoetin (191.3 [95.6, 414.5] euros vs. 103.2 [63.8, 191.3] euros, p = 0.060), darbepoetin α (144.0 [72.0, 288.0] euros vs. 144.0 [72.0, 216.0] euros, p = 0.136) and CERA (196.7 [172.1, 295.0] euros vs. 98.3 [59.0, 147.5] euros, p < 0.001).

30.9% patients were on dialysis (35.0% epoetin, 58.3% darbepoetin α, 6.8% CERA). Median [p25, p75] patient-month cost for patients on dialysis vs. not yet on dialysis was: epoetin (151.1 [74.1, 239.1] euros vs. 92.1 [59.5, 165.6] euros, p = 0.006), darbepoetin α (144.0 [72.0, 216.0] euros vs. 144.0 [67.2, 229.2] euros, p = 0.888) and CERA (393.4 [98.3, 491.7] euros vs. 147.5 [98.3, 196.7] euros, p = 0.035).
Conclusions The cost of epoetin and CERA is greater for both patients with a kidney transplant and patients on dialysis. However there was no difference regarding darbepoetin α.

No conflict of interest.

DGI-044 INHALED COLISTIN IN TREATMENT OF CHRONIC COLONISATION PSEUDOMONAS AERUGINOSA IN PATIENTS WITH NON-CYSTIC FIBROSIS BRONCHIECTASIS OR CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Background Chronic bronchial infection with Pseudomonas aeruginosa in patients with non-cystic fibrosis (CF) bronchiectasis/chronic obstructive pulmonary disease (COPD) is related to worsening lung function and increased morbidity and mortality. Inhaled antibiotics represent an effective therapeutic approach for these diseases.
Purpose To evaluate the use of inhaled colistin in the treatment of chronic colonisation with Pseudomonas aeruginosa in patients with non-CF bronchiectasis/COPD.
Materials and Methods Retrospective study of patients with COPD/non-CF bronchiectasis colonised with Pseudomonas aeruginosa treated with inhaled colistin for at least three months from January 2008 to April 2012. Data collected: sex, age, diagnosis, duration of the treatment, disease-related hospitalizations pre and post-treatment, sputum cultures, clinical evolution.
Results 5 patients (3 with non-CF bronchiectasis and 2 with COPD) and 6 treatment episodes (1 patient received 2 courses of treatment) were included. Treatment duration was 27.6 months (range 4–48). Average cost per patient €13,896 (range €2,950–25,888). In 5 episodes, treatment was initiated after ≥4 consecutive sputum cultures positive for Pseudomonas resistant to tobramycin/ciprofloxacin. No difference in number of disease-related hospitalizations/month pre-and post-treatment (0.25 vs. 0.26). Sputum Pseudomonas eradication (3 consecutive negative sputum samples) was reported in 2 patients; treatment was continued, which was an unnecessary cost of €15,500 (22% of total costs). No resistance developed to colistin. In two episodes (one with eradication) clinical improvement occurred (reduction in cough and expectoration).

The number of hospitalizations/month was similar before and after treatment, and the microbiological response (negative results on sputum) and the clinical response (reducing cough and sputum purulence) was moderate (2 of 6 episodes).

Three patients died from their bronchial disease.
Conclusions In most episodes the initial prescription was correct (≥3 consecutive sputum cultures positive).

In patients whose *Pseudomonas* had been eradicated, treatment was continued, therefore sputum cultures should be monitored more frequently.

No effective treatment was observed.

No conflict of interest.

DGI-045 MANAGEMENT OF THE HAEMATOLOGICAL TOXICITY INDUCED BY BENDAMUSTINE

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Background Bendamustine is approved in Spain for the treatment of chronic lymphocytic leukaemia (CLL), Non Hodgkin Lymphoma (NHL) and multiple myeloma (MM). The most frequent adverse reactions are haematological. Usually patients require supportive treatment with granulocyte colony-stimulating factors (G-CSF) for neutropenia and erythropoietins for anaemia.
Purpose To describe the approach to neutropenia and anaemia caused by bendamustine in patients diagnosed with NHL, CLL and MM in our Hospital
Materials and Methods Descriptive and retrospective study of patients treated with bendamustine between November 2008 and February 2012 in our hospital. We collected data on age, sex, diagnosis, neutrophils count and haemoglobin before treatment and after receiving bendamustine, the proportion of patients requiring G-CSF (filgrastim or pegfilgrastim) or erythropoietins (darbepoetin alfa). Average number of G-CSF and erythropoietins doses.
Results A total of 38 patients received bendamustine, of whom 13 were women and 25 were men, with a mean age of 67 years old. 28 patients were diagnosed with NHL, 4 with MM and 6 with LLC. Before treatment, the neutrophils count was 4,846/mm^3 and haemoglobin 11.7 g/dL. Later these figures were 2,440/mm^3 for neutrophils and haemoglobin 11 g/dl. 73.7% of patients required G-CSF and 10.5% erythropoietins. The median number of doses of G-CSF and darbepoetin alfa respectively were 6 and 2.5.
Conclusions Bendamustine appears well tolerated. Supportive treatment with G-CSF is required in the majority of patients to maintain neutrophil count. This is not the case for anaemia, which occurs less frequently, requiring less rescue treatment. However these patients require close monitoring during treatment.

No conflict of interest.

DGI-046 MONITORING OF ADHERENCE TO TREATMENT AND ADVERSE EVENTS IN THE MANAGEMENT OF PATIENTS WITH HIV INFECTION

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Background Highly active antiretroviral treatment (HAART) is associated with improved health outcomes for people living with HIV/AIDS. Successful long-term treatment of HIV/AIDS requires near-perfect adherence to HAART. Constant monitoring of adherence to HAART and evaluation of related adverse events are two essential aspects for optimal management of patients with HIV.
Purpose To monitor adherence to antiretroviral treatment and adverse events of the outpatients of an HIV referral centre (department of Clinical Infectious Diseases, Policlinico S.Orsola-Malpighi, Bologna).
Materials and Methods The pharmacist was introduced in the department of Clinical Infectious Diseases in order to distribute the antiretroviral drugs and give information on the proper storage, use and possible interactions associated with the treatment. The pharmacist gives out an adherence questionnaire (10 questions about adherence, co-administered drugs and adverse events) to each patient to complete and return during the following visit. This information was entered into a database (Access) and the adherence to treatment and incidence of adverse events was calculated.
Results We analysed the adherence questionnaires of 659 patients, 74% of whom reported 100% adherence to treatment. Co-administered medicines may lead to poorer HAART adherence: patients taking polypharmacy showed medium-low adherence to treatment. Adherence was found to correlate inversely with the daily pill burden.

In terms of adverse effects, we developed a pharmacovigilance system, reporting 15 adverse drug reactions, 27% of which were rated severe. We analysed physical changes, gastrointestinal disorders and neuropsychiatric symptoms associated with the following regimens: efavirenz/emtricitabine/tenofovir, emtricitabine/tenofovir + atazanavir/ritonavir, efavirenz/emtricitabine/tenofovir, emtricitabine/tenofovir + atazanavir/ritonavir, emtricitabine/tenofovir + darunavir/ritonavir, abacavir/lamivudine + emtricitabine/tenofovir + darunavir/ritonavir, abacavir/lamivudine + atazanavir/ritonavir, abacavir/lamivudine + darunavir/ritonavir. Our results showed that the regimens with darunavir correlated with a lower incidence of side effects and perception of physical changes.
Conclusions The physician-pharmacist collaboration is an important support in monitoring adherence and adverse events related to HAART and contributes significantly to the optimal management of patients with HIV infection.

No conflict of interest.

DGI-047 MORPHINE, OXYCODONE AND FENTANYL PRESCRIBING PATTERNS IN THE LOCAL HEALTH AUTHORITY OF MESSINA, ITALY

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Background Pain is associated with significant economic, social and health impact. The cost of uncontrolled pain is enormous, both to individuals and to society as it leads to a decline in quality of life and disability. Several publications and guidelines stress the efficacy and safety of opioid-based treatment for cancer and non-cancer pain management. Until recently Italian legislation was very restrictive concerning the use of opioids, making Italy one of the lowest users of medical opioids in Europe. In 2010 law no. 38 eased the prescription of opioids for cancer and non-cancer pain.
Purpose To evaluate the incidence and cost of using morphine (N02AA01), oxycodone (N02AA05) and fentanyl (N02AB03) in order to assess prescribing patterns in the Local Health Authority (LHA) between 01/01/2010 and 30/09/2012.
Materials and Methods Data were collected from 'Farmanalisi.it' database which records all prescriptions reimbursed by the Messina LHA. All consumption data were expressed in a standardised way and costs as direct costs to the LHA and recorded on a data sheet.
Results During the 2010–2011 period the consumption of morphine (os/IV) remained substantially stable (1,763 units in 2010 vs. 1,730 in 2011). By contrast, consumption of oxycodone and transdermal fentanyl rose (for oxycodone 3,742 units in 2010 vs. 3,888 in 2011; for transdermal fentanyl 13.680 units in 2010 vs. 13,881 in 2011). The same trend was recorded for the first nine months of 2012 with 1,600 units for morphine, 2,236 units for oxycodone and 7,499 for transdermal fentanyl. For the LHA, in the evaluated period, direct costs of transdermal fentanyl were higher (978,428.11€) than the value reported for oxycodone (180,042.89€) and morphine (46,279.96€).
Conclusions Data obtained confirm that, in the Messina LHA, many patients received transdermal fentanyl as a first option although it is recommended only when oral morphine is inadequate. This data could allow an evolution of strategies adopted to control

pain and form the basis for communication among healthcare providers, such as General Practitioners, in order to improve appropriate prescribing policies.

No conflict of interest.

DGI-048 NEW ORAL ANTICOAGULANTS: HOW ARE THEY BEING USED?

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Background The expectations raised by the new oral anticoagulants (OACs) have led some experts to view them as the ideal substitute for anti-vitamin K.
Purpose To analyse the use of dabigatran and rivaroxaban in a Spanish tertiary hospital since their inclusion in the formulary to date.
Materials and Methods The period of study was January 2010–September 2012. We carried out a study on the patients prescribed either of the two new OACs included in the formulary. A data collection sheet was designed in which the parameters recorded were: gender, age, indication and observations (if any adverse reaction had been described).
Results In the period January 2010-September 2012, a total of 86 patients (38% male) were treated with rivaroxaban, with a mean age of 66 (21–91)years old; whereas in the period December 2011–September 2012 (dabigatran was included later in the formulary), 55 patients (60% male), with a mean age of 74 (45–93) years, were treated with dabigatran. 84 out of the 86 patients treated with rivaroxaban received it in prophylaxis after having undergone knee or hip replacement. Nevertheless, dabigatran was used mostly in non-surgery patients, only 2 out of the 55 patients were traumatology patients.

Only one minor bleed was reported in one patient diagnosed with atrial fibrillation and treated with dabigatran, and it should be taken into account that this patient exhibited thrombocytopenia at the time the bleeding occurred. No other adverse effects related to the administration of these drugs were found.

To date, the price of these new OACs is more than ten times higher than anti-vitamin K.
Conclusions Despite the fact that the new OACs have been shown as a good option compared to anti-vitamin K, their use in our hospital is still moderate, for two main reasons: their high cost and the uncertainty about their management in critical situations.

No conflict of interest.

DGI-049 OCTEOTRIDE IN GASTROINTESTINAL ANGIODYSPLASIA

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Background Gastrointestinal angiodysplasia (GIAD) may either be asymptomatic or induce overt or occult bleeding with a high risk of recurrence. Numerous therapeutic options are available but an evidence bass is lacking.
Purpose To analyse costs and improve the clinical parameters in patients with GIAD after intramuscular administration of long-acting octreotide (Oc-LAR) 10 mg/month.
Materials and Methods Retrospective observational study from January to December 2011. We reviewed the medical records of patients who were prescribed long-acting Octreotide for GIAD. Clinical data (haemoglobin, vials of iron needed, blood transfusions) and demographic characteristics of the patients were tabulated using Excel. We compared clinical results pre- and post-Oc-LAR use. The x^2 test was used for category variables, and the t-test was used for continuous variables with normal distribution using SPSS statistical software.
Clinical and monetary value were derived from publicly available data. The study perspective was from the hospital management point of view.
Results 17 patients were included in the study, 11 were men and 6 women. The mean age was 75.2 years. The direct costs were €350 per red blood cell transfusion, €167 per iron administration and €694.95 for Oc-LAR.

The mean Hb levels were 9.0 g/dl and 9.6 g/dl ($p < 0.0001$) before and after treatment. Blood transfusions decreased from 1.8 to 1.7 ($P = 0.258$). However iron requirements were higher after treatment started:. 2.5 vials of iron, up from 1.9 ($P = 0.027$). And there was an increase in hospital admissions annually 3.3 vs. 2.3 before treatment ($P = 0.311$). So Oc-LAR use increased the average annual cost per patient by 8,401.6€ without stopping disease progression.
Conclusions Pharmacological treatments are typically considered in refractory cases of endoscopic failure and recurrent bleeding. Oc-LAR seems to be more suitable in terms of efficacy and tolerance according to the bibliography. However, our study shows that Octreotide long-acting formulation treatment was not cost effective and failed to stop the natural evolution of the disease.

No conflict of interest.

DGI-050 OFF-LABEL USES OF MYCOPHENOLATE MOFETIL

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Background The implementing Law 1015/2009 normalises the compassionate use of investigational drugs, access to off-label and unauthorised drugs in Spain.

Mycophenolate mofetil/Mycophenolic Acid (MM/MA) have been used in off-label conditions to treat kidney diseases.[1–5]
Purpose To describe the dose and effectiveness of MM/MA in the treatment of nephritis.
Materials and Methods Observational, cross-sectional study including all patients diagnosed with nephritis treated with MM/MA in off-label conditions during July 2012.

Diagnosis and dose were recorded. Serum creatinine and the value of urinary proteins were collected at the beginning of the treatment and during the month of the study.
Results 22 patients were included, 14 were treated with MA and 8 with MM.

Of the patients treated with MA, 50% asked to be treated for nephritis, 28.6% for lupus and 21.4% for polyarteritis nodosa. (Both the lupus and the polyarteritis nodosa were giving clinical kidney symptoms.)

The usual dosage was every 12 hours (12/14), the most used dose being 360 mg (10/14).

The mean serum creatinine at the beginning of treatment was 1.14 mg/dl (SD .4) and decreased to 0.95 mg/dl (SD 0.3) at the end of the study. The urinary proteins value decreased from 35.4 (SD 7.3) at the beginning of treatment to 26.2 (SD 3.2) at the end of the study.

Of the patients treated with MM 62.5% requested treatment of nephritis and 37.5% of lupus. (The usual dosage was every 12 hours (7/8), the most used dose being 500 mg (3/8), 400 mg (2/8),1500 mg, 1000 mg and 250 mg (1/8).

The mean serum creatinine at the beginning of treatment was 1.35 mg/dl (SD 0.6) and decreased to 1.13 mg/dl (SD 0.5) at the end of the study. The urinary proteins value decreased from 30.11

(SD 8.2) at the beginning of treatment to 22.12 (SD 5.1) at the end of the study.

Conclusions Long-term monitoring (almost 6 months) of serum creatinine and urinary proteins is required, as in previous studies conducted, to evaluate the effectiveness of treatment.

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No conflict of interest.

DGI-051 ORAL ANTINEOPLASTIC TREATMENT ADHERENCE

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Background The use of orally administered anticancer treatment has increased dramatically in the last few years. Patient non-adherence to oral antineoplastic treatment is a barrier to effective treatment.

Purpose To estimate adherence and to identify factors that can affect compliance with oral antineoplastic drugs in cancer patients.

Materials and Methods Adult oncology-haematology patients using oral antineoplastic treatments dispensed at the outpatients Hospital Pharmacy from July to September 2012 (three months) were included.

Data was collected to characterise the sociodemographic variables (gender, age), medical diagnosis and oral antineoplastic treatment.

Two questionnaires were used for data collection and filled in during pharmacist-patient interviews.

The Morisky and Green Test evaluates attitudes regarding treatment adherence.

The DUKE-UNC functional social support scale measures the perceived social support. A score ≥32 indicates normal support, and <32 low perceived social support.

The association between qualitative variables studied was evaluated with the chi-square test. Quantitative variables, shown as median and standard deviation, were compared with the student test. The $p < 0.05$ values were considered statistically significant.

Results 30 patients were included during the study period, 56.66% female. Median age: 65 years (range 24–78).

Antineoplastic oral drugs used: capecitabine (24 patients), imatinib (4), abiraterone and pazopanib (1 case each)

Type of cancer: colorectal (20 patients), chronic myeloid leukaemia (3), breast (2), gastric, GIST, vagina and thyroid (1 case each)

80% adherence was found using the Morisky and Green Test.

Three patients scored below 32 on the DUKE-UNC questionnaire.

Patients with positive values (non-adherence) for Morisky and Green test were statistically significantly associated with younger age ($p < 0.0366$) and low perceived social support (DUKE-UNC < 32) ($p < 0.003$)

Conclusions Non-adherence to antineoplastic treatment is 20% in our population. Factors related to poor compliance were younger age and DUKE-UNC score below 32.

No conflict of interest.

DGI-052 OUTCOMES WITH THE USE OF NITROFURANTOIN IN RENAL IMPAIRMENT IN PRIMARY CARE – A PILOT STUDY

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Background Nitrofurantoin is probably the agent of choice for urinary tract infections (UTIs), but its use is limited by its lack of efficacy in impaired renal function.

Purpose The British National Formulary says to avoid in patients with renal impairment (estimated glomerular filtration rate [eGFR] <60 ml/min), but the Renal Drug Handbook recommends use if >20 ml/min. This pilot study was to look at which guidance provided the best outcome.

Materials and Methods Patients over 18 years from a single city centre medical practise were reviewed if they had received nitrofurantoin prescriptions and an eGFR had been recorded. Where there was low eGFR, a Cockcroft & Gault Creatinine Clearance (C&G-IBW-ClCr) based on the ideal body weight (IBW) was performed. Outcomes were reviewed. Success was assumed if there were no further antibiotics, no admission to hospital for a related episode or not recorded as still symptomatic on their medical records.

Results Of 164 patients, 37 were reviewed. Average age: 72 (range 21–100); median 80 years. Average eGFR/1.73 m^2 = 73.8 ml/min (range 33–130) and C&G-IBW-ClCr = 55 ml/min (24–127). Of 15 patients with C&G-IBW-ClCr >60 ml/min, none needed further antibiotics or were recorded as still symptomatic.

22 patients with C&G-IBW-ClCr <60 ml/min (average eGFR 61.7 ml/min and CrCl 38.7 ml/min), eighteen (81.8%) had further antibiotics or were recorded as still symptomatic. Only seven patients (31.8%) had an eGFR/1.73 m^2 <60 ml/min. Twelve had further antibiotics, 4 were still symptomatic, 1 went into hospital (unrelated) and 1 went back onto prophylactic antibiotics. No sample stated resistance but 6 samples stated sensitivity. The successfully treated patients had an eGFR of 75, 57, 55, & 53 ml/min /1.73 m^2 & a CrCl of 36, 39, 50 & 53 ml/min.

Conclusions Nitrofurantoin should not be recommended where renal function is impaired. This pilot study shows that eGFR is not a good indicator of renal function, and that CrCl should be used. Over 80% with a CrCl < 60 ml/min needed further treatment. This will progress to a larger study.

No conflict of interest.

DGI-053 PHARMACOECONOMIC CONSIDERATIONS REGARDING THE TREATMENT OF CHRONIC HEPATITIS C WITH PROTEASE INHIBITORS

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Background The standard care for chronic hepatitis C is a double treatment that consists of associating ribavirin (RBV) and peginterferon (pegINF) α-2a/2b. New therapeutic agents telaprevir and

boceprevir have recently been approved in Europe in combination with pegINF and RBV for the treatment of patients with genotype 1 HCV who have not been treated previously or when standard treatment has failed. They are serine protease inhibitors and belong to a new class of drugs: direct acting antivirals (DDAs).

Purpose To evaluate the pharmacoeconomic aspects of triple therapy with RBV, pegIFN and telaprevir or boceprevir, as reported in the literature.

Materials and Methods Cut-off guidelines have been established to quantify the suitability of new treatments based on the cost of treatment per quality-adjusted life year (QALY). The impact of using the new drugs was assessed on a hypothetical group of 14,000 patients infected with HCV (genotype 1). Unfortunately the price of the new drugs has not yet been negotiated in Italy; this represents a limit on the evaluation. The results are expressed in terms of Incremental cost-effectiveness ratios (ICERs).

Results The cost was estimated at €31,000/patient, 236.5 M€ over a period of 30 years. The ICER calculated to 20 years was €29.485/QALY while at 30 years was €18.291/QALY. Investment in these new molecules is favourable from a time horizon of 20 years.

Conclusions Boceprevir and telaprevir with standard treatment are cost effective considering the lifetime incidence of liver complications, quality-adjusted life years and the incremental cost-effectiveness ratio. The cost effectiveness depends on the adherence to the treatment; it could be improved if the diagnostic and therapeutic pathways were optimised.

No conflict of interest.

DGI-054 POST-PANDEMIC INFLUENZA A (H1N1) INFECTION IN CRITICALLY ILL PATIENTS PREVIOUSLY VACCINATED

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Background The A H1N1 2009 virus caused a worldwide pandemic during 2009. Vaccination of high-risk individuals was one of the recommendations of the World Health Organization before the post-pandemic period. Since this period, influenza activity has again associated with A H1N1 virus in Spain.

1059 cases of severe flu were hospitalised during the post-pandemic period in Spain and 41% of them were admitted to the ICU. The status of influenza vaccination was determined in 92% of the ICU patients.

Purpose To compare differential characteristics in morbidity, mortality and clinical manifestations of vaccinated patients who were admitted to Spanish ICUs during the flu season 2010–11 versus unvaccinated patients.

Materials and Methods Prospective, observational and multicentre study performed in 148 ICUs. Data were recorded in the GTEI/SEMICYUC registry. Adult patients with influenza A (H1N1) confirmed by rt-PCR were included in the analysis. Database records discriminated between having or not having been vaccinated.

Results 397 patients were admitted to Spanish ICUs during the post-pandemic period 2010/11 and supplied information about previous vaccination. A total of 22 (5.8%) patients had previously been vaccinated.

Vaccinated patients had a higher percentage of comorbidities compared to the other patients, (95.5% vs. 74.1%; p = 0.021). The mean number of comorbidities was also higher in vaccinated patients [1.91 (1.41) vs. 1.18 (0.99); p = 0.026].

Vaccinated patients showed higher rate of overall pneumonia but not bacterial coinfection. They received empiric antiviral treatment in a similar percentage and dosage, but they were treated for less time [6.9 (4.07) days vs. 8.99 (3.76) days; p = 0.003]. There was 2 days of delay in the initiation of empiric antiviral treatment in vaccinated patients (7.64 vs. 5.59 days), although it was not statistically significant. Data also showed that a greater percentage of vaccinated patients were treated with zanamivir compared to the rest of the group (22.7% vs. 5.3% p = 0.008). Vaccinated patients did not differ from the rest of the group in time from onset of symptoms, days to hospital admission or time until diagnosis.

Conclusions Clinical presentation, management and antiviral treatment was different in patients who had been previously vaccinated against influenza A (H1N1) virus.

No conflict of interest.

DGI-055 PROTEASE INHIBITORS: NEW DRUGS FOR TREATMENT OF CHRONIC HEPATIS C

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Background The protease inhibitors boceprevir and telaprevir are indicated for treatment of chronic hepatitis C (CHC) genotype 1 in combination with peginterferon-alfa and ribavirin. These drugs increase efficacy and adverse effects.

Purpose To study the effectiveness and safety of boceprevir and telaprevir for treatment of CHC.

Materials and Methods Retrospective observational study including all patients who started treatment with telaprevir or boceprevir for treatment of CHC from January to September 2012.

Collected data: age, sex, type of patient (treatment-naive, recurrent or non-responder), liver fibrosis, HIV coinfection, viral loads at weeks 0, 4, 8, 12, 24 to evaluate efficacy and adverse effects and supportive treatment to evaluate safety.

Results We included 51 patients, 35 (70%) men and 15 (30%) women, with a mean age of 51 years. 5 patients were co-infected with HIV (off-label use).

Abstract DGI-055 Table 1 Baseline characteristics

	Telaprevir	Boceprevir
Patients	29 (58%)	21 (42%)
Type of patient		
treatment-naive	5 (17.24%)	4 (19.05%)
recurrent	4 (13.79%)	10 (47.62%)
non-responder	20 (68.97%)	7 (33.33%)
Liver fibrosis		
0–1	6 (20.69%)	1 (4.76%)
2	6 (20.69%)	2 (9.52%)
3–4	17 (58.62%)	19 (90.48%)

Abstract DGI-055 Table 2 Efficacy and safety

	Telaprevir	Boceprevir
Negative viral loads at week		
4	15/23 (65.22%)	7/15 (46.67%)
8	18/21 (85.71%)	8/14 (57.14%)
12	19/19 (100%)	4/5 (80.00%)
24	8/8 (100%)	1/1 (100%)
Anaemia		
Reduced dose of ribavirin	6 (20.69%)	6 (28.57%)
Treatment with erythropoiesis-stimulating agent	2 (6.90%)	1 (4.76%)
Discontinued	1 (3.45%)	1 (4.76%)
Neutropenia		
Reduction dose of peginterferon-alfa	2 (6.90%)	4 (19.05%)
Treatment with granulocyte colony-stimulating factor (G-CSF)	1 (3.45%)	4 (19.05%)
Rash		
Discontinued	1 (3.45%)	0 (0%)

Conclusions Most patients had grade 3–4 liver fibrosis. Most patients were recurrent or non-responders to previous treatment. Telaprevir was the most used protease inhibitor.

Patients using telaprevir got negative viral loads before patients using boceprevir.

A high percentage of patients using boceprevir required the dose of peginterferon-alfa to be reduced and treatment with G-CSF due to neutropenia.

No conflict of interest.

DGI-056 REDUCED DELAY IN THE ADMINISTRATION OF CHEMOTHERAPY AFTER OPTIMISING THE PROCESS OF PREPARATION/DISPENSING OF PARENTERAL ANTINEOPLASTICS

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Background Separation between the Chemotherapy Unit and the Day Hospital Unit makes rapid treatment of onco-hematologic patients difficult.

Purpose To optimise the sequence of dispensing parenteral antineoplastic mixtures when there is relevant physical separation between the Chemotherapy Unit (CU) of the Pharmacy Department and the Day Hospital Unit (DHU) where these treatments are administered to onco-hematologic patients.

Materials and Methods We reviewed stability data from mixtures of antineoplastics, each from Pharmacotherapeutic Schemes (PS) and updated the protocol in our Oncofarm programme. To plan the appointments of onco-haematological patients in the DHU, patients were grouped into three types depending on the stability of the mixtures and the total time of administration: type I [analysis (A), cheque (V) administration and chemotherapy (CT) on the same day], type II (A: one day, with V and CT the next day) and type III (A and V one day, with CT the next day). To evaluate the efficiency of the process, the compliance productivity indicator 'lag time' between confirming the treatments prescribed by doctors and the start of their administration in DHU was calculated.

Results With support from various literature sources, we reviewed the stability of 54 antineoplastic mixtures and updated the Oncofarm data. Of 482 PS analysed, 30% would be appropriate for type I patients, 2% for type II and 68% for type III. The new stability data allowed us to prepare a total of 28 new PS in the CU the day before their administration. To gauge productivity the 'lag time' was calculated for a period of three months for treatments prescribed electronically to 552 patients and the 1023 mixtures dispensed to DHU. The average delay was 2:23 (SD=0:37) hours, keeping the level of compliance at 100%.

Conclusions The reorganisation of the antineoplastic preparation process based on the updated stability data made it possible to dispense the mixtures of PS prescribed for type II and III patients at the best time. This ensured optimum services to health professionals and patient satisfaction.

No conflict of interest.

DGI-057 RELATIONSHIP BETWEEN IN-HOSPITAL USE OF ANTIPSEUDOMONAL AGENTS AND RESISTANCE TO CARBAPENEMS FOR PSEUDOMONAS AERUGINOSA IN A GENERAL HOSPITAL OVER A NINE-YEAR PERIOD

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Background Antimicrobial resistance is frequently related to the high selective pressure of antimicrobials commonly used in hospitalised patients.

Purpose To analyse in-hospital consumption of antipseudomonal agents (AAC), trends and the relationship with increase in Pseudomonas aeruginosa (PA) resistant to imipenem or meropenem.

Materials and Methods Descriptive retrospective analysis (2002–2010) of the AAC in a 1,100-bed tertiary teaching hospital. Data on the use of antibiotics were obtained from the hospital pharmacy and expressed as defined daily doses per 100 bed-days (DDD/100 bed-days).

Resistance rates were obtained from Microbiology and expressed as percentage of total PA cultures resistant to imipenem or meropenem.

Pearson's correlation coefficient(r) was used to determinate the relationship between AAC and % PA resistant to imipenem or meropenem. Linear regression analysis was used to further analyse these relationships with $r \geq 0.7$

Results Antipseudomonal agents represented 20.44% of all antibiotics in 2002 and 28.86% in 2010.

The relationship was studied between each AAC (2002–2010) and %PA resistant to imipenem or meropenem, and a positive relationship ($r > 0.7$) was observed between the increase in P/T, MER, IMI and LEV consumption and increase in %PA resistant to meropenem. Linear regression analysis was used for these antibiotics. The strongest relationship was observed between levofloxacin and %PA resistant to meropenem ($r^2 = 0.7970$). Coefficients of determination (r^2) for P/T, IMI and MER were 0.6951, 0.5932 and 0.5313 respectively.

Conclusions During the period studied, the trend was for an overall increase in antibiotics consumption, in the use of antipseudomonal agents (principally piperacillin-tazobactam and levofloxacin), in the number of cases of PA and in resistances rates (mainly to meropenem).

Data suggest that increasing use of P/T, imipenem, meropenem and especially levofloxacin, means an increase in %*PA* resistant to meropenem.

Antibiotic consumption is important to explain trend in resistance rates, but other variables may also be involved, so we must to be prudent interpreting these types of studies. Despite the limits, more exhaustive studies may be done to determinate the relationship between antibiotics consumption and resistance rates.

Abstract DGI-057 Table 1

Antibiotics consumption (DDDs/100 bed-days)

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Piperacillin-Tazobactam (P/T)	0.76	0.83	1.30	1.95	2.36	3.22	3.82	3.68	4.29
Ceftazidime	0.95	0.66	0.69	0.70	0.59	0.59	0.63	0.56	0.69
Cefepime	0.62	0.72	0.93	1.16	1.05	0.76	0.98	1.05	0.94
Meropenem (MER)	0.68	0.47	0.49	0.47	0.42	0.51	0.90	0.81	1.03
Imipenem (IMI)	1.14	0.99	1.18	0.94	0.86	1.39	1.30	1.43	1.43
Ciprofloxacin	6.25	5.31	5.07	5.73	5.67	6.14	6.02	5.91	5.98
Levofloxacin (LEV)	1.79	1.94	2.03	2.79	3.52	6.96	6.73	6.63	6.83
Overall antibiotics (ATC J01)	59.63	50.98	51.55	56.86	55.77	69.02	74.18	70.84	73.43
Number of cases of PA (N)	534	506	718	749	774	1126	1280	1250	Not available
%PA resistant to imipenem	12.90	14.70	15.60	15.60	11.70	14.10	14.70	11.40	14.20
%PA resistant to meropenem	7.40	6.70	6.50	7.70	6.30	11.30	12.70	9.30	11.40

No conflict of interest.

DGI-058 RESULTS OF USING TOLVAPTAN

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Background Tolvaptan is the first oral antagonist of the vasopressin V2 receptor. It is indicated in adult patients with hyponatraemia secondary to syndrome of inappropriate antidiuretic hormone hypersecretion (SIADH).
Purpose To evaluate the use of tolvaptan in a tertiary hospital.
Materials and Methods An observational study was conducted on patients treated with tolvaptan from January 2012 to September 2012. Data was collected from the review of medical histories, lab tests and dispensing records. A data collection sheet was designed on which were recorded: diagnosis related to hyponatraemia, age, gender, dose, clinical department that prescribed it, serum sodium when the treatment with tolvaptan was initiated, evolution and possible side effects.
Results 6 patients (50% male) received tolvaptan in the study period. Average age was 72.53 years. The clinical department that wrote the prescription was Internal Medicine in five cases and Oncology in the other one. The background pathology was lung cancer in two cases, heart failure in two cases, idiopathic SIADH in one case and only one case of SIADH. The average serum sodium concentration pre-treatment was 113 (101–120) mg/dl. The dose usually used was 15 mg/day, although one patient took 30 mg/day. The average length of treatment was 123 (30–270) days. Only one patient discontinued treatment due to gastrointestinal side effects. One terminal cancer patient and an 85-year-old patient died. The average cost-day per patient was €65.75.
Conclusions Our results agree with the tolvaptan clinical trials, that it appears to be safe and effective in the treatment of hyponatraemia refractory to other treatments. The high cost of the treatment and the limited experience in its use required strict control over its administration.

No conflict of interest.

DGI-059 SAFETY OF ANTI-EPIDERMAL GROWTH FACTOR RECEPTOR AGENTS: CETUXIMAB AND PANITUMUMAB

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Background A recently-published meta-analysis describes the risk of thromboembolic events (TEs) associated with anti-growth factor receptors such as cetuximab and panitumumab.
Purpose To describe the frequency of TEs related to cetuximab and panitumumab use. Likewise, to detail adverse reactions (ARs) and their severity.
Materials and Methods Retrospective descriptive study in a 500-bed university hospital performed from January 2010 to September 2012. All patients who had been treated with cetuximab or panitumumab were reviewed. In a database we recorded: sex, age, underlying disease, drug, dose reduction if it was necessary, number of cycles administered, ARs and degree of severity according to Common Toxicity Criteria. The information was extracted from patients' medical records and from pharmacy service records.
Results Twenty-four patients were included, 12 were men. Mean sample age was 61 years. The main underlying disease was colorectal cancer with liver and lung metastases (41.2%). Mean duration of treatment was 10.7 cycles/patient. All patients received cetuximab in combination regimens with fluoropyrimidines, platinum and irinotecan. Four patients were treated with panitumumab. ARs appeared in 95.8% of the sample. There were 153 ARs, 88.9% during treatment with cetuximab. (Table 1). Two cases of deep vein thrombosis (DVT) during treatment with cetuximab were reported; none with panitumumab. Grade 1 toxicity represented 44.5% of all ARs, 40.5% were grade 2, 13.7% grade 3 and 1.3% grade 4. Due to ARs, three patients required dosage reduction, all related to cetuximab schedules.
Conclusions Two cases of DVT were reported in patients treated with different cetuximab chemotherapy schedules. It is difficult to establish a relationship between ARs and the drugs used. Further studies are needed to clarify the association of TE and cetuximab. The rest of AR founded, are described in the product information. It is necessary a higher foresight to establish preventive measures to avoid or reduce AR toxicity.

Abstract DGI-059 Table 1

AR	% of patients
Rash	79.2
Paresthesia	66.7
Transaminases	54.2
Asthenia	45.8
Diarrhoea	37.5
Neutropenia	29.2
Anaemia	25.0
Tricomegalia	25.0

No conflict of interest.

DGI-060 SAFETY OF INTRAVENOUS TREATMENT OF BREAST CANCER: INTERACTION WITH CHRONIC MEDICINES

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Background Pharmacists may play an important role in the prevention of potential drug interactions (PDIs).
Purpose To investigate PDIs among intravenous cytotoxic drugs and medicines for comorbid illnesses in breast cancer patients, according to the interaction mechanism, its clinical significance and the published literature.
Materials and Methods Treatments for breast cancer patients were analysed in a retrospective study over a month. Data were collected from pharmacy oncology software (Oncowin) and the Primary care Prescription Data-Base (OMI-AP). Interactions were checked with Lexi-Comp Online.
Results 73 women were treated with intravenous cytotoxic drugs in November 2011. Mean age was 57 ± 13 years. Only 40 women were recorded in the Primary Care prescription database, and 3 of them did not receive concomitant treatment during that month. There were 10 different chemotherapy schemes involving 7 antineoplastic drugs. Comorbid chronic diseases were treated with 89 different drugs; antihypertensives, NSAIDs, benzodiazepines and antimicrobials were the most widely used drugs. 7 cases of PDIs were found, comprising 5 different interactions: cyclophosphamide/paroxetine (2), paclitaxel/diltiazem (1), docetaxel/trazodone (1), paclitaxel/atorvastatin (2), paclitaxel/ketoconazole (1). These interactions were detected in 6 patients (15% of patients with OMI-AP data). In one patient 2 PDIs were observed: cyclophosphamide/paroxetine and docetaxel/trazodone. All the PDIs detected were pharmacokinetic interactions. None of the PDIs detected had clinical relevance according to the scientific literature.
Conclusions PDIs may occur among drugs for chronic diseases and chemotherapy in breast cancer patients. These data are consistent with previous reports in which PDIs were observed in 19% of

cancer patients. Most relevant interactions described are paclitaxel with antiepileptics, docetaxel with ketoconazole or cyclophosphamide with benzodiazepines. No clinically relevant interactions were found in our patients. Patients with comorbidities on multiple drug therapy (in addition to the drugs used for cancer treatment) would most benefit from pharmaceutical care.

No conflict of interest.

DGI-061 SAFETY OF TRIPLE TREATMENT IN CHRONIC HEPATITIS C

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Background Efficacy of chronic hepatitis C genotype 1 treatment has been improved with protease inhibitors (PIs) telaprevir and boceprevir. However, triple therapy (PI, peginterferon alfa and ribavirin) has increased the number, type and severity of adverse events.
Purpose To assess the safety of triple therapy in the first 12 weeks of treatment with telaprevir and boceprevir used for chronic hepatitis C treatment in clinical practise.
Materials and Methods Between March and September 2012, all patients treated with telaprevir and boceprevir receiving medicines in the outpatient pharmaceutical care unit of a tertiary hospital were interviewed. Adverse events were collected in a predefined questionnaire. Anaemia, neutropenia and thrombocytopenia were also included as adverse effects if the patient had been treated for any of them. Interviews were conducted during the medicines dispensing (monthly).
Results Fifty-one patients with triple therapy were interviewed; 34 of them were treated with telaprevir and 17 with boceprevir. All patients had at least one adverse event on any of the visits. Globally, the most frequent adverse events were tiredness (84.3%), digestive disorders (70.6%), dermatological disorders (64.7%) and influenza-like syndrome (62.7%). Patients being treated with telaprevir mainly suffered from tiredness (85.3%) and dermatological disorders (70.6%). However, tiredness (82.4%) and mood disorders (70.6%) were the most usual adverse events in patients being treated with boceprevir. The frequencies of other side effects are listed in Table 1.
Conclusions Efficacy in the first 12 weeks of triple therapy results in a high frequency of adverse events. Information on possible side effects and how to prevent or treat them is important for patients. Since PIs have only recently come onto the market, it is also important to communicate and record any new adverse events not identified in clinical trials.

Abstract DGI-061 Table 1

Adverse event	Telaprevir (%)	Boceprevir (%)
Influenza-like illness	61.8	64.7
Tiredness	85.3	82.4
Mood disorders	32.4	70.6
Digestive disorders	67.7	76.5
Dermatological disorders	70.6	52.9
Hair lost	5.9	17.7
Non-productive cough	8.8	29.4
Itchy eyes	0.0	5.9
Oral disorders	32.4	33.3
Haemorrhoids	64.7	0.0
Tachycardia	2.9	23.5
Decreased libido	2.9	11.8
Oedema	11.8	11.8
Anaemia	55.9	47.6
Neutropenia	17.7	11.8
Thrombocytopenia	14.7	5.9

No conflict of interest.

DGI-062 SORAFENIB, SUNITINIB AND EVEROLIMUS IN METASTATIC RENAL CELL CARCINOMA: EFFICACY AND SAFETY

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Background Tyrosine kinase inhibitors (TKIs) and m-TOR inhibitors (m-TORIs) have demonstrated clinical efficacy in patients with advanced renal cell carcinoma (aRCC).
Purpose To describe one centre's experience with the use of TKIs and an oral m-TORI in patients with aRCC.
Materials and Methods Retrospective observational study of patients with aRCC treated with TKIs (sorafenib, sunitinib) and an m-TORI (everolimus) from March 2007–May 2012. Variables: demographics, initial ECOG, line number, duration (TT) and reason for stopping treatment, best response (partial response (PR), stable disease (SD), progression) according to clinical and radiological criteria; progression-free survival (PFS) and overall survival (OS) in weeks (w) and toxicity.
Results Of the 22 patients studied 81.8% were male with an average age of 65.77 years (SD: 11.76): 5 treated with sorafenib, 13 with sunitinib and 4 with everolimus.

Reasons for discontinuing were: 40% (2/5), 46.15% (6/13) and 75% (3/4) progression/clinical worsening; 40% (2/5), 15.38% (2/13) and 25% (1/4) toxicity; and 20% (1/5), 15.38% (2/13) and 0% death, for sorafenib, sunitinib and everolimus respectively. Response rates were (except the 5 patients who stopped too early): sorafenib 100% SD (2/2); sunitinib 25% SD (3/12), 58.33% PR (7/12) and 16.6% progression (2/12) and everolimus 100% progression (3/3).

Treatment-related adverse events: sorafenib 60% asthenia and 40% rash; sunitinib: 53.85% rash, 46.15% diarrhoea and 38.46% neutropenia, mucositis and asthenia, and everolimus: 75% hypercholesterolemia, 50% hypertriglyceridemia and 25% pneumonitis.
Conclusions In our study, median OS was lower than those obtained in pivotal trials, instead, median PFS was higher, except everolimus. Regarding safety, sorafenib had similar toxicity; sunitinib had higher rates of hand-foot syndrome and everolimus had higher rates of hypercholesterolemia. However, the small number of patients limits our conclusions.

No conflict of interest.

DGI-063 STUDY OF THE USE AND EFFECTIVENESS OF DAPTOMYCIN IN A TERTIARY HOSPITAL

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Abstract DGI-062 Table 1

	ECOG				No. metastatic sites				Line number		Median TT (w)
	0	1	2	No data	1	2	3	Common sites	1	≥2	
SORAFENIB		3/5		2/5	2/5	3/5		40% Lung 40% Bones	4/5	1/5	5 (IQR: 2–49.5)
SUNITINIB	7/13	3/13	1/13	2/13	6/13	6/13	1/13	53.85% Lung 30.77% Liver	11/13	2/13	48 (IQR: 16.5–80.5)
EVEROLIMUS	1/4	3/4			2/4	1/4	1/4	50% Liver	0/4	4/4	10 (IQR: 8–12)

Background Daptomycin is an antibiotic only active against Gram-positive bacteria, with rapid bactericidal activity, a concentration-dependent and post-antibiotic effect. Indicated for complicated skin or soft tissue infections in adults (cSSTI), right side endocarditis due to Staphylococcus aureus and S. aureus bacteraemia associated with right-side infective endocarditis.
Purpose To perform a retrospective observational study of the use and effectiveness of daptomycin in our hospital.
Materials and Methods We extracted from the hospital computer system (SAP) prescribing data about daptomycin from January to December 2011. The data collected included age, sex, history number, diagnosis, causative organism, prescriber service, treatment duration and reason for suspension.
Results Were treated 85 patients (69% male) with an average age of 63.3 years (range 22–86 years). The average duration of treatment was 20.5 days. Prescribers' services were: cardiac surgery/cardiology (27%), UCI (15%), haematology (12%), internal medicine (12%), nephrology (12%) and others (22%). The diagnoses for which daptomycin was used were: 32% endocarditis, 32% cSSTI, 20% bacteraemia, 11% osteoarticular infection and 5% others. Microorganisms identified were: 11% methicillin-resistant S. aureus (MRSA), 20% coagulase-negative Staphylococcus, 5% others and 64% was empirical treatment. In 36.5% of prescriptions, daptomycin was used as second-line antibiotic treatment, either because the patient did not respond to previous antibiotic treatment (32%) or due to side effects (39% anaemia with linezolid and 29% renal damage with vancomycin). The reasons for suspending daptomycin were: 77% for improvement/patient discharge or who ended treatment or switched to oral treatment, 9% change in treatment and 14% deceased.
Conclusions In 84% of cases the prescription complied with the authorised indications in datasheet. Daptomycin was prescribed first-choice in 63.5% of treatments. In 64% of case treatment was empirical without subsequent confirmation of the causative organism. It is necessary to establish a mechanism to decrease the rate of use of this antibiotic in the hospital for frontline empirical treatments.

No conflict of interest.

DGI-064 STUDY OF THE USE OF FERRIC CARBOXYMALTOSE (FC) WITHIN THE SYSTEM FOR PREOPERATIVE OPTIMIZATION OF HAEMOGLOBIN (HB) IN SCHEDULED SURGERY

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Background In our hospital there is a protocol for preoperative Hb optimization with the aim of reducing blood transfusions in patients with anaemia and upcoming surgery.
Purpose To evaluate the use of FC in terms of adherence to protocol and effectiveness.
Materials and Methods Descriptive observational study. The study included patients who had received at least one dose of FC in 2011. We collected from the electronic medical record: age, sex, cause of anaemia, iron administered, Hb level, iron saturation, transferrin and ferritin before administration of IV iron and surgery. We evaluated adherence to the protocol and analytical results.
Results We studied 47 patients with an age range between 23 and 87 years (median = 62). 78.7% of the patients met the optimization of Hb protocol (inclusion criteria: anaemia and upcoming surgery). The average increases in Hb after a single administration of 500 mg and 1000 mg of FC were 0.6 g/dl and 1 g/dl respectively. In the case of patients who had also been given other forms of IV iron before surgery (total average dose of iron administered: 1150 mg) levels increased by a median of 2.05 g/dl. Erythropoietin was also administered to 32.43% of the patients. The mean differences in the rest of the analytical parameters studied before and after administration of iron IV were: serum iron: 40.7 μg/dl, %, iron saturation: 15.8%, transferrin: −41.8 mg/dl ferritin: 378.1 ng/ml. The median time between administration and surgery was 6 days.
Conclusions Our results show a fast increase in Hb in a short time. Restriction of the FC implied making a good selection of patients who may benefit from the higher dose (average increase of 2.05 g/dl needs an average dose of 1150 mg iron to be administered) and higher speed of action (median time between administration and surgery: 6 days). Its use would be justified for fast increases in Hb when, due to the impending surgery, with they would not be obtained in time with other presentations of iron.

Mean differences (for average dose of iron administered: 891.89 mg) in patients who met the Hb optimization protocol

Abstract DGI-064 Table 1

	Hb	Serum iron	% iron saturation	Transferrin	Ferritin
Mean differences	1 g/dl	40.7μg/dl	15.80%	–41.8 mg/dl	378.1 ng/ml

No conflict of interest.

DGI-065 STUDY USING FOSCARNET IN HAEMATOLOGICAL PATIENTS

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Background Cytomegalovirus (CMV) commonly affects bone marrow transplant patients causing significant morbidity and mortality. Foscarnet is a broad-spectrum antiviral agent, active against CMV, but is not the treatment of choice.
Purpose To find out why it was prescribed, to cheque the treatment efficacy and its adverse effects.
Materials and Methods Retrospective study (2011). Data were obtained from patient clinical records and the pharmacy database. We produced a database with information on demographics, underlying disease, indication, treatment duration, dosage, adverse effects and treatment results based on PCR viral load negativization. We also examined whether there had been prior treatment with ganciclovir and the reason for the change, or the reason for not starting treatment with ganciclovir.
Results 12 patients (8 male) in the haematology department were treated with foscarnet. Median age was 31. Underlying diseases: aplastic anaemia (3), lymphocytic leukaemia (4), myeloblastic leukaemia (1), Hodgkin's lymphoma (1), Burkitt's lymphoma (1), T-cell lymphoma (1), myelodysplastic syndrome (1). In 10 cases a bone marrow transplant had been performed. The indication was to treat cytomegalovirus infection except one case in which it was used for suspected infection by herpes virus 6. In 6 patients ganciclovir was not used first (pancytopenia and problems with engraftment). The other 6 patients had been given ganciclovir and switched due to development of resistance (4) and haematological toxicity (2).Treatment started at low doses and increased as tolerated up to 90 mg/kg.

Efficacy: The average length of treatment was 11.4 days. The treatment was effective in 11 patients (91.6%).
Safety: four patients had no toxicity. We found ulcers on the glans (2), impaired renal function (3) (1 of them requiring dialysis and 1 suspension of treatment), hypomagnesemia which responded to magnesium supplements (2) and 3 gastric discomfort.

Conclusions

- Foscarnet is an effective alternative in the treatment of CMV infection if there is intolerance or lack of response to ganciclovir.
- Worsening renal function is the most important adverse effect.

No conflict of interest.

DGI-066 SURVIVAL STUDY OF PATIENTS WITH NON-SMALL CELL LUNG CANCER TREATED WITH ERLOTINIB

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Background Lung cancer is the most common malignancy in the world, with approximately 1.4 million new cases per year, representing 16.6% of all tumours in men and 7.5% in women. It is the leading cause of cancer death.

According to the European Medicines Agency erlotinib is indicated in non-small cell lung cancer.

Erlotinib is a cytostatic selective inhibitor of tyrosine kinase coupled to EGFR.

Purpose To determine the survival of patients with stage IV non-small cell lung cancer (NSCLC) treated with erlotinib.

Materials and Methods Retrospective cohort study of all patients treated with erlotinib from 1 January 2011 to 15 June 2012 in a regional tertiary level hospital. Data collection: Viewed outpatient dispensing programme (Cafydim), reviewed medical records.

Statistical analysis:

1. Kaplan-Meier method: to determine the probability of global survival.
2. Logrank method: to compare the survival distributions of two samples.

Variables investigated: death, treatment time, treatment line and treatment discontinuation, Epidermal Growth Factor Receptor (EGFR) mutation (positive or negative).

Results Fifty patients were included. Thirty of them died. The average survival of the patients was 244.9 days with an IC95% [195.3–294.5]. 50% of the patients were alive at 180 days with IC95% [104.9–255.1].

The probability of remaining alive at the end of the study for patients with first-line treatment was 6.7% vs. 45% with the second or third line.

Survival as a function of treatment dropout: no patients who discontinued treatment during the study lived longer than if they continued treatment (8.7% vs. 18.8%).

No determinations of EGFR mutation were made.

Conclusions Erolitinib is emerging as an effective drug that increases survival in patients with NSCLC if it is administered as second or third line vs. first line.

It is necessary to determine EGFR mutations to prevent drugs being administered to patients with negative mutations.

No conflict of interest.

DGI-067 TELAPREVIR, A NEW PROTEASE INHIBITOR FOR TREATMENT OF HEPATITIS C VIRUS

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Background Hepatitis C virus (HCV) infection is a major health problem in the western world. Current treatment with interferon (IFN) and ribavirin (RBV) is able to produce a sustained virological response in approximately 50% of patients with genotype-1. Telaprevir (TPV) represents a change in the treatment of HCV.

Purpose To describe the proportion of patients who had undetectable plasma HCV-RNA at week 4 and 12 of treatment, the haemoglobin and platelets level during treatment and the most frequently reported adverse events.

Materials and Methods We conducted a retrospective study of all patients who started triple therapy in 2012. We collected demographics (age and sex), genotype, pre-treatment response, haemoglobin, platelets, plasma HCV-RNA at weeks 0, 4 and 12 and reported adverse events.

Results Since January 2012, 9 patients began treatment with RBV+IFN+TPV with a mean of age of 49 (SD:6.2). 89% were male. Genotype-1a was predominant (95%).

Five patients were previous non-responders, three were relapsers and one was missing.

The mean haemoglobin at weeks 0, 4 and 12 was 15.5 (SD:1.2), 13.0 (SD:1.7), and 11.3.(SD:1.9) mg/dl respectively and the mean platelets at week 0, 4 and 12 were 217 (SD:142.4), 132 (SD:46.2) and 121 (SD:33.9) respectively. The mean of plasma HCV-RNA at the beginning was log 6.55 (SD:0.39). At week 4, 8 patients (88.9%) had undetectable plasma HCV-RNA and 1 had to discontinue treatment (HCV-RNA: log5.63). At week 12, 7 patients had undetectable plasma HCV-RNA. One patient had to discontinue treatment due to severe anaemia.

The most frequent adverse event was anaemia (89%); in two cases it was even necessary to administer erythropoietin. Other adverse events were rash, fatigue and haemorrhoids.

Conclusions Our rate of undetectable plasma HCV-RNA at week 4 is high (89%) which allowed TPV to be suspended at week 12 and RBV+IFN treatment to be shortened to 24 weeks.

Anaemia was the major serious adverse event reported.

No conflict of interest.

DGI-068 THE EFFECT OF MAIN GENE POLYMORPHISMS ON STABLE DOSES OF ACENOCOUMAROL IN LONG-TERM ANTICOAGULATION TREATMENT

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Background Several variants in CYP2C9 (CYP2C9*2 and especially the CYP2C9*3 allele) and VKORC1 genes (especially the 1639G>A polymorphism) are associated with effective coumarin derivative dose. The rs2108622 polymorphism in the gene encoding cytochrome P450, family 4, subfamily F, polypeptide 2 (CYP4F2) could also influence warfarin dose with relevant effects on coumarin response. Concomitant drugs metabolised by CYP450, such as proton pump inhibitors, mainly metabolised by CYP2C19, may increase the risk of overanticoagulation in long-term oral anticoagulation therapy. Acenocoumarol pharmacokinetics may result altered with the presence of the C3435T gene polymorphism in the P-glycoprotein and has been associated to higher warfarin dose requirements in patients with deep vein thrombosis.

Purpose Our aim was to evaluate the influence of VKORC1, CYP2C9-(CYP2C9*2 and CYP2C9*3 alleles), CYP4F2*2, CYP2C19*17 and MDR1-C3435T gene polymorphisms on the achievement of stable anticoagulation dose in patients treated with acenocoumarol.

Materials and Methods Patients with atrial fibrillation, pulmonary embolism, deep vein thrombosis, metallic aortic valve and metallic mitral valve prosthesis treated with acenocoumarol at a third level hospital were genotyped by Polymerase Chain Reaction (PCR)-Restriction Fragment Length Polymorphism, direct sequencing or real time PCR. Clinical, pharmacological and socio-demographic

parameters were analysed during 6 months of follow-up after starting anticoagulation therapy with acenocoumarol.

Results One hundred and eighteen patients (mean age: 73 ± 12 years; 55.7% male) treated with acenocoumarol therapy and monitored for dose adjustment were recruited.

The frequency of different genotypes according to stable anticoagulation status is shown in Table 1. Table 2 shows the frequency of genotypes in stable anticoagulated patients classified by stable anticoagulation dose (High: >28 mg/week; Intermediate: 7–28 mg/week; Low dose: <7 mg/week).

The stable anticoagulation status was not associated to any gene polymorphism, and the stable anticoagulation dose was only associated to CYP2C9*3 (0.047).

Conclusions The achievement of a stable anticoagulation status is not associated to VKORC1, CYP2C9*2, CYP4F2*2, CYP2C19*17 or MDR1-C3435T gene polymorphisms, although the stable anticoagulation dose is associated to CYP2C9*3.

Abstract DGI-68 Table 1 The frequency of different genotypes according to stable anticoagulation status

			Stable		Total	p-value
Gene polymorphism	**Genotype**	**n**	**No**	**Yes**		
VKORC1*2 (rs9923231)	CC	44	30	14	115	0.758
	CT	57	40	17		
	TT	14	11	3		
CYP2C9*2 (rs1799853)	CC (WT)	82	61	21	117	0.223
	CT	33	20	13		
	TT	2	2	0		
CYP2C9*3 (rs1057910)	AA (WT)	98	69	29	116	0.724
	AC	18	14	4		
CYP4F2*3 (rs2108622)	CC (WT)	53	38	15	117	0.352
	CT	50	33	17		
	TT	14	12	2		
CYP2C19*17 (rs12248560)	GG (WT)	85	59	26	113	0.729
	GA	27	20	7		
	AA	1	1	0		
ABCB1 C3435T (rs1045642)	CC (WT)	31	22	9	118	0.864
	CT	56	41	15		
	TT	31	21	10		

VKORC1: Vitamin k epoxide reductase complex,subunit 1; CYP2C9*2: Cytochrome P450 family 2, subfamily C,polypeptide 9, allele variant:2; CYP2C9*3 Cytochrome P450 family 2, subfamily C,polypeptide 9, allele variant: 3; CYP4F2: cytochrome P450, family 4, subfamily F, polypeptide 2; CYP2C19 Cytochrome P450 family 2 subfamily C,polypeptide1 9;ABCB1: ATP-binding cassette, subfamily B, member 1.

Abstract DGI-068 Table 2 The frequency of genotypes in stable anticoagulated patients classified by stable anticoagulation dose

Gene polymorphism	**Genotype**	**Stable**	**Low dose**	**Intermediate dose**	**High dose**	**p-value**
VKORC1*2 (rs9923231)	CC	13	0	13	1	0.280
	CT	17	1	15	1	
	TT	3	1	2	0	
CYP2C9*2 (rs1799853)	CC (WT)	21	1	18	2	0.498
	CT	13	1	12	0	
CYP2C9*3 (rs1057910)	AA (WT)	29	1	27	1	0.047
	AC	4	1	2	1	
CYP4F2*3 (rs2108622)	CC (WT)	15	1	14	0	0.685
	CT	17	1	14	2	
	TT	2	0	2	0	
CYP2C19*17 (rs12248560)	GG (WT)	26	2	22	2	0.542
	GA	7	0	7	0	
ABCB1 C3435T (rs1045642)	CC (WT)	9	1	8	0	0.430
	CT	15	1	12	2	
	TT	10	0	10	0	

(High dose: >28 mg/week; Intermediate dose: 7–28 mg/week; Low dose: <7 mg/week)

No conflict of interest.

DGI-069 THE IMPORTANCE OF CLINICAL PHARMACIST COUNSELLING IN IMPROVING PATIENT MEDICATION ADHERENCE

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Background Adherence is a key factor in achieving good clinical outcomes in patients undergoing long-term treatment. Meeting with patients is fundamental in educating them on correct drug use, and recommending dietary and lifestyle changes.

Purpose To assess the clinical pharmacist (CP) counselling programme, up to the discharge and outpatient visits, to improve medicines adherence, reduce adverse drug events, and encourage positive behaviour.

Materials and Methods CP counselling was addressed to adult abdominal and cardiac surgery patients, including transplanted patients. The topics discussed were: importance of prescribed drugs and therapeutic indications, directions, and potential side effects. A drug information sheet was given to all patients. A survey was then conducted by the ISMETT Pharmacy Service from 1 May to 30 September 2012.

Results The survey included 524 patients, of whom 54.6% were transplant patients and 45.4% cardiology patients; 326 were male and 198 female, with a mean age of 56 ± 15.1. Of these patients, 97.5% (511/524) knew that respecting therapeutic recommendations improves outcomes and 85.3% (447/524) reported that the CP had explained the importance of correct dosage and mode of administration. However 11.5% (60/524) didn't know the correct mode of administration and 6.3% (33/524) didn't take their drugs on time. 4.8% (25/524) reported occasionally missing a dose, 32% of them (8/25) because of a lack of symptoms, and 68% (17/25) because of a regimen of multidrug treatment. CP counselling was repeated for patients who didn't completely adhere to treatment. For clinical reasons and to increase patient compliance, the physician and CP changed the treatment from mycophenolate mofetil to mycophenolic acid for 7 patients, from immediate release tacrolimus to an extended release formulation for 1, and from mycophenolate mofetil to everolimus for 1. All patients reported that CP counselling had a positive effect and 58.6% asked to meet with the CP more often.

Conclusions Our survey confirmed that CP counselling improves patient outcomes and safety, results in stricter adherence to treatment and changes in patient behaviour, and contributes to better outcomes and faster convalescence.

No conflict of interest.

DGI-070 THE PURPLE WASTE STREAM – HOW NORTH BRISTOL NHS TRUST (NBT) DEALS WITH HAZARDOUS WASTE MEDICINES

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Background All hazardous pharmaceutical waste must be clearly identified, segregated and consigned with the six digit European Waste Catalogue code (18 01 08) within purple-lidded containers to permit safe destruction. [The Hazardous Waste (England and Wales) Regulations 2005 (amended 2009)].

Within NBT, as for most UK hospitals, the route for the disposal of cytotoxic pharmaceutical waste was well established, but did not include cytostatic material.

Purpose To adopt a new mechanism throughout NBT to:

- Identify and segregate hazardous waste
- Raise awareness and train staff to manage waste legally
- Introduce new hazardous labelling and patient information

Materials and Methods This included:

- Revision of the existing pharmacy waste control manual and comprehensive list of hazardous drugs. This laminated list with a visual guide to the waste streams was displayed throughout the pharmacy
- The list was used to 'code-tag' and highlight all existing hazardous material in the software system
- New hazardous products were identified following an initial Quality Assurance assessment
- A new permanent self-adhesive purple 'Hazardous – dispose of appropriately' sticker was designed for attachment to each package of relevant items by stores staff on receipt
- A leaflet was designed following discussions with NBT patient panel

Results The new system was agreed/ratified through NBT Medicines Governance Group before implementation. The NBT waste management team adopted this purple waste stream model throughout NBT and amended policies/procedures. Awareness was raised with all staff through existing training sessions to ensure trust-wide uptake and continued compliance.

Conclusions NBT Pharmacy has developed a waste control mechanism to process hazardous waste to ensure compliance with all legal requirements. Following recent external independent audits by the current waste contractors and the Environment Agency, the new model was described as 'very impressive' and stated that that this 'more than satisfied that the department and trust are fully compliant with waste regulations'.

Abstract DGI-070 Table 1

NBT leaflet
§ The medicine that you have been prescribed has been classified as hazardous waste.
§ This medicine should be disposed of safely as it could be hazardous if it is disposed of in household waste or via the sink or toilet.
§ This medication could also be dangerous if taken or handled by anyone other than the patient.
§ Any unused medicine should be returned to a pharmacy for disposal.
§ This medicine should be taken as directed by your Doctor or Pharmacist and should only be taken by the patient named on the label.
§ Keep all medication out of the reach and sight of children.
Thank you for your co-operation.
NHS Constitution. Information on your rights and responsibilities. Available at **www.nhs.uk/aboutnhs/constitution** (Last accessed March 2010)
If you or the individual you are caring for need support reading this leaflet please ask a member of staff for advice.
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No conflict of interest.

DGI-071 THE RATIONAL USE OF CETUXIMAB IN METASTATIC COLORECTAL CANCER

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Background Cetuximab label indication includes treatment of epidermal growth factor receptor (EGFR)-expressing, KRAS wild-type metastatic colorectal cancer in several possible ways: combination with irinotecan-based chemotherapy, first-line in combination with FOLFOX and as a single agent after oxaliplatin- and irinotecan-based treatment failure in irinotecan-intolerant patients. In our hospital, a multidisciplinary team drawn from the Oncology and Pharmacy services has established a consensus for the rational use of cetuximab as first or second-line agent in association with other chemotherapeutic agents and as monotherapy in third-line treatment after the failure of oxaliplatin and irinotecan-based treatment.

Purpose To verify the relevance of cetuximab prescription to the local protocol and cheque the label indications for cetuximab in our hospital.

Materials and Methods A retrospective study of patients diagnosed with metastatic colorectal cancer between 2006–2012 with available KRAS status. Patients were followed up for a minimum of three months after diagnosis.

Results Twenty-six patients were collected (mean age: 62.2 ± 12.6 years; 53.8% male).

KRAS mutation was negative in 42.3% (11/26) patients and therefore they were eligible for treatment with cetuximab. Five out of those 11 patients underwent cetuximab treatment (5/11; 45.5%): three associated with oxaliplatin in first-line treatment, one associated with irinotecan in second-line treatment and one as monotherapy in second-line treatment. Four out of these 5 prescriptions of cetuximab were in accordance to our local protocol and label (4/5; 80.0%). One prescription was not in accordance with either the local protocol or the cetuximab label; due to this the patient was treated with oral capecitabine as first-line and cetuximab monotherapy as second-line treatment.

Three KRAS-negative patients (3/11; 27.3%) are currently in treatment with irinotecan as second-line therapy.

Three KRAS-negative patients were lost to follow-up after undergoing second-line treatment not known to contain a cetuximab prescription (3/11; 27.3%).

Fifteen patients positive for KRAS mutation (15/26; 57.7%) were not treated with cetuximab.

Conclusions Ninety-five percent of cetuximab prescriptions in our hospital are in accordance with the established local protocol and the cetuximab label (19/20).

No conflict of interest.

DGI-072 THE USE OF LINEZOLID IN NEUROSURGERY: THE EXAMPLE OF A FRENCH TEACHING HOSPITAL

doi:10.1136/ejhpharm-2013-000276.338

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Background Linezolid (LNZ) is an antibiotic indicated for the treatment of methicillin-resistant Gram-positive infections. Following recent unavailability of fosfomycin in France, local standards for the treatment of nosocomial meningitis and nosocomial brain abscesses (NM-NBA) have temporarily changed. Indeed, in Toulouse's Teaching Hospital, the Anti-infectious Committee has decided to modify its recommendations, changing fosfomycin to LNZ. At the same time, the use of LNZ is strictly controlled in our hospital, in order to preserve antimicrobial activity as long as possible.

Purpose To present an overview of the use of LNZ in a neurosurgery ward, in Toulouse's teaching hospital.

Materials and Methods We analysed the prescriptions for LNZ between 1 January 2011 and 1 August 2012, collecting data on: type of infection, germ and antibiotic sensitivity, treatment duration, total cost of antibiotic treatment.

Results When fosfomycin was still available, LNZ was only prescribed to six patients, none of whom was treated for NM-NBA. When fosfomycin became unavailable, 72 prescriptions were written for LNZ, of which 59 (82%) were for NM-NBA. Of these 59 prescriptions, 54 (92%) were initially empirical; 45 (76%) were revaluated at day 3 with advice from a senior infectious disease specialist, which resulted in 19 treatment discontinuations (42%). Moreover, 29% (17/59) of identified germs were multi-resistant and

in 44% of cases (26/59) no germ was isolated. In one case, the isolated germ was resistant to LNZ. The substitution for fosfomycin by LNZ has led to an estimated extra cost of 2014 euros per month.
Conclusions Unavailability of fosfomycin has led to a strong increase in the use of LNZ, particularly for the treatment of NM-NBA, causing extra costs and increasing the risk of LNZ resistance. Careful use of this antibiotic, with the contribution of Hospital Pharmacists, should help us preserve its potential.

No conflict of interest.

DGI-073 THE USE OF TRABECTEDIN IN METASTATIC SARCOMA: CASE REPORT OF YOUNG MALE TREATMENT

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Background Trabectedin is a DNA minor groove binder of marine origin. It is indicated for the treatment of adult patients with advanced soft tissue sarcoma after failure of anthracyclines and ifosfamide, or for patients unsuited to receive these agents. In Italy it has been approved since 2009 and it has been included in the Register Monitoring Cancer Drugs.
Purpose To asses the safety and efficacy of treatment for a 28-year-old male patient, with inoperable metastatic sarcoma, not responsive to ifosfamide or anthracyclines
Materials and Methods The oncologist draws up a treatment protocol that is checked by the hospital pharmacist prior to preparation in the Clean Room. The patient was treated with 3 mg of trabectedin in elastomeric pump of 5 ml/h for 24 hours. This treatment was performed every 21 days.
Results From August 2010 to February 2012 the patient was given trabectedin at the standard dose of 1.5 mg/m^2. The first TAC in October 2010 showed stable disease. In March 2011, after 10 cycles, he was still progression-free. The disease started to progress only after 22 cycles. At the beginning of the treatment the patient had abdominal pain, at the end of it, he has neutropenia and increased levels of transaminases. The time to progression (TTP) was 20 months, while in a randomised study TTP was 13.9 months.
Conclusions Trabectedin treatment in soft tissue sarcoma was well tolerated with a good safety profile, demonstrating also a low grade of side effects and a greater time to progression in comparison with the published studies.

No conflict of interest.

DGI-074 TREATMENT AND PROGNOSIS IN PATIENTS WITH WALDENSTROM'S MACORGLOBULINEMIA

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Background Waldenstrom's macroglobulinemia (MW) is an uncommon lymphoproliferative disorder of the B cells, associated with overproduction of the monoclonal component Immunoglobulin M (IgM).
Purpose To analyse the treatment and outcome of patients with MW.
Materials and Methods Observational, retrospective and descriptive study of all patients diagnosed with MW from 2001 to the present day. A cytostatic dispensing programme (OncoGest) and the electronic history (Selene) were used to gather the following data: gender, age, year of diagnosis, previous treatments, treatment regime, adverse reactions. The treatment response was rated according to symptom let-up and decrease in the serum IgM.
Results 8 MW patients were included, their average age was 72 years old (rank: 51–82), of which 50% were male.

The symptoms with which patients presented before commencing treatment included: asthenia (100%), anorexia, peripheral neuropathy (37.5%), anaemia (25%), hyperviscosity syndrome (62.5%); 40% of patients required a session of plasmapheresis.

Various treatment regimens were used: Two of the patients commenced treatment with fludarabine, one started with cladribine and two with chlorambucil. Patients with fludarabine had a good response and in the other three cases the response was quite low; as a result, treatment was changed to weekly rituximab until the symptoms stopped and the IgM decreased. Three of the patients started treatment with weekly rituximab with a good response in two of the cases and one had a low response so the treatment was changed to rituximab with cladribine.

All patients except one who is currently receiving rituximab and cladribine have had relapses after the first treatment. They were treated with weekly rituximab until the symptoms stopped, except in two of the cases, who currently continue with maintenance rituximab every two and three months respectively.

As regards tolerance and adverse reactions, neutropenia appeared in just one patient treated with chlorambucil, the treatments were well tolerated by the remaining patients.
Conclusions Various drugs are used for the treatment of MW: chlorambucil, fludarabine, cladribine and rituximab, alone or in combination. The treatment regimen the most commonly used, especially if weekly rituximab, especially for those patients that have had relapses with other treatments. Weekly rituximab is a treatment with a good response rate and is well tolerated.

No conflict of interest.

DGI-075 USE OF BOTULINUM TOXIN TYPE A IN POLAND: SYSTEMATIC REVIEW AND QUESTIONNAIRE SURVEY

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Background Each botulinum toxin type A product is a unique biological. Due to differences in physicochemical characteristics, measurement of unit doses and dosing regimens they cannot be considered as biosimilars.
Purpose To assess the relative doses used in clinical practise of two different brands of botulinum toxin type A, Dysport and Botox, in focal dystonias (FD), hemifacial spasm (HS) and juvenile cerebral palsy (JCP).
Materials and Methods A systematic review of studies conducted in a variety of countries. The comparison of Dysport with Botox was carried out in accordance with guidelines from the Cochrane collaboration and AHTAPol (Agency for Health Technology Assessment in Poland). Search terms included botulinum toxin type A, dystonic disorders, blepharospasm, hemifacial spasm and cerebral palsy. Concurrently an electronic survey was conducted of eleven Polish doctors, which captured data from 101 of their patients.
Results The systematic review of studies of treating FD and HS with botulinum toxin type A found that where 1.00 unit of Botox is used to treat a patient, between 2.56 and 5.00 units of Dysport are used to treat a patient diagnosed with the same condition. No clinical trials comparing Dysport to Botox were found for JCP. Mean age and percentage of female patients included in the survey was 58.3, 54.7 and 8.9 years; 59.5%, 45% and 40.7% for FD, HS and JCP respectively. Based on information from patient data collected and surveyed doctors' estimates, the doses for Dysport reflected a broad

range within and across indications and were on average 4.18–4.78 times those for Botox in FD and HS and 2.41–3.18 times those for Botox in JCP (overall range 2.41–4.78).

Conclusions Botox and Dysport are not interchangeable. The doses used in Poland are consistent with the results of the REAL DOSE study [1]. Treatment is individualised according to patient needs, experience and doctors' preferences.

Reference

1. Marchetti A *et al*, Retrospective evaluation of the dose of Dysport and Botox in the clinical management of cervical dystonia or blepharospasm (The REAL DOSE Study), *Movement Disorders* Vol. 20, No. 8, 2005, pp. 937–944

No conflict of interest.

DGI-076 USE OF COLONY STIMULATING FACTORS (CSF-G) IN FEBRILE NEUTROPENIA IN PATIENTS UNDERGOING CANCER CHEMOTHERAPY

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Background The hematopoietic growth factors are a fundamental tool for medical oncologists in the treatment of chemotherapy-induced cytopenia. The proper use of these therapeutic aids plays an important role in terms of reduction of morbidity, mortality and costs.

Purpose To evaluate whether clinical practise follows national guidelines on colony stimulating factors (CSF-G) in the management of hematopoietic toxicity in oncology (AIOM 2010); to investigate the incidence of certain parameters involved in the overall assessment of the risk factors for febrile neutropenia (FN).

Materials and Methods In the first half of 2012, we analysed the CSF-G requirements in patients undergoing cancer chemotherapy. We selected patients treated with cancer chemotherapy, older than 60 years with a risk factor of FN > 20%, calculated on factors related to the chemotherapy regimen, patient age and type of tumour.

Results We identified 57 patients treated with chemotherapy and CSF-G. Of these, 27 were treated with lenograstim, 24 with pegfilgrastim and 6 with filgrastim. Evaluating the appropriateness of prescribing, according to the parameters identified, showed that only in 12 patients undergoing chemotherapy was a risk factor of FN greater than 20% observed; of these, 4 were treated with pegfilgrastim, 3 with lenograstim and 5 were not treated (3 of which were older than 65 years). We observed that most patients were treated for ovarian, breast or lung cancer or non-Hodgkin's lymphoma, whereas only a small percentage were treated for other cancers such as endometrial, colon, bladder, thymus or biliary tract cancer.

Conclusions The comparison between clinical practise and the AIOM guidelines showed that the use of CSF-G is higher than the level required by the guidelines, when referring exclusively to the 3 major risk factors considered. Therefore, the use of CSF-G in chemotherapy regimens with a low score for febrile neutropenia seems very influenced by additional factors related to the treatment, the patient and the disease.

No conflict of interest.

DGI-077 USE OF EVEROLIMUS IN COMBINATION WITH EXEMESTANE FOR THE TREATMENT OF ADVANCED BREAST CANCER IN A TERTIARY HOSPITAL

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Background Everolimus has recently been approved by the European Medicines Agency (EMA) for the treatment of postmenopausal women with advanced breast cancer in combination with exemestane, after treatment failure with letrozole or anastrozole. The approval was based on the results of the BOLERO-2 study.

Purpose To compare the use of everolimus plus exemestane in breast cancer in our hospital with the BOLERO-2 study.

Materials and Methods Retrospective study of all patients treated with everolimus in combination with exemestane from September 2011 to September 2012.

Data source: clinical history and Pharmacy Department records.

The following variables were analysed: age, disease stage, metastases and localization, previous treatment, adverse reactions, duration of treatment, discontinuation of treatment and reasons.

Safety was evaluated by the appearance of adverse reactions.

Results 9 patients with stage IV breast cancer were included. The median age was 54 (range 76–45) years. All patients had bone metastases and 2 had also visceral involvement (pulmonary and hepatic). Previous treatment included: letrozole/anastrozole (7), tamoxifen (6), fulvestrant (5) and chemotherapy (8). 5 patients met the inclusion criteria of the BOLERO-2 study.

The most frequent reason for discontinuation in the BOLERO-2 study was disease progression. In our study 7 patients discontinued, the reasons were: disease progression (3), death (2), and unknown (2).The median duration of treatment was 16 weeks (14.6 weeks in the BOLERO-2 study). 2 patients are still continuing with the treatment.

The main side effect was stomatitis (55.6%) as in the BOLERO-2 study. Other side effects in our study were: epistaxis, rash, fatigue, infection and gastrointestinal reactions.

Conclusions 55.55% of patients met the inclusion criteria of the BOLERO-2 study and the median duration of treatment was similar.

Stomatitis was the main adverse effect observed.

No conflict of interest.

DGI-078 USE OF SGN35 OR BRENTUXIMAB VEDOTIN IN ANAPLASTIC LARGE-CELL LYMPHOMA: A CASE REPORT IN PAEDIATRICS

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Background Lymphoma is one of the most frequent haemopathies among children and young adults. Anaplastic large cell lymphoma affects 15% of such children under 15 years old and 40% above 15 years old in France. Although the initial treatments are well codified and the efficacy of chemotherapy is well established in most patients, non-responses or relapses with these drugs are leading haemo-oncologists to look for new and effective therapeutic strategies. Thus, SGN35 or brentuximab vedotin is a monoclonal antibody drug conjugate (mADC). It combines an antibody that selectively targets CD30 expression in tumour cells and a cytotoxic drug derived from auristatin. This cell poison is delivered in situ and leads to apoptotic cell death. SGN35 activity is established in Hodgkin's lymphoma and relapsed or refractory systemic anaplastic large-cell lymphomas that are CD30+.

Purpose To report the use of brentuximab vedotin in a paediatric case study.

Materials and Methods A literature search was undertaken about the use of brentuximab vedotin in paediatrics. The pharmacy undertook the administrative work to obtain the treatment for the patient.

Results In July 2012, FDA licenced this ADC to treat CD30+ Hodgkin's lymphoma and relapsed or refractory systemic

anaplastic large-cell lymphoma in adults. It is currently awaiting conditional marketing authorization for adults in Europe. A Phase I/II study in paediatrics is at the moment recruiting. Brentuximab vedotin is administered every three weeks at 1.8 mg/kg (half-life ranges from 4 to 6 days and steady-state was achieved in 21 days for the ADC). Administration is possible in France, after the ANSM granted it temporary authorization on a named patient basis.

An 8-year-old male child, with a diagnosis of anaplastic large-cell lymphoma, was treated according to the ALCL99 protocol. Two months after diagnosis the tumour grew under this first-line chemotherapy. A multidisciplinary group decided to start brentuximab vedotin treatment. A total of 5 courses spaced 3-weekly were scheduled combined with chemotherapy. Signs of the tumour disappeared, thorax imaging normalised, fever and pulmonary and mediastinum adenopathies decreased.

Conclusions After the 4th dose of brentuximab vedotin, the treatment was well tolerated by the patient and the tumour regressed. Among adults, the median response is about 12 months. Thus, confirmation of efficacy still has to be evaluated. Further studies are required to establish the efficacy and safety profile in the paediatric population.

No conflict of interest.

DGI-079 VALPROIC ACID AND BEHAVIOUR DISORDERS: OBSERVATION OF EFFICIENCY AND TOXICITY IN A COGNITIVE-BEHAVIORAL UNIT

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Background In order to limit neuroleptic use in the elderly, because of cardiovascular events, specialists in charge of behaviour disorders don't have many therapeutic options in cognitive-behavioural units (CBU).

Purpose Valproic acid (VPA) is an anticonvulsant and/or a mood stabiliser that can be used in a behavioural way in CBU. One side effect of VPA is hyperammonaemia, which can lead to sedation and changes in behaviour or personality.

Materials and Methods Inclusion criteria were opposition, agitation, aggressiveness or impulsiveness. Ammoniemia levels were assessed before starting the VPA, between 2 and 4 days and after 5 days with VPA. For each person included, Cockroft's creatinine clearance, medical background and neuroleptic co-prescriptions were identified. Results are presented with mean±SEM.

Results The population was defined by an average age of 79.3 y ±1.74, a sex ratio of 15 men for 6 women; a creatinine clearance of 65.4 mL/min ± 8.9, no patients had liver troubles or a history of epilepsy. 21 patients received VPA in the CBU, for at least one of the following indications: opposition (n = 9), agitation (n = 13), aggressiveness (n = 16) or impulsiveness (n = 6). 9/21 patients came out of the CBU with VPA (42.85%), 13/21 without VPA (61.9%), 5/21 with a neuroleptic (23.8%) and 8/21 without VPA or a neuroleptic (38.1%). Ammoniemia rates at D-1, between D2 and D4 and after D5 were respectively 47.47 μM ± 3.71, 51.4 μM ± 6.43 and 63.76 μM ± 4.95. Response rate to VPA was 55% (5/9 patients) for opposition, 37.5% (6/16) for aggressiveness, 38% (5/13) for agitation and 66.6% (4/6) for impulsiveness.

Conclusions Those results show that only one of every two patients with VPA were responders, and average ammoniemia increases during treatment. However, 100% of patients going out with VPA didn't have any neuroleptics and for 33%, VPA contributed to stopping neuroleptics.

No conflict of interest.

Pharmacotherapy: pharmacokinetics and pharmacodynamics (including: ADE, TDM, DUE)

PHC-001 AMIKACIN DOSING TO TREAT RESPIRATORY TRACT INFECTIONS ACCORDING TO PATIENT'S BODY MASS INDEX

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Background Body mass index (BMI) is a factor related to the disposition of aminoglycosides (AMG). Dosage is based on total body weight (TBW) or adjusted body weight (ABW) according to patients' BMI.

Purpose To assess if the amikacin dosage prescribed to patients matches with the dosage based on BMI.

To calculate the optimal cut-off point of BMI that predicts a 10% discrepancy between dosage based on TBW or ABW.

Materials and Methods Retrospective study January 2003–December 2010 performed in a 450-bed tertiary hospital.

Dosage of 15 mg/TBW was considered except for patients with TBW > 30% over ideal body weight (IBW). That dose was calculated according to ABW: ABW(kg) = IBW + 0.4(TBW–IBW) as recommended.

Patients included: intravenous amikacin treatment of respiratory tract infections in an extended-interval dosing regimen with therapeutic drug monitoring of amikacin.

Patients excluded: <18 years, ClCr < 60 mL/min, sepsis, lack of data.

Data collected: demographics, TBW, height, BMI, renal function.

Amikacin levels: fluorescence polarisation immunoassay (TDX, Abbott Lab)

Pharmacokinetic analysis: Bayesian estimation compartmental model (PKS programme)

Statistical analysis: ROC curve.

Results 133 patients (79.70% men). Mean (±SD): age: 62.12 years (±15.48); TBW: 65.52kg (±13.43); height: 166.89 cm (±7.44); serum creatinine baseline: 0.68 (±0.19) and CrCl: 97.32 mL/min (±34.67).

Difference between TBW dose vs. ABW dose (mg)(%): BMI[<16]:16.45 vs. 16.45(0%); BMI[16–18.49]:16.57 vs. 16.57(0%); BMI[18.5–24.9]:15.28 vs. 15.61(2.2%); BMI[25–29.9]:12.70 vs. 14.30(11.2%); BMI[30–34.9]:11.56 vs. 14.34(19.3%); BMI[35–39.9] and [>40]: 1 patient.

A ROC curve was built to determine the best cut off point of BMI: 26 mg/m^2

Difference between recommended dosage and prescribed dosage (mg): BMI[<16]: +1.45; BMI 16–18.49: +1.58; BMI[18.5–24.9]: +0.64; BMI[25–29.9]: –0.70; BMI[30–34.9]: –0.66; BMI[35–39.9] and [>40]: 1 patient.

Conclusions Considerable variation between the dosage of amikacin based on TBW and ABW was observed with a reduction of recommended dose in patients with BMI ≥ 25 kg/m^2 and an overdose in patients with BMI < 24.9 kg/m^2.

A reduction of 10% or more of the adjusted calculated dose of amikacin was observed in patients with BMI ≥ 26 kg/m^2.

No conflict of interest.

PHC-002 ANALYSIS OF THE INCIDENCE OF POTENTIAL DRUG INTERACTIONS IN HOSPITALISED PATIENTS

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Background Prescriptions with more than one drug increase the risk of drug-drug interactions, treatment failure, large pharmacological effects and adverse events.

Purpose To estimate the frequency of potential drug-drug interactions in prescriptions for hospitalised patients, and to identify the factors associated with these prescriptions.
Materials and Methods The work was in part sited in the Specialty Hospital in Rybnik (Poland) with the pharmacotherapy team. One of the tasks of the Team was to assess on the basis of documentation, the frequency of random combinations of drugs prescribed and the risk of adverse interactions. Analyses of prescriptions for medicines were made on randomly selected days. The analysis included 760 patients on the fourteen different wards of the hospital. Age, gender and administration of the drugs were noted. The potential D-DIs were identified and recorded.
Results Generally 59.42% of the patients received drugs identified as potentially causing D-DIs (52% of the patients were women, 48% were men). 59% of patients older than 65 years of age received a prescription including one potential D-DI. The average number of medicines taken by one patient was 3.29. The highest numbers of medicines were taken by a cardiology patient (8) and an internal patient (5). The greatest risk of occurrence of drug interactions was in patients in the cardiology department medical care facility (84.3%) and internal medicine department (69.9–80%). The lowest was observed in patients in the laryngological, ophthalmic and rehabilitation departments.

The potentially dangerous pairs of drugs most frequently prescribed were: furosemide-angiotensin converting enzyme inhibitors, non-steroidal anti-inflammatory drugs/angiotensin converting enzyme inhibitors, non-steroidal anti-inflammatory drugs/warfarin, spironolactone/potassium and proton pump inhibitors/simvastatin. Gender and the number of drugs received were factors associated with the potential D-DI.
Conclusions The high percentage of prescriptions with potential drug-drug interactions makes it necessary to adopt alerting strategies that include warning about any associated factors identified and to implement educational programmes. This action may improve the quality of prescribing and reduce the risks for hospitalised patients.

No conflict of interest.

PHC-003 ASSESSMENT OF THE IMPACT OF PHARMACOKINETICS MONITORING RECOMMENDATIONS

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Background In our general hospital, with 450 beds, the Pharmacy department (PD) has a pharmacokinetics area in which vancomycin and aminoglycosides are monitored in non-critical adult patients.

The monitoring starts when:

- There is a medical request (MR).
- Or a pharmaceutical proposal (PP) is made followed by medical acceptance (MA)

Purpose To determine and quantify the acceptance of monitoring recommendations made by the PD, to assess the recommendations and describe PP monitoring.
Materials and Methods Prospective and descriptive study. We collected patients treated with vancomycin or aminoglycosides over a 3-month period (March-June/2012), excluding those for whom there was an MR. Patients included in our study were divided into two categories: monitoring was recommended and not recommended.

Criteria for recommended monitoring: GFR < 60 ml/min, >5 days' treatment, geriatric, obese or concomitant nephrotoxic drugs.

Recommendation was made through the electronic prescription programme with the appropriate justification. If a positive answer was not obtained in two days, it was considered as 'not accepted'.

Patients requiring dose adjustments and the mean number of dose adjustments necessary to achieve appropriate plasma concentrations were also recorded.
Results View table.

Due to pharmaceutical intervention, 19.6% patients were monitored, the majority of them with vancomycin (13.3%).
Conclusions Pharmacy recommendation is an instrument to strengthen monitoring of certain drugs in some situations. Because gentamicin is used mainly in surgical prophylaxis, the number of patients who might need monitoring was low. Out of range initial concentrations with vancomycin and amikacin, might indicate an inappropriate dosage. The low number of adjustments per patient showed that the correct pharmacokinetic calculations had been made by the PD.

Abstract PHC-003 Table 1

Antibiotic	N*	PP	MA	Relevant recommendation	Nº adjustments/ patient
Vancomycin	112	53(47.3%)	32(60.4%)	19(60.8%)	1.5
Amikacin	25	10(40.0%)	7(70.0%)	3(42.9%)	1
Tobramycin	8	2(25.0%)	1(50.0%)	1(50.0%)	2
Gentamicin	95	18(18.9%)	7(38.9%)	1(14.3%)	1
TOTAL	240				

* Patients treated with the antibiotics in question minus patients for whom there was already an MR

No conflict of interest.

PHC-004 BAYESIAN APPROACH IN THE DOSING OF VANCOMYCIN IN THE TREATMENT OF STAPHYLOCOCCAL INFECTIONS

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Background Vancomycin is primarily effective against Gram-positive cocci. However, as it can only penetrate the tissue superficially, it is uncertain if it is really able to achieve concentrations of therapeutic benefit at the site of infection. Suboptimal concentrations have been associated with lack of clinical response and increased resistance. There are no clear criteria on pharmacokinetic parameters associated with a good response, although the most conservative proposals consider an AUC/MIC > 400, in pathological conditions such as pneumonia and meningitis. Some authors have described the failure to achieve these values with the usual doses when the MIC > 2.
Purpose Our work evaluates the pharmacokinetic data of vancomycin in a group of 30 inpatients, and individual Bayesian estimates of the dose needed to overcome the described value of AUC/MIC > 400.
Materials and Methods We estimated the kinetic parameters of a population of 30 patients with a staphylococcal infection through a Bayesian model with application v.1.0 Abbotbase Pharmacokinetic Systems. From each patient we obtained the MIC, and the dose required to obtain an AUC/MIC > 400. We calculated the percentage of patients who reached target values for AUC/MIC with a standard dose of 1 g/12 h and those receiving an individualised dose according to the kinetic parameters obtained by Bayesian setting. Maximum doses of 4 grammes/day were considered.
Results Mean clearance (CI 95%) obtained through Bayesian estimation was 3.91 l/h (3.2–4.6). Median MIC value was 1 mcg/ml. According to these data, 57% of patients would reach therapeutic AUC values with conventional dose. However, if the dose is set individually 90% of patients would reach the target value, with a mean calculated dose of 2300 mg (CI95%: 1550–3000).

Conclusions Most patients with staphylococcal infections can be treated with vancomycin, which also contributes to cost reduction. A Bayesian approach shows better pharmacodynamic results than conventional dosing, with a 90% of patients successfully treated in a real setting.

No conflict of interest.

PHC-005 BLOOD LEVELS OF IMMUNOSUPPRESSANT DRUGS IN PATIENTS WITH CYSTIC FIBROSIS AFTER LUNG TRANSPLANTATION

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Background Patients with Cystic Fibrosis (CF) can absorb oral drugs differently, which could be translated into reduced blood levels of immunosuppressant drugs in transplant patients.
Purpose To evaluate the blood levels of immunosuppressant drugs in patients with CF after lung transplantation during the first months of oral treatment and their effect on the development of acute rejection (AR) and renal failure (RF).
Materials and Methods Retrospective observational study (study period: April 2008 to October 2012). Tacrolimus and mycophenolic acid blood levels of lung transplant patients were collected during the first three months of oral treatment. Blood levels were corrected by dose and body weight [(Concentration/(dose/weight)) (Concentration = ng/mL for tacrolimus and mcg/mL for mycophenolic acid; dose = mg/kg/24 h; weight = kg)]. The primary outcome was to compare immunosuppressant levels between patients with CF and other transplant patients (control group). The incidence of AR and RF (Chi-square test) and overall survival (Kaplan-Meier method) were calculated in both groups.
Results Sample size 49 patients (69.0% male, mean age = 45.2 (SD = 16.2) years), of which 27.0% were CF patients. Immunosuppressant blood levels were lower in the CF group compared with the control group [mean(SD)): Tacrolimus: month 1: 67.6(34.9) vs. 105.6(58.2)*; month 2: 64.9(36.5) vs. 140.2(106.3)*, month 3: 97.0(76.6) vs. 129.8(128.2); Mycophenolic acid: month 1: 0.05(0.03) vs. 0.09(0.14)*, month 2: 0.09(0.08) vs. 0.09(0.04) month 3: 0.20(0.17) vs. 0.16(0.14) (* $p < 0.05$, Wilcoxon-T test)]. The incidence of AR was higher in the CF group (53.8% vs. 47.2%, $p = 0.84$), while the incidence of RF was higher in the control group (27.8% vs. 23. 0%, $p = 0.74$). Overall survival after transplantation was higher in the CF group (51.1 vs. 39.1 months, $p = 0.08$).
Conclusions Patients with CF have lower immunosuppressant levels than the control group. However, there were no significant differences in the incidence of AR, the development of RF or in overall survival after transplantation between the two groups.

No conflict of interest.

PHC-006 CONCOMICANT DRUGS AS A RISK FACTOR FOR THE APPEARANCE OF ADVERSE EVENTS

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Background The best polytherapy is associated with a major risk of adverse events (ADEs) and with an increase of both mortality and morbidity.
Purpose To evaluate the frequency of the appearance of ADEs in those patients undergoing polytherapy compared to the frequency of ADEs tied to monotherapy.
Materials and Methods Patients entering A.O 'Gaetano Rummo' of Benevento were monitored by a dedicated hospital pharmacist, over a period of twenty-four months, by collecting data concerning recorded ADEs and total value analysis (mono/polytherapy), the seriousness and the number of medications considered suspicious.
Results Out of 253 reports made, 140 (55.3%) involved patients undergoing polytherapy compared to 113 attributable to monotherapy. More precisely, 108 ADEs were considered 'serious' and 55.5% of these (60 cases) were due to the polytherapy. Out of 48 serious cases imputable to the use of one drug, just 1 has ended with the death of the patient (anaphylactic shock by ceftriaxone), 1 endangered the patient's life and for 16 of them it was remedied by prolonging hospitalisation. Out of 145 cases which were considered by the detector as 'not serious', 80 proved to have been associated with polytherapy while 60 were relative to 1 medicine.
Conclusions The multi-drug approach represents a significant factor which can cause the appearance of ADEs. To improve health care it is desirable that competent professional figures, such as the pharmacist, would more often employed in a departmental activity of pharmacovigilance in order to develop a prior information network on the risk of medicine interactions and the proper use of the medication.

No conflict of interest.

PHC-007 DEPLOYMENT OF BAR CODE MEDICINES ADMINISTRATION TO CONTROL THE ADMINISTRATION OF MEDICINES IN GERIATRIC UNITS

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Background Of the errors occurring in drug treatment, about 24% take place during the step of administration (Mission nationale d'expertise et d'audit hospitaliers (MeaH) 2008). Poon *et al*, showed in 2010 that the Bar Code Medicines Administration (BCMA) reduced drug administration errors by 41.4% and serious potential adverse drug events by 54.1%.

Drug prescribing, dispensing and administration have been computerised in the 13 geriatric units at the University Hospital (CHU) of Toulouse. Since January 2012, an additional device has been deployed in 8 wards: barcode readers have been installed to read barcodes on the drug packaging to make administration safer.
Purpose A quality indicator was developed in order to analyse the use of barcode readers in care units in real time, to directly reduce drug administration errors. This indicator is a management tool to ensure that the BCMA system does not deviate over time.
Materials and Methods The indicator was designed with the help of a computer specialist. The request is based on an Access file that extracts administration data from the Disporao prescription software. Two parameters are determined: the number of doses administered by BCMA and the number of administered doses that could be scanned; the ratio of these two elements reflects the use of barcode readers by nurses.
Results The training of 89 nurses was completed in June 2012. The indicator showed that nurses scan an average of 70% of unit doses. The objective is to scan more than 95% of unit doses. Investigations are underway to understand the reasons for incompleteness (temporary nursing staff not trained, incorrect prescriptions, faulty hardware, for example) and make corrective actions.

Conclusions Optimization of the deployment of BCMA in the Geriatric units of Toulouse CHU allows us to plan the development of this practise over a large number of clinical departments at a later date.

No conflict of interest.

PHC-008 DEVELOPMENT AND APPLICATION OF A SIMPLE LC-MS METHOD FOR THE DETERMINATION OF PLASMA RILPIVIRINE CONCENTRATIONS

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Background Rilpivirine is a second-generation non-nucleoside reverse transcriptase inhibitor that is highly potent against both wild-type and drug-resistant HIV-1 strains. The quantification of rilpivirine in human plasma is important to support clinical studies.

Purpose Rilpivirine was just approved in May 2012 in Japan. Therefore, pharmacokinetic studies of rilpivirine have still not been completed in Japanese patients. We intended to develop a conventional method for determining plasma rilpivirine concentrations and compare plasma rilpivirine concentrations of Japanese HIV-1 infected patients with those of foreign healthy volunteers.

Materials and Methods We used a Waters Alliance 2695 HPLC and a Micromass ZQ-2000 MS, controlled with MassLynx version 4.0 software. Our method involves rapid liquid-liquid drug extraction from plasma and use of gradient elution on a reversed-phase C18 column. We recruited 34 Japanese HIV-1 infected patients who were treated with a rilpivirine-containing regimen at the National Hospital Organization Nagoya Medical Center, Japan. All patients had been given 75 mg rilpivirine once daily in combination with other antiretrovirals.

Results The LC-MS method established was validated by estimating the precision and accuracy for inter- and intraday analysis in the concentration range of 18–715 ng/ml. The calibration curve was linear in this range. Average accuracy ranged from 100.0 to 100.6%. Relative standard deviations of both inter- and intraday assays were less than 3.3%. In this study, mean rilpivirine plasma concentration for Japanese patients at trough was 58 ng/ml (n = 18). Mean rilpivirine concentration at peak was 126 ng/ml (n = 6). These levels were higher than rilpivirine concentrations seen in trials with healthy foreign volunteers.

Conclusions Our LC-MS method provides a conventional, accurate and precise way of determining rilpivirine in human plasma. In clinical practise, AUC of rilpivirine for Japanese HIV-1 infected patients is larger in comparison with foreign data. We think that this was caused by the poor build of Japanese HIV-1 infected patients.

No conflict of interest.

PHC-009 DRUG DOSE ADJUSTMENT IN RENAL FAILURE

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Background In renal failure, alteration in the pharmacokinetics increases the frequency of overdoses.

Purpose To evaluate pharmaceutical care using a computer programme for drug dose adjustment in renal failure.

Materials and Methods The study period lasted from September 2011 to January 2012 (inclusive), in a 420-bed hospital. Every day creatinine values over 130 mmol/l were filtered. Treatment was reviewed and we obtained creatinine clearance values (Crockcoft & Gault) of selected patients. After consulting the drug dose adjustment on the sheet and in Micromedex, a report was sent with the pharmaceutical recommendation.

Results There were 68 interventions for the 2147 patients studied: Internal Medicine (34) Cardiology (1), Short Stay Unit (5), Orthopaedics (7), Urology (5), Haematology (7) Surgery (5), Neurology (1), Intensive Care Unit (ICU) (2) Oncology (1). 55.9% of notifications were for changes in the dose of enoxaparin (38), 11.8% of amoxicillin-clavulanic acid (8), piperacillin-tazobactam 14.7% (10), 8.8% levofloxacin (6), 2.9% meropenem (2), 2.9% ciprofloxacin (2), 1.5% imipenem (1) and 1.5% aztreonam (1). The proportion of suggested changes accepted was 58.8% (40). 5.9% (4) discontinued treatment, 5.9% (4) were discharged and 29.4% (20) not changed. Of the latter, five were for changes in the pattern of enoxaparin in trauma patients, another 5 from Internal Medicine and 2 more from Haematology and ICU. The rest of them were changes in the pattern of antibiotics (imipenem 1, 2 levofloxacin, 1 meropenem, 1 ciprofloxacin, piperacillin-tazobactam 3) that were given out in the different services.

Conclusions A high percentage of doctors followed the recommendations. Part of the unaccepted tally corresponds to trauma patients whose prophylactic regimen of enoxaparin (40 mg/24 h) was not modified due to the service criteria. Some of the antibiotic prescriptions were not changed because of the severity of the patient's illness (1 levofloxacin and 1 Internal Medicine Meropenem Imipenem Oncology and 1). The rest were rejected without explanation.

No conflict of interest.

PHC-010 DRUG INTERACTION: A CASE REPORT

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Background The serum concentration of valproic acid (VPA) in epilepsy patients is reduced to sub-therapeutic by the administration of carbapenems antibiotics.

Purpose Description of the interaction and communication to the Pharmacovigilance Center with yellow cards.

Materials and Methods A 66-year-old was admitted to the resuscitation unit after being operated on for perforation peritonitis secondary to cytomegalovirus. Treatment was with imipenem because the suspicion of extended-spectrum beta-lactamases (ESLB) organisms was confirmed. Concomitant treatment was with VPA 400mg–400mg–400mg due to an underlying disease, epilepsy. The pharmacy department was asked to cheque the VPA blood level: initially levels were within the therapeutic interval (TI), but at 24 hours after starting treatment with imipenem it decreased by 70% to below the TI. In addition, because of the proconvulsive properties of imipenem, the patient started to have convulsions.

After reporting the suspected interaction, the doctor decided to change the antibiotic to meropenem 1g/8h and so eliminate at least the pharmacodynamic component of the interaction. After 24 hours of the change VPA levels continued to fall and at 48 hours were almost undetectable (≤3 mcg/mL). VPA dose was increased, 1000 mg-1200 mg-1000 mg, without the situation reversimg. After 30 days meropenem was suspended and VPA levels did not return to the TI until after approximately 120 h.

Results Although the exact mechanism is unknown, it is suspected to be of the pharmacokinetic kind and at several levels:

intestinal absorption, enterohepatic cycling, distribution and hepatic conjugation. This would explain the rapid and of intense decline in levels, in spite of the high dose of antiepileptic, and the difficulty reversing the situation.
Conclusions Given the magnitude of the reduction in plasma levels, the speed with which it appears and the difficulty of getting it back at TI, we think that monitoring and dose adjustments are not useful to manage this interaction. A change of anticonvulsivant or antibiotic treatment should be considered.

No conflict of interest.

PHC-011 DUAL ABSORPTION IN INTRANASAL ADMINISTRATION: A NEW PHARMACOKINETIC MODEL

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Background The role of pharmacokinetic modelling is important in the development of new formulations. Some of these models are related to a particular dosage form, others are similar to models that have already been developed. Intranasal (IN) administration can be an example of a dosage form with a specific pharmacokinetic model, especially when it is applied to create a systemic effect.
Purpose To design a pharmacokinetic model that adequately describes a dual absorption profile of the concentration-time curve for intranasal administration.
Materials and Methods A strategy to predict dual absorption was developed to describe the pharmacokinetics of an intranasal administration (model1 and model2). A programme for fitting and simulation was developed (SIMLAB). Midazolam nasal spray was used as an example for this model. To validate the final pharmacokinetic model, Monte Carlo simulations were performed.
Results We had trouble fitting the observations to a single one-compartment dual absorption model. In many cases a flip-flop condition occurred in which the fitted absorption rate was lower than the estimated elimination rate, and the elimination rate showed an unrealistic value. To prevent this flip-flop condition, we used the absorption parameters from the associated observations. We developed the following model: the model superposes two one-compartment absorption models where the dose is split up over the two compartment inputs and the concentration-time curves are separated by using different lag-times (t0). Monte Carlo simulations resulted in a plasma concentration-time profile, indicating the median concentration and the 5th–95th percentile ranges. Biphasic profiles were observed starting at a parameter error of 15%, increasing to 13.6% of biphasic profiles at a parameter error of 50%. When increasing the difference between a parameter in Model 1 and Model 2, the contribution of t0 to creating a local minimum exceeded the contribution of ka. The AUC of the measured and estimated curve was 201.6 μg/L*h and 201.3 μg/L*h, respectively.
Conclusions The model developed is able to fit concentration-time curves showing individual dual absorption curves adequately.

No conflict of interest.

PHC-012 ERLOTINIB IN NON-SMALL CELL LUNG CANCER PATIENTS FROM FERNANDO FONSECA HOSPITAL

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Background The oral epidermal growth factor receptor (EGFR) tyrosine kinase inhibitor (TKI) erlotinib is an established second-line treatment for advanced non-small cell lung cancer (NSCLC). Erlotinib delays disease progression and increases survival after first-line chemotherapy in patients with advanced NSCLC as second-line treatment. Maintenance treatment with erlotinib, when compared to placebo, could be associated with a significantly longer progression-free survival and tolerability mainly in EGFR-activating mutation tumours. However second-line treatment with erlotinib is not more effective than chemotherapy (pemetrexed or other). In terms of traditional toxicities associated with chemotherapy, erlotinib seems to have a better safety profile than chemotherapy, with no haematological toxicities. The most common event has been mild to moderate skin rash which is relatively manageable.
Purpose To study erlotinib's efficacy profile in Fernando Fonseca hospital NSCLC patients.
Materials and Methods We followed up 30 NSCLC patients, who had taken erlotinib before and after other approved chemotherapies, during the 14 months starting from June 2011. During this period we collected patient demographics and baseline characteristics and also their EGFR mutational status. To determine erlotinib effectiveness we calculated progression-free survival (PFS) which was defined as the time from starting erlotinib treatment to the date of documented disease progression or death.
Results The median age of our 30 patients was 62.5 years. The most common pathological subtype was adenocarcinoma (66.7%). 46.6% of our patients had received one prior chemotherapy regimen before erlotinib and 36.6% had received two prior chemotherapy regimens before erlotinib. Two patients took erlotinib as a first line treatment. Median PFS for second-line erlotinib patients was 18.7 weeks while for third-line erlotinib patients it was 12.3 weeks. Only 50% of our patients had information available regarding EGFR mutational status; however patients who harboured tumour-associated EGFR activating mutations seemed to have higher response rates to erlotinib. Rash was the most common treatment-related adverse event with erlotinib, as expected.
Conclusions Our results show that maybe there could be a better disease outcome for advanced NSCLC patients if the oral epidermal growth factor receptor tyrosine kinase inhibitor (erlotinib) were administered as a second-line treatment instead of using it as a third-line treatment. As far as EGFR mutational status is concerned it seems that enhanced efficacy is related to EGFR mutation-positive disease.

No conflict of interest.

PHC-013 EXPERIENCE WITH CANNABINOID TREATMENT

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Background Since March 2011 cannabinoids have been authorised in Spain for the treatment of spasticity due to multiple sclerosis (MS). The product is composed primarily of two cannabinoids: CBD (cannabidiol) and THC (delta 9 tetrahydrocannabinol) and it is administered as a metered dose oro-mucosal spray. The dose should be individualised after a titration period.
Purpose To describe the use of CBD-THC in our hospital and to evaluate adverse effects and the quality of life of the patients treated.
Materials and Methods Descriptive study of all patients treated with CBD-THC from March 2011 to September 2012.

Patients were monitored from the start of their treatment. We recorded the titration period, maintenance dose and adverse

reactions for each patient, besides demographic data. They answered a of quality of life questionnaire (SF-36) at the beginning of treatment and two months before starting.

Results During this period, 7 patients began treatment with CBD-THC, prescribed by neurologists. The average age was 40 years (±8.2), 4 males and 3 females.

It was used for spasticity due to MS in two patients and it was off-label use for the rest of patients: two cases of refractory spasticity not caused by MS and three cases of neuropathic pain.

The quality of life improved 21%, showed by SF-36 questionnaire.

The average titration period was 26 days, the average dose used was 7.8 sprays/day (standard deviation 3.27) (min: 3 max 12), spread three times a day.

All patients, except for one, suffered adverse reactions, mainly mild or moderate dizziness (57% of them), dysgeusia (taste alteration) 29% and hypotension (14%).

Conclusions The quality of life has improved for our patients treated with CBD-THC.

As many adverse effects appeared and it was difficult to manage this drug the pharmacist's role assumed considerable importance; monitoring and pharmaceutical care is very necessary

No conflict of interest.

PHC-014 EXPLORATORY ANALYSIS OF 1,936 SNPS IN 225 ADME GENES FOR ASSOCIATION WITH BUSULFAN CLEARANCE IN ADULT HEMATOPOIETIC STEM CELL RECIPIENTS

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Background Busulfan is used in preparative regimens prior to stem cell transplantation (SCT). There is significant inter-patient variability in busulfan pharmacokinetics (PK) and outcome is related to exposure.

To date, only polymorphisms in genes encoding for glutathione-S-transferases have been studied; they could only explain a small portion of the variability in PK.

Purpose To investigate the role of other genetic variants on busulfan clearance by interrogating 1,936 variants in 225 genes that are involved in drug absorption, distribution, metabolism and excretion (ADME).

Materials and Methods 62 adult patients who received busulfan were genotyped using the Drug Metabolizing Enzymes and Transporters (DMET) array. Busulfan clearance was estimated with a limited sampling (t = 2.5, 4 hrs) PK model. Individual SNPs were associated with busulfan clearance. Top SNPs and haplotypes were replicated in an independent cohort (n = 78).

Results In the discovery cohort 7 variants (3 SNPs and 4 haplotypes) explained 64% (adjusted R2) of variance in busulfan clearance ($p < 0.001$). These genetic variants, located in GSTA5, CYP2C19, CYP39A1 (2 haplotypes), ABCB4, SLC22A4 and SLC7A8, were replicated in the second cohort. One haplotype in GSTA5 (rs4715354 and rs7746993) remained statistically significant ($P = 0.025$) for correlation with busulfan clearance.

Conclusions This is the first study using an exploratory pharmacogenetic approach in 225 genes involved in ADME to explain the inter-individual variability in busulfan clearance. The GSTA5 haplotype was significantly correlated with busulfan clearance, both in the discovery and replication cohort. No additional genetic markers involved in drug metabolism and transport appear to be associated with busulfan clearance.

No conflict of interest.

PHC-015 IMPACT OF MDR1 POLYMORPHISMS ON THE ANALGESIC EFFICACY OF TRAMADOL IN PATIENTS AFTER MINOR SURGERY

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Background P-glycoprotein is a transmembrane transporter coded by the ATP-binding cassette sub-family B multi-drug resistance gene (MDR-1) gene. It influences the bioavailability, disposition and excretion of many drugs. Among the 50 SNPs of the MDR1 gene, more attention has been focused on the SNP at position 3435 in exon 26. Homozygous TT samples were associated with more than two-fold lower intestinal MDR1 expression levels compared with homozygous CC samples. A trial in patients suffering from chronic and cancer pain reported decreased opioid consumption in carriers of the 3435T allele. Our previous data suggest that the pharmacokinetics and therefore effectiveness of tramadol could be affected by MDR1 polymorphism C3435T.

Purpose To evaluate the possible effect of MDR1 polymorphisms on the analgesic efficacy of tramadol in realistic clinical settings.

Materials and Methods Pain intensity was assessed using a visual analogue scale at 2 and 24 hours after minor surgery in 156 patients. Polymorphisms and gene duplication in the MDR1 gene were analysed by PCR–RFLP (restriction fragment length polymorphism).

Results Variant allele 3435T was seen at a frequency of 58.3%. There were no statistically significant differences between MDR1 subgroups in basic demographic parameters. Mean VAS2h in groups C3435CC, C3435CT and C3435TT were 40.0 ± 11.8; 43.2 ± 17.9, resp. 45.5 ± 16.1 mm (P = ns). Corresponding values for mean pain difference, defined as VAS2–24h were 19.3 ± 12.1; 21.3 ± 14.6 and 23.4 ± 15.4 mm (P = ns). Mean tramadol consumption was 2.47 ± 1.17, resp. 2.62 ± 1.1; 2.42 ± 1.1; 2.44 ± 1.3 mg/kg (P = ns) during the 24 h period. There were no significant differences in the drug consumption, reporting of adverse reactions or need for rescue analgesics among the MDR1 genotype subgroups.

Conclusions Although there were approximately 20% higher mean pain difference values in the 3435TT group in comparison with the wild-type subjects, the between-group variation did not reach statistical significance.

No conflict of interest.

PHC-016 NILOTINIB VERSUS IMATINIB FOR THE TREATMENT OF PATIENTS WITH NEWLY-DIAGNOSED PHILADEPHIA CHROMOSOME-POSITIVE, CHRONIC MYELOID LEUKAEMIA IN THE CHRONIC PHASE

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Background Nilotinib is a BCR-ABL inhibitor designed to be more potent and selective than imatinib. Imatinib was the first of a new class of drugs that act by specifically inhibiting a tyrosine kinase receptor.

Purpose To assess the molecular response at 12 months from the start of nilotinib treatment, defined as BCR-ABL transcript levels on the International Scale of 0·1% or less by real-time quantitative PCR in a peripheral blood sample.

Materials and Methods We present data from the ENESTnd study. In ENESTnd, a phase 3, multicentre, open-label, randomised study, patients treated with nilotinib demonstrated higher and faster rates of major molecular response (MMR), more profound molecular response (MR), and complete cytogenetic responses (CCyR) compared with imatinib by 12 and 24 months. 282 adult patients were randomly assigned to receive nilotinib 300 mg twice daily, 281 to receive nilotinib 400 mg twice daily and 283 to receive imatinib. Patients were eligible if they had been diagnosed with chronic phase, Philadelphia chromosome-positive CML within the previous 6 months.
Results By 24 months after the start of treatment, significantly more patients had a MMR with nilotinib than with imatinib (201 with nilotinib 300 mg twice daily, 187 with nilotinib 400 mg twice daily and 124 with imatinib; $p < 0.0001$ for both comparisons). Significantly more patients in the nilotinib groups achieved a complete molecular response at any time than did those in the imatinib group (74 with nilotinib 300 mg twice daily, 59 with nilotinib 400 mg twice daily and 29 with imatinib; $p < 0{\cdot}0001$ for nilotinib 300 mg twice daily vs. imatinib, $p = 0.0004$ for nilotinib 400 mg twice daily vs. imatinib).
Conclusions Nilotinib continues to demonstrate superiority vs. imatinib with faster and more profound molecular responses. These results support nilotinib as a first-line treatment option for patients with newly diagnosed Philadelphia chromosome-positive and chronic myeloid leukaemia.

No conflict of interest.

PHC-017 PHARMACOGENETIC STUDY ABOUT INFLUENCE OF A POLYMORPHISM IN GENE TRAILR1 IN RESPONSE TO INLFIXIMAB IN PATIENTS WITH CROHN'S DISEASE (CD)

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Background Anti-TNF drugs show high inter-individual variability in efficacy and toxicity.

Currently there are no genetic, biochemical or environmental markers to predict response to treatment.
Purpose To assess the influence of gene polymorphism rs2230229 TRAILR1 as a genetic marker in response to treatment with infliximab in patients diagnosed with Crohn's disease (CD). Will it enable us to predict response and improve the effectiveness of the drug?
Materials and Methods Prospective observational study of all patients diagnosed with CD treated with infliximab at our hospital. The assessment of response to infliximab was performed using as criteria of clinical response a decreased questionnaire score CDAI (Crohn Disease Activity Index) at the 4th dose. Subsequently patients were considered to have responded if their CDAI decreased by 70 points or more with respect the baseline and at least 25% on the total score and clinical remission was achieved by a CDAI of less than 150 points. Biological response criteria were defined such as patient responders, partial responders or non-responders according to variation in levels of C-reactive protein (CRP) with regard to baseline at 3, 6 and 12 months. To detect polymorphism KASPAR probes were used in a PCR-based allele-specific competitive FRET technology using a computer and a real time PCR of Aplied Biosystems 7500F in 96-well plate. All patients included in the study received a starting dose of infliximab 5 mg/kg at 0, 2 and 6 weeks after the start and then a maintenance dose every 8 weeks. Statistical analyses were performed with Epidat 3.1 and the level of significance was indicated by a p value of less than 0.05.
Results The study included a total of 40 patients. The mean age of the patients was 38.66 ± 13.98 years and 61.1% were female. The distribution for genotypes was 81.6% AA, 15.8% GA and 2.6% GG. Significant correlation wasn't found between genotypes or alleles of this polymorphism and clinical response to infliximab. Instead, statistically significant differences were shown for approximately 6 months of treatment when comparing patients with genotypes GG and GA/AA and a positive response ($p = 0.047$) when considering the biological response. Similarly patients with a G allele had a more frequent negative response than those with the A allele ($p = 0.043$). On the other hand, significant correlation was found between patients carrying the A allele and the positive response, at 3, 6 and 12 months based on biological response distribution.
Conclusions The results of our study show an association of this polymorphism with response to infliximab. Worst response rates are observed in patients carrying allele G diagnosed with CD. We need more studies on this polymorphism and with a larger sample size to confirm these findings.

No conflict of interest.

PHC-018 PHARMACOGENETIC STUDY AS A PREDICTOR OF EFFICACY AND TOXICITY IN PATIENTS WITH ADVANCED RENAL CELL CARCINOMA TREATED WITH SUNITINIB

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Background Sunitinib (SU) is an oral, small-molecule, multitargeted tyrosine kinase receptor inhibitor that is approved for the treatment of renal cell carcinoma (RCC). However, several patients either do not respond to treatment, or they do, but they experience significant toxicity.
Purpose To find genetic markers of toxicity and efficacy using a commercially available DNA microarray genotyping system.
Materials and Methods 25 patients with newly-diagnosed metastatic RCC were evaluated prospectively from January 2010 to May 2011. Patients received SU in repeated 6-week cycles of 50 mg/day orally for 4 weeks, followed by 2 weeks off treatment. A total of 92 single nucleotide polymorphisms (SNPs) in 34 genes in the pharmacokinetic and pharmacodynamic pathways of drugs were analysed using the Drug inCode pharmacogenetic service. This test is performed from a saliva sample and uses a DNA microarray system. Polymorphisms in candidate genes, together with clinical characteristics, were tested by univariate analysis for association with the number of days of sunitinib treatment until the first reduction of dose, progression free survival (PFS) and overall survival (OS).
Results Patients with CYP1A2*1/*1, a low-metabolising genotype, needed dose reduction due to an increased risk of toxicity vs. *1F/*1F or 1F/1F*(Median time to dose reduction: 2.33 months vs. not reached during study period; $p < 0.006$). Patients with CYP2C19*1/*1, wild type genotype, had an increased risk of dose reductions due to toxicity versus other genotypes (Median time to dose reduction: 2.8 months vs. 9.73 months; $P < 0.021$). No statistically significant associations were observed among drug metabolising genes and PFS or OS.

Val(158)Met Catechol-O-methyltransferase (COMT) gene polymorphisms have been associated with PFS and OS. We found that Met/Met carriers, low metabolising allele, had longer PFS and OS compared to those with Met/Val (PFS not reached vs. 15 months; OS not reached Vs17.2 months) and Val/Val (PFS = 3.3 months; OS = 4.4 months) phenotypes ($P = 0.005$ for PFS and $P = 0.003$ for OS).

Conclusions This preliminary analysis suggests that CYP1A2 and CYP2C19 polymorphisms may be associated with toxicity in patients with RCC treated with sunitinib. Polymorphisms associated with toxicity and survival in this preliminary analysis are being validated in an independent cohort of 95 RCC patients treated with sunitinib.

No conflict of interest.

PHC-019 PHARMACOGENETICS OF ANTIPLATELET AGENTS: TOWARDS PERSONALISED TREATMENT?

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Background Clopidogrel antiplatelet effects differ according to genotypes ABCB1 and CYP2C19, establishing normal, intermediate and slow metabolizers. The intermediate and slow metabolizers and poor transporters are responsible for the poor response to the antiplatelet drug.
Purpose To determine the prevalence of CYP2C19 and ABCB1 genetic polymorphism in the normal Andalusian population (control) and compare it with other populations as a step to implement this determination in clinical practise.
Materials and Methods We genotyped 100 controls from the Andalusian DNA bank for CYP2C19 * 2 (rs4244285), CYP2C19 * 3 (rs4986893) and ABCB1 (rs1045642) using TaqMan probes and allelic discrimination technique. Statistical analysis for allelic and genotypic distributions was calculated by chi-squared test or Fisher's exact test, when necessary, using the Statcalc software packages.
Results Genotype frequencies CYP2C19 (*2) in the Andalusian population: *1/*1: 73%, *1/*2: 25%, *2/*2: 2%, and CYP2C19 * 3: none; the same results as in HapMap (NW European ancestry) population. ABCB1: Andalusian population: CC 36%, CT 44%, TT 20%; HapMap population CC 27%, CT 50%, TT 23%. Allelic frequencies: NW European ancestry HapMap CYP2C19 * 2: G is 85% and A is 15%, the same as our Andalusian control results. ABCB1: HapMap C allele frequency is 45% and the T is 55%, and our frequencies are 57% C and 43% T. Having made the genotype study, 59% of the controls were sensitive to clopidogrel and 41% resistant to it.
Conclusions

- Frequencies for CYP2C19 * 2 and * 3 were similar to those reported in other studies. The frequencies for ABCB1 differed slightly
- It is necessary to perform this type of study in patients with acute coronary syndrome undergoing a percutaneous coronary intervention, to ensure effective treatment as it is documented that clopidogrel is not an effective drug in polymorphisms with allele CYP2C19 * 2 (*1/*2 and *2/*2) and/or ABCB1 TT.

No conflict of interest.

PHC-020 PHARMACOKINETICALLY GUIDED DOSE ADJUSTMENT OF 5-FLUOROURACIL (5-FU) IN GASTROINTESTINAL CANCER PATIENTS

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Background Appropriate dosing of chemotherapeutic drugs is critical to reducing mortality and increasing progression-free survival. 5-fluorouracil (5-FU) is a widely used chemotherapeutic drug in gastrointestinal cancer. The standard approach to dosing 5-FU is based on body surface area (BSA). However, BSA does not account for many of the factors that are responsible for 5-FU clearance such as age, gender, genotype, disease state, drug-drug interactions, organ dysfunction and co-morbidities. Clinical evidence indicates a strong correlation between both toxicity and therapeutic efficacy and total 5-FU exposure expressed as area under the curve (AUC) concentration. This evidence make 5-FU a good candidate for pharmacokinetic (PK)-guided dosing.
Purpose To evaluate the role of therapeutic drug monitoring (TDM) of 5-FU in daily clinical oncology practise.
Materials and Methods Prospective study of adult patients diagnosed with gastrointestinal cancer treated with infusion schedule regimes based on high doses of 5-FU (2.5–3.2 g/m^2 in 24–46 h infusion) in a university hospital. All patients were included regardless of disease state or general clinical status. Individual pharmacokinetic parameters were calculated based on anthropometrics and history of 5-FU administration using the Bayesian software programme (USC*Pack). In the first cycle the dose was calculated using the BSA, and subsequent doses were adjusted to an optimal target AUC of 30–35 mg·h/L.
Results Fifty-four patients were included in the study. Male/female ratio was 31/23, and average age and weight were 60.9 ± 12.8 years and 72.2 ± 16.9 Kg. Mean estimated pharmacokinetic parameters for volume of distribution and 5-FU clearance were 0.49 ± 0.08 L/Kg and 203 ± 68.6 L/h, respectively. To achieve the target AUC of 30–35 mg·h/L, the dose had to be increased in 33 (86.8%) patients and adjusted downward in 5 (13%). No adjustment was needed in 16 patients (29.6%).When the estimate was based on BSA, 30 patients (55.6%) had AUC < 25 mg·h/L.
Conclusions BSA-based 5-FU dosing approaches are limited when it comes to achieving optimal plasma levels in most patients. Pharmacokinetically guided dosing represents a better strategy to improve the efficacy and safety of 5-FU.

No conflict of interest.

PHC-021 PHARMACOKINETICS OF PIPERACILLIN AND CIPROFLOXACIN IN CRITICALLY ILL PATIENTS UNDERGOING CONTINUOUS VENOVENOUS HAEMODIALYSIS (CVVHD) OR CONTINUOUS VENOVENOUS HAEMODIAFILTRATION (CVVHDF)

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Background Critically ill patients on intensive care units are often suffering from sepsis and multiorgan failure causing a high mortality rate. In the presence of acute renal failure (ARF) survival can be improved by continuous renal replacement therapy (CRRT). However these procedures are known to be associated with underdosing of the antibiotic agents.
Purpose To investigate the efficacy and safety of antibiotic treatment, especially piperacillin/tazobactam and ciprofloxacin in patients undergoing CRRT.
Materials and Methods A total of 24 patients with ARF treated with CRRT were enrolled in the clinical trial. Plasma and dialysate concentrations of piperacillin/tazobactam and ciprofloxacin were measured in the steady state treatment phase. Serum concentrations of piperacillin and ciprofloxacin were analysed by a validated HPLC method. Optimum exposure to piperacillin is to be expected when serum concentrations are maintained 4–5 times higher than the minimal inhibitory concentration (MIC), i.e. above 64 mg/l. Optimum exposure to ciprofloxacin is given when the ratio (AUIC) of the area under the curve (AUC) and MIC is ≥125 h. In addition the Cmax/MIC ratio should amount to ≥10.
Results For 10 of 21 patients treated with piperacillin/tazobactam 4/0.5g three times a day plasma concentrations lower than 64 mg/l

were measured. According to a Clopper-Pearson interval 26–70% of the patients were underdosed and the exposure to piperacillin was too low. Only in 9 of 20 patients treated with ciprofloxacin 200 mg twice per day the calculated AUIC averaged ≥125 h and the Cmax/MIC ratio ≥10. Thereby 29–76% of patients treated with ciprofloxacin were underdosed. With regard to the total body clearance 29% of piperacillin and 16% of ciprofloxacin were eliminated by CRRT. Despite the moderate rate of ClCRRT the exposure of the patients to piperacillin and ciprofloxacin was revealed to be inadequate.

Conclusions In critically ill patients undergoing CRRT for piperacillin/tazobactam increased doses of 4/0.5g four times per day and for ciprofloxacin doses of 400 mg twice per day are recommended.

No conflict of interest.

PHC-022 PRACTICAL USE OF THERAPEUTIC DRUG MONITORING OF TEICOPLANIN

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Background The trough concentration of teicoplanin should be >10 mg/L for successful treatment, although it needs to be >20 mg/L for more severe staphylococcal infections, such as endocarditis and osteomyelitis.

Purpose To analyse the trough serum concentrations for teicoplanin by therapeutic drug monitoring (TDM) in current clinical practise in our hospital.

Materials and Methods Descriptive, analytical, observational study involving the first determination of trough serum concentration of teicoplanin, intravenously administered, from 2010 to 2012.

Results Trough serum concentrations of teicoplanin from 48 inpatients (56.3% female) were analysed. The mean age was 59.8 years (CI95%: 55.7–63.9). 58.3% of the inpatients received one single loading dose of 800 mg, the other 37.5% received 400 mg twice daily for the first day, one patient (2.1%) 400 mg twice daily for two days and another patient (2.1%) 400 mg each day. 70.8% of inpatients continued with 400 mg twice daily, 25% with 400 mg once daily and the rest with 200 mg once daily. The mean dose was 6.9 mg/kg/day (CI95%: 5.4–8.5 mg/kg/day). The number of doses received until the first determination was 4.7 (CI95%: 4.1–5.3 doses)

It was observed that the 37.5% of inpatients had a trough serum concentration of teicoplanin lower than 10 mg/L, 58.3% between 10–25 mg/L and 4.2% greater than 25 mg/L. 64.3% of the patients received 400 mg once daily and 26.5% had doses of 400 mg twice daily and had concentrations lower than 10 mg/L.

All patients with concentrations lower than 10 mg/L were readjusted in their dose and frequency to reach serum trough concentrations greater than 10 mg/L, in steady-state.

Conclusions We found out one problem in our setting. The current TDM of teicoplanin can help to solve it, diminishing the risk of treatment failure or micobiological resistance to teicoplanin.

No conflict of interest.

PHC-023 RATIONAL USE OF MEDICINE IN SWEDISH COMMITTEE FOR AFGHANISTAN HEALTH FACILITIES

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Background Medicine and medical commodities constitute essential and important inputs to health service delivery in all health systems. Irrational use of medicines is a multi-dimensional issue and requires interventions at several levels including Health Systems, Organization, Doctors, Dispensers, Patients and Community and it still remains a challenge in health facilities (HF) all over the country, including those managed by the Swedish Committee for Afghanistan (SCA).

Purpose To identify the factors that influence prescribers' behaviour and decision-making (Personal, Interpersonal, Workplace and Informational) while managing medicines and medical supplies.

To provide detailed information for improving the Rational Use of Medicine in SCA health facilities.

Materials and Methods Along with my teams I assessed 4 SCA projects through register books, stock cards, prescriptions, structured questioners and medical records. 28 were selected randomly from 123 HFs with a sampling interval of 5 (every 4th HF). This constituted 10 Comprehensive Health Centres, 9 Basic Health Centres, 5 Sub Centres, 2 District Hospitals and 2 Provincial Hospitals.

Results The average number of medicines per encounter was 2.1, ranging between 1.76 in Saripul and 2.49 in Wardak.

Prescription of antibiotics in health facilities visited averaged at 53.4%. It ranged from 48%.in Saripul and 60% in Samangan. In Wardak it was 56% and it was 49% in Laghman.

The average percentage of injectables prescribed was 7.8 percent. Laghman prescribed 10%, Saripul 6.22%, Samangan 8% and Wardak 7%.

Conclusions Irrational use of medicines is a complex issue and calls for multi-dimensional interventions.

RUM training for professional staff and health education and awareness programmes for people who are living in rural areas as well as distribution of standard treatment guidelines will play a significant role in promoting the rational use of medicine.

Abstract PHC-023 Table 1

Indicator	Wardak	Laghman	Samangan	Saripul	Total Average
Average number of medicines prescribed per encounter	2.49	1.94	2.24	1.76	**2.11**
Percentage of antibiotics prescribed per encounter	56%	49%	60%	48%	**53.4%**
Percentage of injectable prescribed per encounter	7%	10%	8%	6.22%	**7.8%**

No conflict of interest.

PHC-024 RENAL FUNCTION ESTIMATION BY DIFFERENT METHODS (CKD-EPI,COCKCROFT-GAULT AND MDRD4-IDMS) AND ITS EFFECT ON THE DOSE OF IV DEXKETOPROFEN

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Background The different methods that currently exist to estimate renal function take into account different parameters, which may affect the dose of some drugs, such as dexketoprofen.

The recommended dose of IV dexketoprofen is 50 mg every 8 hours if eGFR is >80 mL/min/1.73 m^2, 25 mg every 12 hours if eGFR is between 50–80 mL/min/1.73 m^2 and it is contraindicated if eGFR is <50 mL/min/1.73 m^2 – according to the summary of product characteristics.

Purpose To determine the differences in the estimates of renal function, using CKD-EPI, MDRD4-IDMS and Cockcroft-Gault (CG) to estimate the glomerular filtration rate (eGFR) and to assess their effect on the functional characterization of patients and the dose of IV dexketoprofen.

Materials and Methods Retrospective observational study performed in adults admitted to surgical units – general, trauma and obstetric – treated with dexketoprofen IV in a tertiary hospital from January to September 2011 (9 months).

The eGFR was calculated by CKD-EPI, MDRD4-IDMS and Cockcroft-Gault. Patients with serum creatinine below 0.4 mg/dl were excluded.

CKD-EPI was used as a reference formula to assess the concordance between the different methods of estimating, classifying patients in 3 eGFR groups according to the IV dexketoprofen SmPC: <50 mL/min/1.73 m^2, 50–80 mL/min/1.73 m^2 and >80 mL/min/1.73 m^2.

Results The study included 1946 patients – 54.3% men, 45.7% women – from a total population of 2052 admissions; mean age of 59.8 years (range 17–103). The mean serum creatinine concentration was 0.84 mg/dL ± 0.43 and mean eGFR, according to CKD-EPI, 83.05 ± 26.17 mL/min/1.73 m^2.

The following results of non-concordance were found by comparing these formulas to estimate renal function:

- CKD-EPI vs. MDRD4-IDMS: 4.3% in eGFR <50 mL/min/1.73 m^2 group, 23.2% in the eGFR 50–80 mL/min/1.73 m^2 and 18.9% in eGFR > 80 mL/min/1.73 m^2.
- CKD-EPI vs. CG: 2.8% in eGFR <50 mL/min/1.73 m^2 group, 10.5% in eGFR 50–80 mL/min/1.73 m^2 and 7.8% in eGFR> 80 mL/min/1.73 m^2.
- MDRD4-IDMS vs. CG: 4.5% in the group of eGFR < 50 ml/min, 21.4% in group eGFR 50–80 mL/min and 17.1% in the group of eGFR> 80 ml/min.

Conclusions A great difference was found in the estimates of renal function between the three methods used – CKD-EPI, MDRD4-IDMS and CG – in the three eGFR functional categories –<50, 50–80 and >80 mL/min/1.73 m^2 – ranging between 2.8% and 23.2%.

These results are relevant in clinical practise because the functional category determines the non-use or limited dose of dexketoprofen IV for each patient.

No conflict of interest.

PHC-025 SINGLE NUCLEOTIDE POLYMORPHISMS ASSOCIATED WITH ADVERSE EVENTS IN TAXANE-TREATED BREAST CANCER PATIENTS

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Background Inter-individual differences in drug efficacy and toxicity are linked, in many cases, to single nucleotide polymorphisms (SNPs) in genes coding for drug metabolising enzymes and transporters. Taxanes are active for several tumour types, including breast cancer. But this is limited by adverse events such as neurotoxicity and haematological toxicity.

Purpose To evaluate the associations between a panel of 92 SNPs in 33 genes and adverse events developed by breast cancer patients treated with taxanes.

Materials and Methods Between June 2011 and May 2012 breast cancer patients treated with taxanes who gave informed consent were genotyped for 92 SNPs in 33 genes. Genomic DNA was analysed by a genetic analysis platform (MassArray, Sequenom). Hardy-Weinberg equilibrium was assessed. Clinical data were recorded. The association between genotypes and adverse reactions was assessed with Fisher's exact test and X2-test.

Results Sixty-seven Caucasian women (mean age: 53 years old; 95%CI = 49–56) were genotyped. All genotype frequencies were in Hardy-Weinberg equilibrium. 53.7% (n = 36) of the patients were treated with docetaxel and 46.3% (n = 31) with paclitaxel. Histotypes: 88.1% (n = 59) ductal, 7.5% (n = 5) lobular and 4.5% (n = 3) other. Significant associations were found between: A) Overall grade III–IV toxicity: *TP53 rs1045522* [10.8% (n = 4) GG vs. 43.3% (n = 13) GC/CC, p = 0.004]; DNA repair gene *XPC rs2228001* [8.7% (n = 2) AA vs. 34.1% (n = 15) AC/CC, p = 0.037]. B) Anaemia grade II–IV: *ERCC2 rs1799793* [7.1% (n = 2) GG vs. 33.3% (n = 13) GA/AA, p = 0.016]; *XPC rs2228001* [4.3% (n = 1) AA vs. 31.8% (n = 14) AC/CC, p = 0.012]. C) Neutropenia grade II–IV: *CYP2C8 rs1341164* [6.5% (n = 2) TT vs. 27.8% (n = 10) TC/CC, p = 0.028]; *TP53 rs1045522* [8.1% (n = 3) GG vs. 30.0% (n = 9) GC/CC, p = 0.027]; *XPC rs2228001* [0.0% AA vs. 27.3% (n = 12) AC/CC, p = 0.006]. D) Diarrhoea grade II–IV: *ABCB1 rs1128503* [21.4% (n = 6) TT vs. 2.6% (n = 1) TC/CC, p = 0.018]; *CYP1B1 rs72549389* [20.0% (n = 7) TT vs. 0% TG/GG, p = 0.014]. No associations with neurotoxicity were found.

Conclusions Studying genetic variations can help to identify patients at higher risk of suffering adverse events and provides useful information to individualise therapy.

No conflict of interest.

PHC-026 TACROLIMUS AND IMATINIB INTERACTION. A CASE STUDY

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Background Tacrolimus is a drug metabolised by CYP3A4. Since imatinib increases the plasma concentrations of simvastatin, a CYP3A4 substrate, this indicates that it is an inhibitor of this enzyme and may affect other drugs.

Purpose To describe the possible interaction between imatinib and tacrolimus that result in increased blood levels of Tacrolimus.

Materials and Methods Information was collected through the SAVAC and SELENE computer systems and reviewing patient history. The variables compiled were tacrolimus blood levels, dose and dose regimen.

Results The patient had an allogeneic blood stem cells transplant from an unrelated donor, HLA and ABO compatible, presenting cutaneous sclerodermiform graft versus host disease (GVHD) on tacrolimus (2 mg/12 h) treatment and blood levels around 4 ng/ml for 12 weeks. After starting treatment with imatinib, in the following five tests tacrolimus levels ranged from 5.8 ng/ml to 8.9 ng/ml with no change in the dose of tacrolimus. After 45 days of treatment imatinib was suspended and tacrolimus levels recorded in the following test after discontinuation of imatinib fell to around 4 ng/ml.

Conclusions The increase in tacrolimus blood levels, without changing the dose, supports the possible interaction between imatinib and tacrolimus.

No conflict of interest.

PHC-027 THE PHARMACIST'S ROLE IN IMPROVING VALPROIC ACID PRESCRIPTIONS

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Background Valproic acid (VPA) is 90–95% protein bound to albumin; this binding can be saturated so other parameters that can modify the free fraction of VPA should be taken into account.

Purpose To identify areas for improvement in VPA use and monitoring in a tertiary hospital where the pharmacy service does not routinely send pharmacokinetic dose adjustment recommendations.

Materials and Methods A retrospective study was conducted from February to April 2012. All patients treated with VPA were included and grouped depending on whether VPA was part of their home treatment or not.

Variables collected were: dose, indication, total VPA serum concentration (C), drug interactions classified as ≥C by Lexi-Comp, glomerular filtration rate (GFR), Child-Pugh score, albumin and bilirubin.

Results 30 patients were treated with VPA, 24 of whom were on VPA before admission (15 epilepsy, 9 psychiatric disorders and 1 unknown reason).

Reasons for admission were: 5 convulsions, 12 psychiatric disorders and 13 causes unrelated to VPA. At discharge 27 patients continued on VPA with a mean dose similar to the dose at admission.

C was determined in 14 patients: 5 were within the reference range (50–100 mg/L); 2 above, achieving therapeutic levels before discharge and 7 below. In these latter cases, 3 had an albumin <4.2 g/dL, but none reached C > 50 mg/L after correcting it with the J. Hermida formula which is a theoretical method for normalising C in hypoalbumenic patients. GFR, Child-Pugh score and bilirubin were normal. Mean time between changes in dose and C determinations was 1.5 days (0–5 days).

21 drug interactions were detected in 15 patients, involving a total of 10 drugs. Only 2 interactions were reported: VPA meropenem and VPA lamotrigine.

Conclusions Changes in free fraction of VPA, due to hypoalbuminaemia, liver or kidney disease and hyperbilirubinaemia, must be detected.

C should be measured once a steady state has been achieved (3–5 days).

Drug interactions affecting VPA should be added to the pharmacy service's interaction notification programme.

No conflict of interest.

PHC-028 THERAPEUTIC DRUG MONITORING OF DARUNAVIR IN TWO DIFFERENT TREATMENT MODALITIES

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Background Darunavir (DRV) is a protease inhibitor (PI) that when boosted with ritonavir is effective against both wild-type and PI-resistant HIV. It's relatively long half-life supports once-daily dosing (QD) in treatment-naïve patients. To treat treatment-experienced patients twice-daily dosing (BID) is preferred.

Purpose To analyse the need for therapeutic drug monitoring (TDM)-guided interventions for darunavir and their results in patients receiving darunavir/ritonavir both in BID and QD modalities.

Materials and Methods A prospective study that included 38 patients was performed: 21 (55.3%) in the BID group and 17 (44.7%) in the QD group. Plasma darunavir levels were determined using an HPLC method and viral loads (VL) were measured. Assessments were performed at inclusion and whenever VL was detectable. Patients with detectable VL load were subjected to intervention (change in dose and/or adherence reinforcement) and another plasma drug determination was scheduled. Interventions were considered successful if VL became undetectable.

Results Abnormal plasma drug levels (outside a 1000–8000 ng/ml range) were found in 13/83 (15.6%) determinations which correspond to 9 patients and in all cases detectable VL were also found. Among measures yielding normal levels the proportion of cases with detectable VL was 49/83 (59%). TDM-guided interventions were performed in 22/38 (58%) patients and were successful in 11 of them (7 BID and 4 QD).

Mean plasma levels in the BID group were greater than in the QD group: 3715 ng/ml (SD:±1679) and 2830 ng/ml (SD:±1030) respectively ($p < 0.02$). In the BID group cases with undetectable VL had mean plasma levels superior to those of cases with detectable VL: 4524 ng/ml (SD: SD:±1679) versus 3375 (SD:±1679), $p < 0.05$.

Conclusions TDM-guided interventions could be useful in patients receiving darunavir/ritonavir and experiencing viral failure, especially if the BID dosing modality is used.

No conflict of interest.

PHC-029 VANCOMYCIN PHARMACOKINETICS IN ALCOHOL AND INTRAVENOUS DRUG ABUSERS

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Background Elimination of vancomycin is primarily by glomerular filtration (80–90%), but the liver may also be involved to a small extent. Chronic consumption of ethanol induces hepatic enzymes and can lead to hepatic damage. Both factors could affect vancomycin elimination. Moreover, the use of drugs of abuse could also affect vancomycin clearance.

Purpose To characterise vancomycin pharmacokinetic parameters in non-cirrhotic alcoholics, patients with alcohol-induced cirrhosis and intravenous drug abusers (IVDAs).

Materials and Methods Retrospective study in the aforementioned patients treated with vancomycin in whom therapeutic drug monitoring (TDM) was performed, between 2009–2012, in a tertiary University Hospital. Clinical and pharmacokinetic reports from TDM (PKS Abbot) were reviewed to obtain demographic characteristics, hepatic/renal surrogates, initial/recommended dosage, steady state (SS) distribution volume (VdSS), clearance (CL), CSSmin and CSSmax. The therapeutic target was 7–12 mg/L for CSSmin. Patients with renal failure (CLcr < 60mL/min) were excluded. Results are shown as a mean±SD (T-test for comparisons with controls).

Results Sixty-five patients were included. Demographic data were similar between the groups. 87.7% were men. Pharmacokinetic data is shown in table 1. As regards pharmacokinetic parameters, significant differences were only observed in CL in cirrhotic patients ($\#p = 0.02$).

Conclusions Vancomycin CL is significantly decreased in cirrhotic patients, probably due to hepatorenal syndrome. Initial dose reduction might be considered. Vancomycin CL tends to be higher in alcoholics and IVDAs. Higher doses could be needed to obtain therapeutic concentrations. Therefore, vancomycin TDM is highly advisable in all these groups of patients.

Abstract PHC-029 Table 1

	Control	Non-cirrhotic alcoholics	Cirrhosis	IVDA
Number of patients	20	18	18	9
CL (L/h)	5.27 ± 1.47#	6.40 ± 2.16	4.27 ± 1.18#	6.53 ± 1.91
Vd^{SS} (L/Kg)	0.75 ± 0.33	0.64 ± 0.16	0.68 ± 0.10	0.59 ± 0.09
Initial dosage (mg/kg/day)	29.23 ± 5.75*	26.55 ± 7.35*	27.28 ± 9.01*	28.05 ± 6.12*
C^{SS}_{min} (mg/L)	9.76 ± 3.49	7.91 ± 4.26	10.37 ± 4.51	5.30 ± 3.04

*$p > 0.05$; #$p = 0.02$

No conflict of interest.

Other hospital pharmacy topics (including: medical devices)

OHP-001 A SURVEY OF PHYSICIANS' OPINIONS ON BIOEQUIVALENT PHARMACEUTICAL PRODUCTS

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Background Bioequivalence studies are basically comparative bioavailability studies designed to establish equivalence between generic and innovator products. Pharmaceutical equivalence is the pre-condition of bioequivalence. Medicinal products are described as pharmaceutically equivalent if they contain the same amount of the same active substances in the same dosage forms that meet the same or comparable standards.
Purpose To discover the opinions of physicians on bioequivalent pharmaceutical products and their use.
Materials and Methods 130 physicians were given a form with 10 questions. In this survey, questionnaires were answered by face to face interview.
Results

Q no.	Question	Yes	No	Sometimes
1	Do you think generic drugs are effective?	49%	36%	15%
2	Do you prescribe generic drugs?	35%	39%	16%
3	Do you think generic drug are bioequivalent?	44%	42%	14%
4	Can you see clinical results in patients who use generic drugs?	52%	25%	23%
5	Have you ever seen any problems with your patients who use generic drugs?	35%	42%	23%
6	Do you use generic drugs for yourself or relatives?	31%	64%	5%
7	Do you trust bioequivalent products?	50%	37%	13%
8	In your opinion are generic drugs safe to use?	67%	32%	1%
9	Do you encounter problems with generic drugs? In which category?	18% Antibiotics, analgesics	47%	N.R. 35%
10	Generally which categories of generic drugs are more prescribed?	Analgesics, antipyretics, antacids, antibiotics		

Conclusions The questionnaire shows that physicians are uncertain about whether generic drugs are as effective as their originals. Furthermore the results revealed that physicians prefer not to use generic drugs for themselves or their relatives. Most of them opined that generics are safe but less effective and therefore they avoid prescribing generic drugs especially antibiotics.

No conflict of interest.

OHP-002 ACCESSIBILITY, AVAILABILITY, AFFORDABILITY OF PRESCRIPTION DRUGS, ARETAIEIO UNIVERSITY HOSPITAL, ATHENS GREECE

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Background Time is that wherein there is opportunity, and opportunity is that wherein there is no great time. Healing is a matter of time, but it is sometimes also a matter of opportunity (Hippocrates, Precepts Part 1)

Access to medicines, apart for its social dimension as a human right, has also had a great impact on financial issues since ancient time. With the rise in life expectancy the cost of treating many progressive degenerative and chronic diseases is tending towards a tremendous increase as well. New biotechnological methods in drug preparation claim long-term research and high financial investments resulting in very expensive medicines.

In response to the social demand for unlimited health budgets it is estimated that medicines expenditure is increasing annually by 5% in western countries. The growing use of generics could be considered a means of controlling the rising cost of healthcare.
Purpose To investigate alternative ways to cope with medicines shortages due to the financial crisis. Many pharmaceutical companies are requiring direct payment in order to supply their products. It is imperative to ensure that the patients will really take the drug treatment prescribed by their physicians.
Materials and Methods The reduction in the cost of medicines in Aretaieio University Hospital, Athens, Greece, during 2011 by the use of generics was estimated.

Sources used:

1. our pharmacy software data regarding medicines use in the hospital wards
2. data on prescription modification in cases of shortages, always in cooperation with the medical staff
3. data on official lower prices (competition between providers of generics or biosimilars)

Results Cost reductions were estimated at between 5–10% for contrast media (Radiology Department), and much more than 50% for antibiotics (Surgical, Obstetrics – Gynaecology, Paediatric Departments).
Conclusions Use of generics could be considered a means to control the rising healthcare costs. On the other hand medicines availability in Greece not only in hospitals but also in community pharmacies has become problematic for two main reasons: 1. the policy of reducing the prices of prescription drugs, leading to medicines' shortagse due to exports to other countries and 2. large pharmaceutical companies demanding direct payment, which is impossible under current financial conditions.

Abstract OHP-002 Table 1 Medicines cost reduction in Aretaieio University Hospital, Athens, Greece, 2011 (Surgical – Obstetrics, Gynaecology, Paediatric – Radiology Departments)

Medicines	Cost reduction	Comments
Quinolones	52% generic +26% brand (offer) Total: 78%	Brand offers 26% lower price
2nd generation cephalosporins	50%	Brand offers 16% higher price instead of 50% initially
Piperacillin/Tazobactam	22%	New brand offers equal brand –generic price
Omeprazole	31–40%	Depending on the generic chosen
Contrast media	5–12%	Depending on the generic chosen

No conflict of interest.

OHP-003 ADHERENCE AND DRUG-RELATED PROBLEMS IN BREAST CANCER PATIENTS ON ORAL ENDOCRINE THERAPY

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Background The breast cancer mortality rate is high among Brazilian women, a fact probably related to late diagnosis of this condition. Adjuvant endocrine treatment with tamoxifen for 5 years can increase the survival rate of patients with hormone receptor-positive tumours. Because it is an orally administered drug, the patient plays an important role in compliance with the correct treatment (adherence) assuming much of the responsibility for her treatment. Therefore, Pharmaceutical Care has subsidies to influence treatment of these patients, identifying, preventing and resolving drug treatment problems (DTPs).

Purpose To evaluate adherence to tamoxifen and to identify the most important DTPs in patients with breast cancer on adjuvant endocrine treatment.
Materials and Methods A prospective study was conducted in a university hospital specialising in women's health. Over 6 months patients with breast cancer were included if they were on adjuvant endocrine treatment for at least 1 month. All were interviewed by the pharmacist (Minnesota model). The instrument used to evaluate adherence was the Morisky-Green test.
Results Forty-one patients were included (mean age 55.0 years; ranging from 34–78). In the first visit, the pharmacist identified 82 DTPs (mean: 2.0 ± 1.1 DTPs/patient), 63.4% related to drug safety. The adherence to oral endocrine treatment was 36.6%; according to the Morisky-Green test; among the non-adherent patients 92.3% were non-intentional (mostly by forgetting to take doses of tamoxifen). The patient's average time on endocrine therapy was 24.9 ± 17.6 months.
Conclusions We observed that the DTPs are present in oral endocrine therapy and adherence to this treatment can be considered inappropriate. The results obtained may contribute to the development of strategies in pharmaceutical care to improve adherence to oral endocrine therapy and decrease DTPs in breast cancer patients using tamoxifen.

No conflict of interest.

OHP-004 ADHERENCE TO ANTIRETROVIRAL TREATMENT

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Background Knowledge of the patient's adherence to antiretroviral treatment is extremely useful for monitoring HIV infection. However to measure this reliably is not easy. Several methods have been proposed to calculate adherence, each with its advantages and disadvantages.
Purpose To compare three of the available methods for assessing medicines adherence. To determine the factors associated with non-adherence to highly active antiretroviral treatment (HAART) in HIV/AIDS patients.
Materials and Methods Non-interventional and longitudinal study of patients diagnosed with HIV/AIDS who received HAART (May–June 2010). Three methods for evaluating medicines adherence were studied prospectively: Recording medicines dispensed (RD) from the Pharmacy Department; SMAQ (simplified medicines adherence questionnaire) interview; SMAE (scale for medicines adherence evaluation) interview. We recorded: demographic data (age, sex); years in treatment and daily doses of medicines.
Results 85.2% (104) of patients were males and mean age was 46 years (S8.9) with an average treatment time of 8.7 years (S4.6). 79% of patients have had a change in their medicines at some point in the treatment.

The percentage of patients with greater than 95% adherence was: 77.0% (RD), 62.3% (SMAQ) and 79.4% (SMAE).

By all measures of adherence patients with a single dose of medicine daily (SDM) were more adherent than twice-daily medicines (TDM): RD: 84% vs. 70% ($p = 0.0781$); SMAQ: 70.1% vs. 49.2% ($p = 0.0189$); ESPA: 85.9% vs. 69.2% ($p = 0.0283$) respectively. Patients who had been on HAART between 6–10 years had an adherence of 77.1%, while it was 65.8% for those treated 1–5 years and for patients with over 10 years of treatment, it was 40.8% ($p = 0.002$). Similar results with other measures.
Conclusions Since there is currently no ideal method to determine adherence to treatment, it is important to combine several methods depending on patient characteristics to obtain a measure as real as possible. Years with HAART reduces adherence and SDM regimens schedules appear to have better adherence than TDM regimens. This may affect treatment efficacy positively in the long term.

No conflict of interest.

OHP-005 ADVANTAGES AND DISADVANTAGES OF AN ELECTRONIC PRESCRIBING SYSTEM. ASPECTS TO CONSIDER DURING PHARMACIST VALIDATION.

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Background An electronic prescribing system (EPS) improves the prescription-validation-administration sequence and reduces errors. Nevertheless new questions can appear and it is interesting to take them into account.
Purpose To describe positive and negative aspects that the implementation of an EPS produces in a physician when he/she prescribes, in a nurse during the administration of the drugs and in the pharmacist when he/she validates.
Materials and Methods We recorded the advantages and disadvantages identified by pharmacists as seen by different professionals from the introduction in January 2010 of an EPS.
Results
Positive aspects for the pharmacist: real-time validation (it avoids administration errors and facilitates communication between healthcare professionals); no unreadable or incomplete prescriptions, chance to cheque nurse records (administration time, observations and incidents); quick access to ambulatory care and other hospital admissions medicines records; ability to see and change drug administration rates and information about the drugs is instantly available from databases. Physician: availability of protocols; rapid access to the hospital formulary, automatic drug changes, automatic allergy alerts. Nurse: drugs appear automatically on the administration records, they can request medicines directly from the prescription screen.

Negative aspects for the pharmacist: repeated validation is required of unchanged prescriptions; errors can be made if the medicine is changed (e.g. duration of treatment). Physician: errors due to lack of knowledge of trade names (e.g. insulin); the existence of protocols can lead to incorrect prescriptions (e.g. for elderly people); errors due to ignorance of the programme (former frequencies of administration are retained); need to delete old prescriptions. Nurse: they cannot change the administration schedule; some services don't use yet the EPS.
Conclusions The implementation of EPS improves many aspects for all the health professionals involved. Pharmacist validation is more complete, real time and faster. It is necessary to know the programme well to detect new errors as they arise in order to correct them.

No conflict of interest.

OHP-006 ADVERSE EFFECTS OF DAY-HOSPITAL CANCER TREATMENT MONITORED AT HOME: CREATION OF A PHYSICIANÑPATIENT LOGBOOK

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Background Most anticancer drugs bring adverse effects (AEs) occurring during treatment-free intervals (TIs) while the patient is at home. A significant difference exists between AEs that really

happen at home and those reported to physicians at the time of the subsequent course.

Purpose To set up a comprehensive tool for AE reporting by patients and to assess whether it leads to an improvement in patients' quality of life.

Materials and Methods All consecutive patients treated in a day hospital oncological ward (digestive, thoracic, dermatological and haematology) over four courses of chemotherapy were included. A physician-patient logbook of 14 questions (rated from 1 = absence to 4 = strong) was completed daily during the first and third TIs. A global score was calculated for each course and compared to the results of QLQc30 forms.

Results Thirty-four patients were included, with a mean age of 59.9 and a male/female ratio of 1.3. A majority of metastatic diseases (67.6%) had a WHO performance status (PS) score of 0/1 (88.2%). Most frequent AEs during the first TI were eating disorders (1.72 ± 0.11) and pain (1.41 ± 0.08). The daily score progressively decreased over subsequent TIs. Mean global score was 1.31 ± 0.06 and 1.14 ± 0.06 after the first and third TI, respectively. The frequency of all side effects decreased between the first and third courses. Eating disorders (1.28 ± 0.10) and neuropathy (1.23 ± 0.08) were the most frequent AEs in the third TI. Results of QLQc30 forms showed an improvement of the quality of life between the first and fourth courses. Most important improvements concerned nausea/vomiting (respectively score 22.1 to 8.3) and loss of appetite (score 31.4 to 21.2).

Conclusions A better awareness of AEs of anti-cancer drugs may improve their management. The use of a logbook could be helpful, as its interpretation may be related to an improvement in the quality of life.

No conflict of interest.

OHP-007 AN OLD FRIEND FOR MINIMISING COST: DIRECT INTRAVENOUS ADMINISTRATION

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Background The increase in drug spending and the decrease in resources make it necessary to look for strategies for minimising costs.

Purpose To describe the strategy for administering high-consumption intravenous drugs (IVd) directly and estimating the associated resources saved in an Intensive Care Unit (ICU).

Materials and Methods We obtained a list of drugs whose consumption in the ICU was more than 1,000 units/year.

After a literature review, we selected those that could be safely administered via IVd but are usually administered in intermittent intravenous infusion. We prepared a table containing instructions for their reconstitution and administration.

For four weeks two nurses administered the medicines that had been prescribed and were included in the table via IVd, recording: drug, time spent in preparation & administration and adverse reactions related to the route of administration.

After collecting data:

We estimated the direct cost savings in fluids if all drugs consumed by the unit and included in the table had been administered by IVd during 2010.

We compared the time spent on the preparation and administration of drug doses used in routine practise versus time used to implement this strategy.

Results The ICU used more than 1,000 units/year of each of 39 intravenous drugs, of which 12 were included in the table: metoclopramide, colistimethate, hydrocortisone, phytonadione, pantoprazole, amoxicillin/clavulanic acid, dexamethasone, piperacillin/tazobactam, furosemide, methylprednisolone, meropenem and ranitidine.

The nurses made 117 administrations via IVd (following the usual procedure) of these drugs. The average time was 6.5 minutes for preparation and administration of each dose and no adverse reactions were detected related to the route of administration.

We estimate the ICU can save 28,000€/year.

Conclusions Direct IV administration can be safe and efficient.

The extension of a programme of this type throughout the Hospital could increase efficiency and rational use of medicines significantly.

No conflict of interest.

OHP-008 ANALYSIS OF COSTS AND CONSUMPTION OF MEDICAL DEVICES FOR EXTRACORPOREAL PHOTOCHEMOTHERAPY IN SIENAÍS UNIVERSITY HOSPITAL (AOUS)

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Background Extra-corporeal photochemotherapy (ECP) is a procedure that exposes mononuclear blood cells, obtained through centrifugation, to ultraviolet irradiation, in the presence of the DNA binding agents such as 8-methoxypsoralen (8-MOP). Two methods can be used:

ON-LINE, which consist of irradiation of cells through extracorporeal circulation (the only method used in AOUS until 2011).

OFF-LINE, which consist of leukapheresis of concentrated lymphomonocytotic cells, irradiation and subsequent reinfusion (this method was introduced in AOUS in 2012).

Purpose The objective of this study was to analyse the costs and consumption data of the Medical Device (MD) necessary for ECP in the period 2007–2011, and make a prediction of costs and consumptions in the light of the introduction of the new method.

Materials and Methods We analysed the costs and consumption data of the MD used in ECP in AOUS, extrapolating from the hospital's computer database. Then an estimate of consumption and costs over the period was calculated. The literature and technical specifications of the MD were also consulted to find for what purposes ECP is indicated.

Results ECP is mainly used for T-cell-mediated diseases such as organ transplant rejection, systemic sclerosis, bullous pemphigus, acute and chronic graft-versus-host-disease (GvHD).The period considered to have the highest consumption was in 2008, with 956 kits consumed (at a cost of €756,099.96) and 5 UV lamps (€7,987.50). In subsequent years, there was a progressive decrease in materials consumed. The average consumption was 867 kits/year, with cost/year of €767,178.82. The cost of an off-line ECP kit is €300.99 and a leukapheresis kit is €169.4. The estimated annual cost of the product if using the off-line method would be €409,922.21, versus €914,080.83 using the on-line method.

Conclusions By using the off-line method and the prices of the new contract, AOUS would save 55% compared to the current cost of the on-line method, equal to €504,158.62. A further savings factor is the fact that the lamps for the ECP with the new contract are provided free of charge. This will allow better reallocation of financial resources.

No conflict of interest.

OHP-009 ANALYSIS OF SUGAMMADEX EXPENDITURE AFTER ITS INTRODUCTION INTO CLINICAL PRACTISE IN A FRENCH UNIVERSITY HOSPITAL

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Background The launch on the market of a new drug is always an important event for a specialty, particularly when the mechanism of action is completely new. It is the case with sugammadex, a cyclodextrin, the first selective relaxant binding agent. It binds and holds within its lipophilic core only the non-depolarizing steroidal muscle relaxants rocuronium and vecuronium. This novel agent acts ten times more rapidly than neostigmine without the need to administer atropine concomitantly.
Purpose To determinate how the arrival of sugammadex has changed the management of neuromuscular blockade in everyday practise and to evaluate the additional cost caused by the use of this drug in all the hospital departments and especially in the department of anaesthesia.
Materials and Methods We conducted a retrospective study over two years' use of sugammadex from January 2010 to December 2011. All the consumption data were extracted from the PHARMA software.
Results During the period of the study, the use of rocuronium increased by 110%, with an additional cost of about 47%, explained by the increase in surgery over 2011 (3%), and the increased use of sugammadex (+127%).

An additional cost (€70,092.84) due to the change in practise (neuromuscular block + recovery) was observed. It represents an average increase of 37.4% over all hospital departments.

In the department of anaesthesia, the use of rocuronium increased by 31% (+€2,055), but did not generate an increase in cost, because the use of other neuromuscular blocking agents (benzylisoquinolines and suxamethonium) decreased between 2010 and 2011.

The number of vials of neostigmine requested from the pharmacy decreased by 37%, while the number of vials of sugammadex increased by 102%.

The additional cost in this department was estimated at 25%; expenditure increased from €68,291.57 in 2010 to €85,334.63 in 2011, caused specifically by the change in neuromuscular block recovery practises.

These results agree with those of Raft *et al*, 2010, who proved that the increased expenditure was mainly due to the new neuromuscular block recovery practises (€658 to €28,225 between 2009 and 2010).
Conclusions The introduction of sugammadex into clinical practise joins a quality assurance programme, something new to improve patient safety. However, there are currently pharmacoeconomic barriers to the widespread introduction of sugammadex and further clinical trials will inform the debate concerning cost-effectiveness.

No conflict of interest.

OHP-010 ANALYSIS OF THERAPEUTIC PLANS FOR PATIENTS WITH MULTIPLE SCLEROSIS AT SALERNO UNIVERSITY HOSPITAL: FIRST RESULTS

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Background The Pharmacy Division of Salerno University Hospital distributes medicines to patients referred to the Provincial Centre for Multiple Sclerosis, and since November 2011 has begun monitoring treatment plans to probe the degree of pathology more deeply and patients' use of the drugs.
Purpose The study draws a general profile of patients in the first six months of monitoring.
Materials and Methods Monitoring the treatment plans presented in period 15/11/2011–15/05/2012, the total number, age and sex prevalence of patients were extrapolated, which were classified into: new diagnosis or following a therapeutic programme; severity of neurological disability, according to the Expanded Disability Status Scale (EDSS); drugs used; therapeutic switches; recent interruptions; association with neurological drugs.
Results 165 patients were being assisted, mean age 44 ± 10 years. 115 were females. 5% of the subjects correspond to new diagnoses; 67% were following a therapeutic programme. 77.94% had an EDSS score in the range 0.0–3.0. 5.4% had scores over 7.0. Patients were starting or continuing treatment with the following medicines: interferon B1a 30 mcg/0.5 ml solution for injection (34%); interferon B1b 250 mcg/ml solution for injection (24.2%); interferon B1a 44 mcg/0.5 ml solution for injection (13.3%); interferon B1a 22 mcg/0.5 ml solution for injection (2.5%); glatiramer 20 mg/ml solution for injection (23%); fingolimod 0.5 mg capsules (3%). Of the subjects in continuation, 30% were taking interferon B1a, 16.4% glatiramer. 28% changed treatment because of new neurological abnormalities (50%), recurrent relapses (37%), problems of adherence to the previous regimen (12%). One patient each discontinued interferon B1b 250 mcg/ml and glatiramer due to elevated transaminases. More patients were switched from glatiramer to interferon B1b (33.3%). 20% were also taking neurological drugs such as escitalopram 10 mg (20%), baclofen 25 mg (16%), carbamazepine 400 mg (10%).
Conclusions A high percentage of patients emerge who, despite having neurological deficits, are living independently. In this stage there may be less full awareness of the disease, and pharmacists, with personalised counselling, can detect, correct and prevent poor compliance.

No conflict of interest.

OHP-011 APPLICATION OF BENCHMARKING TECHNIQUES TO HOSPITAL PHARMACY PRACTISE

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Background Benchmarking is a process designed to discover best practise through a comparison of various competing methods.

The use of drug benchmarking can identify problems in health team practise, yield a clearer understanding of competitor hospitals and aid in establishing attainable goals.
Purpose To identify differences in drug expenditure between two hospitals.
Materials and Methods Two hospitals with the same number of occupied beds, size and medicines procurement systems were evaluated for drug expenditure. Analysis included financial measurements: expenditure per hospitalisation day, per patient, cost grading (Pareto), drug inflation index and cost analysis by a time & motion study. Clinical measurements used policies of checking the suitability of drug use and antimicrobial streamlining programmes.
Results Hospital A' drug expenses (+11.5%) and cost/patient (+35%) were higher than in hospital B', the main differences being attributed to the use of infusions and antibiotics. A comparison between IV infusions showed a higher expenditure in hospital A' (48%) compared to B'; differences were attributed to the practise

models of drug preparation and administration. In hospital A' all drugs were diluted in a minibag under aseptic conditions, while in hospital B', nurses diluted the drug on the wards and administered it through a buretrol device. A cost analysis time & motion study was performed to find out the cost of each practise model; 11.3 Euro/unit in hospital A' versus 13 Euro in hospital B'. Hospital A' used PTZ' treatment based on a streaming system & antibiogram assistance, while in B', use was according to physician approval and a system of switching.

Conclusions This survey has several limitations: the difficulty of accurately reflecting prescribing practises, equipment and patient case mix. Nevertheless, the benchmarking exercise provided valuable data, which can be used to target key areas for cost control and performance.

No conflict of interest.

OHP-012 ASSESSMENT OF UNIFIED INHALATION GUIDANCE DOCUMENTS FOR DIFFERENT INHALERS AND THE INFLUENCE OF AGE ON INHALATION TECHNIQUE

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Background When using an inhaler for asthma or chronic obstructive pulmonary disease, the correct inhalation technique is essential for obtaining the desired effect. However, the development of different types of inhalers has led to inhalation techniques that differ greatly among devices. Therefore, we prepared the 'Unified Inhalation Guidance Documents' (UIGDs) in cooperation with hospitals and pharmacies in our region for each available type of inhaler.

Purpose To assess the benefits and problems of the UIGD.

Materials and Methods A total of 165 Japanese patients who received inhalation therapy from June 2011 to September 2012 were enrolled, and 213 points regarding the inhalation technique with 8 types of inhalers were obtained. The inhalation technique of patients who received guidance based on the UIGD for the use of inhalers was assessed by scoring inhalation skill. In addition, we assessed the impact of age on the acquisition of inhalation technique.

Results We found that 86 cases (40.4%) showed problems with inhalation technique. In particular, patients using a Breezhaler (4/5) and Turbuhaler (18/37) had a high rate of problems with their technique. Problems were more frequent in patients aged 65 or over (older) (63/146, 43.2%) compared with other patients (younger) (23/67, 34.3%). In particular, for patients using a Turbuhaler, more older patients (10/14, 71.4%) than younger patients (8/23, 34.8%) had trouble with technique.

Conclusions Around 40% of patients who received guidance based on the UIGD for the use of inhaler devices had trouble with their inhalation technique. Therefore, the UIGDs for the Breezhaler and Turbuhaler should be reassessed. Because the use of some types of inhalers was difficult for older patients, developing an inhaler and guidance specifically for older patients should be considered.

No conflict of interest.

OHP-013 BLEEDING IN CARDIAC SURGERY: USE OF BLOOD COAGULATION FACTORS

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Background There are few references or publications about the management of bleeding during cardiac surgery. Practices are influenced by the availability of drugs and equipment and are team-dependant.

Off-label use of blood coagulation factors (BCFs) has become a major public health and financial concern.

Purpose To explain the increasing use of BCFs, during cardiac surgery under Extracorporeal Circulation (ECC), in a University Hospital setting.

Materials and Methods We assessed the amounts of BCFs and Transfused Blood Products (TBPs) used between 2009 and 2011 and compared these figures to the number of operations using ECC.

Results During this 2 years, the workload, in number of operations requiring ECC, increased by only 3% (with a decrease of 11% in emergencies).

The use of TBP increased 3%.

In the same time, BCF prescriptions increased dramatically (representing a cost of Euro 270,000). The analysis of quantities dispensed shows:

- An increase of over 138% for Prothrombin Complex Concentrates (PCCs)
- Increase of over 586% for fibrinogen (Fg)
- Increase of over 102% for activated factor VII

National figures for the same period were:

- 23% increase for PCC
- 70% increase for Fg
- 4% increase for FVII

Conclusions The increased use of these factors can be explained by changes in local professional practise. In order to standardise and justify the use of these costly products, multidisciplinary meetings (anaesthetists, biologists, cardiac surgeons and pharmacists) are taking place. A procedure for the management of bleeding during cardiac surgery is in development. This document should contribute to the improvement of care in terms of therapeutic efficiency and safety.

No conflict of interest.

OHP-014 CLINICAL AND FINANCIAL EFFECTS OF THE USE OF A THERAPEUTIC EQUIVALENCE PROGRAMME IN A TERTIARY HOSPITAL

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Background A Therapeutic Equivalence Program (TEP) assembles clinically equivalent drugs and defines the best therapeutic alternative included in the hospital's pharmacotherapeutic guide to drugs not included (DNI).

Purpose To measure the clinical and financial impact of a TEP in a tertiary hospital.

Materials and Methods Descriptive observational study conducted between November 2011 and January 2012. During the transcription and validation of the prescriptions of clinical units that work with unit-dose drug distribution system, pharmacist applied the TEP and notified the physician of the substitution in writing. The prescription of an unincluded was only retained if there was a clinical justification that made substitution impossible.

The variables collected were: rate of substitution proposals accepted and rejected, justifications for not performing the substitution, cost of the DNI, cost of the therapeutic equivalent per hospital stay and percentage of therapeutic equivalents prescribed at discharge.

Results 199 substitution proposals were sent to the physicians (51.8% accepted, 48.2% not accepted. Of these, in 17.1% of cases the patient brought the medicine from home and in 7% treatment was discontinued).

The most common clinical justification accepted (8 cases) was leg oedema caused by amlodipine (maintenance of manidipine). The second one was anaerobic infection where levofloxacin is not active (maintenance of moxifloxacin).

The global DNI price within two months of study was €1,148.78. The cost saving with the acceptance of 51.8% of substitutions was €472.63 in two months. If 100% of substitutions had been accepted, the therapeutic equivalent prescription would have saved €586.75.

In 17% of cases therapeutic equivalents were prescribed at discharge.

Conclusions The suggested substitution was accepted in more than half of cases.

The adjustment of medical prescriptions to the hospital's pharmacotherapeutic guide prevailed over the economic saving, which was not significant.

The prescription of therapeutic equivalents at discharge was not as expected.

No conflict of interest.

OHP-015 CLINICAL RESEARCH IN FRANCE AND QUEBEC

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Background Pharmacy practise is evolving in most countries. Hospital pharmacists are pivotal in the organisation and the support of clinical trials. We looked at the current state of pharmacy practise in clinical research.

Purpose To identify differences in clinical research organisation and pharmacy practise between France and Quebec (Canada).

Materials and Methods This is a descriptive study. A literature review was performed in order to describe the organisation of clinical research and the role of pharmacists in clinical research for both countries. Differences were identified by a panel consisting of one French pharmacy intern, one French hospital pharmacist, one Quebec research assistant and two Quebec hospital pharmacists.

Results Fourteen differences relating to research organisation were identified. France and Canada have different normative frameworks, regulatory authorities, authorization processes, delays and shutdown processes. While it is encouraged, clinical trial registration is not mandatory in Canada. Data needs to be archived for 15 years in France vs. 25 years in Canada. Institutional review boards (IRB) have different names, location, composition, nomination processes, mandate duration and informed consent processes for minors. Seven key differences in pharmacy practise were identified. There are different authorization processes for drug compounding and manufacturing. Pharmacy fees are based on a national reference in France, but not in Canada. Software for the computerization of pharmacy services for clinical trials is common in France. In addition to drug trials, French pharmacists also manage sterile medical devices and medicinal products derived from human blood. Canadian pharmacists offer decentralised pharmaceutical care to hospitalised patients. Canadian pharmacists can be principal investigators if a doctor is the qualified investigator.

Conclusions Clinical research organisation is similar on many aspects, but 21 main differences were identified. Comparisons between countries help identify best practise and may contribute to practise improvement.

No conflict of interest.

OHP-016 CONSUMPTION OF OPIOID ANALGESICS IN HOSPITAL PHARMACY AND CONSULTATIVE CARE FOR PATIENTS

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Background In recent years the incidence of different types of pain is increasing. We have found the same in the St. Anne's hospital in the Czech Republic. Patients are now able to ask about the correct usage of opioid drugs in pharmacy consultation centre, which opened in 2011.

Purpose To find out the consumption of opioid analgesics from 2008 to 2011. This is an analysis of prescriptions by doctors from the pain treatment centre. We also collected data from patient records in the pharmacy consultation centre and we wanted to know how many patients come to consult us.

Materials and Methods Data were obtained from the pharmacy computer software. We made a retrospective evaluation, calculated the defined daily dosage (DDD) and compared consumption of opioid analgesics during 2008–2011 for ATC class N02A and other subclasses. We analysed the consultation records.

Results Consumption of weak opioids decreased over that time, while consumption of strong opioids increased, which had to be prescribed. Opiates were prescribed more often to women. The highest consumption was of buprenorphine, than fentanyl and oxycodone, from weak opioids it was tramadol. Consumption of fentanyl increased from 35 735 DDD (2010) to 39 924 DDD (2011), while buprenorphine consumption decreased from 45 059 DDD (2010) to 38 675 DDD (2011). The amount of morphine used last year was twice that of previous years. The total number of patients who visited the pharmacy consulting centre was 41, six patients were from the pain treatment centre. Average age was 61.3. Patients wanted to control interactions, secondly combat adverse effects of opioids and requested information about neuropathic pain. Average consultation length was 22.5 minutes.

Conclusions The consumption of strong opioids is gradually increasing, doctors follow guidelines and they aren't afraid of prescribing strong opioids. In future it would be appropriate to extend the distribution of informatory materials by the consultation centre – not only about the opioid analgesics.

No conflict of interest.

OHP-017 COST COMPARISON OF INTRAVITREAL ANTIANGIOGENIC DRUGS IN THE TREATMENT OF AGE-RELATED MACULAR DEGENERATION

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Background The primary treatment of Age-related Macular Degeneration (AMD) is based on inhibition of Vascular Epithelial Growth Factor (VEGF) with antiangiogenic drugs, which delay disease progression and improve the patient's vision.

Choosing between bevacizumab and ranibizumab is still up for debate. Bevacizumab has not been approved for AMD, while ranibizumab has a safer profile and is legally approved for this condition, although it is more expensive.

Purpose To evaluate the cost of intravitreal ranibizumab in AMD and to compare with the hypothetical cost of treatment with intravitreal bevacizumab in off-label conditions for the same group of patients.

Materials and Methods This descriptive observational study was carried out in a General Hospital, over a period of 24 months between January 2010 and December 2011. All patients diagnosed with AMD who received at least one dose of intravitreal ranibizumab were included.
Results 77 patients were included in the study, with a total of 82 eyes treated. This involved the administration of 259 injections of intravitreal ranibizumab. Each dose cost €549.75. In total, the consumption of intravitreal ranibizumab to treat the AMD during the period of study carried an expense of €142,385.25.

Considering that the unit cost of intravitreal bevacizumab is €4.08, the administration of this drug instead of ranibizumab would have cost €1,056.72.
Conclusions Ranibizumab is 135 times more expensive than bevacizumab.

In this group of patients, the use of bevacizumab would have reduced costs by approximately €141,000.

No conflict of interest.

OHP-018 COST-MINIMIZATION STUDY ASSOCIATED WITH TWO STRATEGIES OF INTRAVENOUS CHEMOTHERAPY: PERIPHERALLY INSERTED CENTRAL CATHETERS VERSUS SUBCUTANEOUS CENTRAL VENOUS ACCESS PORTS

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Background Subcutaneous central venous access ports (CVPs) and peripherally inserted central catheters (PICCs) are two widely used devices for the administration of chemotherapy. Many studies focus on their complications but no cost study could be found in the literature.
Purpose To determine which technique allows cost minimization in the administration of chemotherapy.
Materials and Methods We constructed a Markov chain (TreeAge Software) from literature data in which probabilities were adjusted to the duration of one cycle (21 days).

Time horizon was 5 cycles. Population was oncohaematology.

Four states were identified for patients: absence of complications; mechanical complications, infectious complications and obstructive thrombotic complications.

Three consequences were isolated: the maintenance, removal or reinstallation of the catheter.

Costs were estimated from care protocols of a French University Hospital, from treatment recommendations and the French 'Common Classification of Medical Acts'.
Results Adjusted complication rate (%): (Table)

Cost of these strategies:

PICC (with fixture) = €542
PICC (without fixture) = €486
CVP = €550

The financial gain on the purchase of PICCs doesn't recoup the costs associated with maintenance and management of their complications.

Limits: the study is based on a literature review with a low number of subjects (PICCs) and foreign data (CVPs).The foreign data cannot necessarily be applied to French practise (PICC thrombosis rate in France < international rate).

Moreover unlike the CVP group, the majority of PICC complications are mechanical and therefore depend on the hospital maintenance practises.
Conclusions Costs incurred by the two strategies are equivalent; however we economise on PICCs when the care protocol doesn't change the fixture every time.

Abstract OHP-018 Table 1 Adjusted complication rate (%)

Complications	Infectious	Mechanical	Obstructive/ thrombosis	Absence of complications
CVP	0.41	0.16	0.31	99.1
PICC	0.76	9.28	0.76	82.3

No conflict of interest.

OHP-019 DAY-1 CALL IN AN ONCOLOGY DAY UNIT: WHAT IMPROVEMENTS?

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Background The preparation in advance of anticancer drugs can decrease the waiting time of patients in oncology day units.
Purpose To establish a system of phoning patients before their session (D-1 call) to cheque their availability. A year after its deployment, we evaluated the impact of this plan.
Materials and Methods The oncologist and a nurse call patients one day before their appointment. The prescriptions are validated when the patient's condition permits it in the light of the patient's biological assessment, done in an outside medical analysis laboratory, and an interview using a standardised questionnaire. After pharmaceutical validation, anticancer drugs are prepared in the afternoon for the next day. Indicators of routine monitoring were defined.
Results A median of 13 patients with 23 planned day-hospital appointments were called the day before their appointment. An oncologist validated the treatment of 45% of the patients on D-1 and 95% of the cancer treatments were delivered on D1 before 9:00 am. The total time the patients spent in the unit was reduced from 273 minutes to 242 minutes after our plan was adopted. The average time between the end of the medical consultation and the start of the treatment went down from 79 minutes before the D-1 call to 52 minutes. In addition, 2/3 of patients received the treatment only 30 minutes after seeing their doctor. Finally, fewer than 2% of anticipated preparations were not administered.
Conclusions The D-1 call requires significant effort, but it enables us to improve the organisation of care in the oncology day unit and the preparation of the anticancer drugs by the pharmacy's production unit. The workload is more even throughout the day and is not stressful for the staff. All of this contributes to making the system safer. We are hoping to extend the D-1 call to the oncology week unit and evaluate patient satisfaction.

No conflict of interest.

OHP-020 DE-ESCALATION STRATEGY OF EMPIRICAL ANTIBIOTIC TREATMENT WITH CARBAPENEMS

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Background Therapeutic de-escalation enables us to improve the effectiveness of empirical antimicrobial therapy and avoids the development of resistance.
Purpose To analyse the preliminary results of a pilot project of pharmacy interventions to achieve de-escalation of treatment with carbapenems, within a programme of optimisation of antibiotics use.
Materials and Methods Prospective study of pharmacy interventions aimed at de-escalation in patients starting treatment with carbapenems, over three months (from March to June 2012) in a

tertiary hospital, based on available microbiology results. The de-escalation suggestion was made through the electronic prescribing software. The variables analysed were: number of patients prescribed carbapenems, prescribing speciality, request for cultures, micro-organisms isolated and interventions performed. De-escalations carried out without pharmacy intervention were also assessed.

Results Total number of prescriptions was 433. The most prescribed carbapenem was ertapenem (37.6%) followed by meropenem (36%). The carbapenem most used in Internal Medicine was meropenem (58.2%) and in Urology, imipenem (75%). Ertapenem was used more frequently in General Surgery (53.7%) and Vascular Surgery (86.0%). Out of a total of 316 requested tests, 172 (54.4%) were positive. The most common pathogen isolated was Escherichia Coli (24.7%) 20.8% of which were Extended-Spectrum Beta-Lactamase (ESBL)-producing, 60% of which were sensitive to piperacillin-tazobactam or fosfomycin. Klebsiella spp. were isolated in 3.6%, of which 33.3% were ESBL-producing and 50% were sensitive to piperacillin-tazobactam. Total treatments subject to de-escalation were 96 (55.8%), out of 172 showing this possibility, where 74 (77.1%) were carried out by initiatives of medical teams and 22 (22.9%) after pharmacy interventions. The Services with a higher degree of acceptance of pharmacy interventions were Internal Medicine (36.4%) and General Surgery (27.3%).

Conclusions Although the therapeutic de-escalation of empirical treatments with carbapenems was a low percentage, nevertheless pharmacy interventions achieved an increase of this practise, with the more receptive specialties being Internal Medicine and General Surgery.

No conflict of interest.

OHP-021 DEVELOPMENT AND IMPLEMENTATION OF A PERIPHERAL STANDARD PARENTERAL NUTRITION FOR A NEONATOLOGY DEPARTMENT

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Background Parenteral nutrition (PN) for neonates has to be infused by a central line, due to the high osmolarity resulting from the recommended requirements. The central catheter frequently needs to be removed, and therefore PN may have to be administered by a peripheral line. This problem has been resolved by infusion of enriched glucose solutions, minus the protein input, which is very important in order to avoid catabolism.

Purpose To develop a standard PN with glucose, electrolytes and amino acids, suitable for peripheral infusion and available for the Neonatology department at any time.

The aim is to infuse 100 mL/Kg.

Materials and Methods We performed a literature search about standard PN and we made microbiological and biochemical cheques to ensure the stability and integrity of the solution, after keeping it refrigerated for seven days.

Results We developed a standard PN solution with the following composition per 100 mL:

Amino acids: 2 g
Glucose: 9.5 g
Sodium: 4 mEq
Potassium: 2 mEq
Magnesium: 0.2 mEq
Calcium: 1.5 mEq
Phosphate: 0.8 mmol
Osmolarity: 792 mOsm/L
Total calories: 46 Kcal

Weekly, we prepare four 500 ml bags from a stock solution. We give the neonatology department two so they can hold a small stock and we keep the other two in order to cheque when we need to make another batch.

From implementation, in February 2012, the microbiological controls have always been negative and the biochemical controls have demonstrated that degradation does not occur after refrigeration for seven days.

Conclusions This formulation makes it possible for the physicians to continue with the nutritional support, by peripheral infusion, at any time.

However this type of nutritional solutions is only suitable for meeting the nutritional requirements for short periods, until a new central catheter is placed or the neonate is able to have complete enteral feeding.

No conflict of interest.

OHP-022 DEVELOPMENT OF AN AUTOMATIC METHOD FOR THE COMPARISON OF MASKS USED IN 81MKR/99MTC DUAL ISOTOPE PLANAR VENTILATION/PERFUSION SCINTIGRAPHY

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Background Various pulmonary diseases can be evaluated by ventilation and perfusion scintigraphy with a continuous inhalation of 81mKrypton. Leak of radionuclide during inhalation is a major issue for image quality and requires the intervention of a technician, exposing him-her to gamma radiation from the patient.

Purpose To compare two masks: the DAR breathing system (Covidien) and the Performa Trak VNI (Philips Respironics) including a harness for ventilation scintigraphy and to develop an automatic method for evaluating the quality of 81 mkr inhalation.

Materials and Methods We enrolled and randomised 48 patients to breathe through two types of masks: DAR (n = 25) or VNI (n = 23). After intravenous injection of 99mTc-labelled macroaggregated human albumin (LyoMAA, Covidien) and during continuous inhalation of 81mKr extracted from a 81Rb-81mKr generator (Kryptoscan, Covidien), eight incidences were acquired on a dual-head gamma camera. Three parameters were automatically computed by an automatic segmentation method: the mean ventilation counts (mcounts), an index of constancy of the inhalation rates (Cvent/perf) reflecting variations of the ventilation counts [(maximum-minimum)/median] between incidences compared to perfusion and an index of inhalation leak (mBN, the maximum background noise mean on the profiles incidences). Non-parametric tests of comparison of variance and proportion were used (Mood test and Fisher exact Test).

Results Variance of Cvent/perf and mBN were significantly higher (P = 0.03) in the DAR group. In this group 6/25 (24%) patients had parameters out of the distribution of the VNI group and 11/25 (44%) needed the help of a technician to hold their mask. No difference in the mcounts rate was observed.

Conclusions Index of variability of the ventilation rate as well as background noise were significantly higher in the DAR group and involved about 24% of the patients. Support with VNI masks improved the image quality, decreased exposure to radiation and guaranteed constancy in care compared to DAR. Nevertheless high costs restrict their use.

No conflict of interest.

OHP-023 DIFFERENCES IN TRAINING REQUIRED FOR HOSPITAL PHARMACY PRACTISE IN FRANCE AND QUEBEC

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Background During a one-year internship in a Quebec teaching hospital, a group of French pharmacy interns explored the similarities and differences in training.
Purpose To compare the training required for hospital pharmacy practise in France and in Quebec.
Materials and Methods This is a descriptive comparative study. A list of relevant themes was established by consensus after a review of key websites and literature. A panel of three French interns, a Quebec hospital pharmacy resident and two teaching hospital pharmacists was assembled. Similarities and differences for each theme were identified and discussed.
Results Twenty-seven themes were selected with seven similarities and twenty differences between France and Quebec. In both countries, post-graduate training included a selection process, a structured programme with pre-identified topics, lectures and experiential courses. While post-graduate training is perceived as a plus-value, it is not mandatory. Amongst the differences identified, the two post-graduate systems have been offered for a different period of time (1815-France vs. 1961-Quebec), French interns are not working as pharmacists while Quebec residents are, French internship lasts 4 years vs. 16 months in Quebec, French annual scholar fees are lower (500 euros/year vs. 3840 euros/18 months in Quebec), both programmes offers two paths (hospital/industry in France; hospital/community pharmacy in Quebec), French internship locations includes healthcare agencies, laboratories, research units, hospitals while Quebec residency focuses on patient care locations in hospitals/retail pharmacy and admission capacity differs. Other differences were identified in geographic mobility, resident status, obligations and responsibilities, modalities of supervision, compensation, on-call shifts and evaluation.
Conclusions There are significant differences between French and Quebec post-graduate training although both require work in hospital settings. A better understanding of these similarities and differences may contribute to reciprocal improvement of these programmes and favour exchanges between the two countries.

No conflict of interest.

OHP-024 DOSES OF ANTI-TUMOR NECROSIS FACTOR IN CLINICAL PRACTISE: A FOUR-YEAR RETROSPECTIVE STUDY IN ANKYLOSING SPONDYLITIS PATIENTS

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Background Achieving minimum clinically effective doses could improve the efficiency of treatment with anti-TNF.
Purpose To evaluate the mean dose in ankylosing spondylitis (AS) patients treated with adalimumab (ADA), etanercept (ETN) or infliximab (IFX) in clinical practise and to estimate mean patient-year costs.
Materials and Methods Observational, multicentre, retrospective study performed in two tertiary hospitals. AS patients who received ADA, ETN or IFX from October 2006 to October 2010 were included. Patients could constitute several cases if they received different sequential treatments for at least 6 months. Mean drug consumption was analysed based on individual hospital pharmacy service claims. Demographic data, C-reactive protein (CRP), HLA-B27, axial or mixed AS subtypes, disease activity (BASDAI, BASFI) and concomitant and previous AS treatments were analysed. Associated costs were estimated based on public ex-factory prices including tax (2011 Euros). IFX cost included €110.93 per infusion.
Results 119 patients were included, for a total of 137 cases. No differences were found in recorded variables among groups, except fewer IFX patients (8.2%) had previously received a biological treatment than ETN (25.0%) or ADA (28.6%) patients ($p < 0.05$).

ANCOVA and multivariate regression analysis showed that the only variable to affect patient-year costs was anti-TNF treatment (table 1).
Conclusions Although IFX patients started with a basal PCR lower than ADA patients and a basal BASFI lower than those treated with ETN, no differences were found among groups at the end of the study. IFX doses were higher than ETN doses as a percentage of the label doses.

Abstract OHP-024 Table 1

	ADA	ETN	IFX
Cases	28	48	61
Basal CRP (mg/dl)	2.00*	1.46	0.83
Final CRP (mg/dl)	0.40	0.57	0.92
Basal BASFI	5.1	5.3*	3.7
Final BASFI	3.7	3.7	4.0
% patients achieving BASDAI < 4	60.0%	60.5%	58.3%
Patient-year cost (label doses)	€12,860	€11,846	€13,928
Study mean doses (% of label doses)	37.12 mg/biw (92.80%)	44.39 mg weekly (88.78%)*	5.1 mg/kg/8 wk (101.99%)
Patient-year cost (study clinical practise doses)	€11,934 *	€10,516 *	€14,235

*$p < 0.05$ vs. IFX

No conflict of interest.

OHP-025 DRUG INFORMATION AND THE USE OF A PILLBOX TO IMPROVE SATISFACTION OF PATIENTS TREATED WITH TEMOZOLOMIDE

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Background Compliance is sometimes difficult for patients treated with temozolomide, because of the inconvenience due to the high daily number of capsules needed. Studies with other drugs showed that pillboxes increased patient satisfaction.
Purpose To determine if pharmaceutical information and the use of pillboxes may improve satisfaction of patients treated with temozolomide.
Materials and Methods This prospective and interventional study included adult patients who picked temozolomide up in our Hospital Pharmacy (01/03/2012 to 31/08/2012).

In the first visit, patients previously treated with temozolomide completed a satisfaction questionnaire, which was adapted from the ESTAR questionnaire (ARPAS study). It consisted of 9 questions to be answered from 0 (very unsatisfied) to 6 (very satisfied), and another two items about temozolomide information. In addition, pharmaceutical information and pillboxes were provided to all patients.

At their next visit, patients received another questionnaire, with 6 of the previous satisfaction questions and 5 new questions about usefulness of the pillbox and of the received information.
Results 35 patients were evaluated with the first questionnaire (50.69 ± 13.38 years old; 77.14% were treated with ≥3 capsules per dose) and 28 of them filled in the second questionnaire (50.32 ± 12.45

years old; 75% taking ≥3 capsules per dose). 88.57% vs. 85.71% of patients took their pills in cycles of 5 days followed by 23 days without treatment.

Satisfaction pre- and post-intervention was related to: the number of capsules prescribed per dose (4.43 ± 1.60 vs. 4.96 ± 0.84), the possibility of taking their treatment everywhere (5.17 ± 0.92 vs. 5.32 ± 0.82), and the convenience of the chemotherapeutic regime (5.06 ± 0.94 vs. 5.07 ± 1.05).

The usefulness of the pharmaceutical attention, the pillbox and the leaflet were valuated as 5.46 ± 0.58, 5.39 ± 0.69 and 5.68 ± 0.48, respectively. Global satisfaction with pharmaceutical attention was 5.79 ± 0.42.

Conclusions In this study, information provided by hospital pharmacist and the use of pillboxes improved satisfaction in patients treated with temozolomide.

No conflict of interest.

OHP-026 ECONOMIC EVALUATION OF ANTIFUNGAL DRUGS IN AN INTENSIVE CARE UNIT

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Background Anidulafungin is a semisynthetic echinocandin, mainly used in invasive Candida infections in non-neutropenic patients, with a daily dose cost lower than other antifungal drugs used in candidiasis treatment.

Purpose To prepare a mathematical model, able to produce an estimate of the savings that could be realised using anidulafungin instead of the other antifungals.

Materials and Methods A pilot study was carried out at Turin hospital 'Città della Salute e della Scienza', involving two Intensive Care Units (ICUs), which are the major consumers of echinocandins.

In these two ICUs:

- Data concerning consumption, prices and 2010 rebates for various antimycotics were collected;
- The medical records of 174 patients, admitted in 2010, were examined to identify all those instances where anidulafungin could have been appropriately used, instead of other antifungals.

Based on the analysis of medical records, the substitution index of the other antimycotics with anidulafungin has enabled us to calculate its potential use and the saving that the hospital might be able to achieve.

Results The analysis revealed a frequently inappropriate use of various antifungal drugs.

The review of medical reports confirmed a 70% substitution index of liposomal amphotericin B with anidulafungin.

In 2010, the hospital used 9,237 vials of caspofungin, anidulafungin and liposomal amphotericin B.

If we assume 100% use of anidulafungin in instances where it would be appropriate in the two ICUs, the hospital could make savings exceeding Euro 100,000 per year.

Results The ICUs in question account for 18% of the total vials. The possible savings that could be made by extending the analysis and application of the mathematical model to the entire hospital have not yet been investigated, but the model has confirmed the initial assumption of possibly saving money by using anidulafungin, according to approved indications, in substitution for other antimycotic drugs.

No conflict of interest.

OHP-027 EDUCATIONAL MODEL FOR IT SYSTEMS

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Background An electronic documentation management system had been implemented, replacing and uniting three previously paper-based documentation systems. 130 users located on 6 different locations needed to be educated in the new system.

Purpose To evaluate the training on the new system. Would it be possible for a large number of employees at 6 different locations to use an educational model, called Less Is More (LIM) to rapidly learn a new IT system, with a high degree of satisfied users?

Materials and Methods The training of the personnel was carried out by educating 30 supervisors over a period of 5 days. The supervisors conducted the education of the remaining personnel, based on the principles and materials of LIM. The education model (LIM), is based on simple graphic displays with very simple drawings, that do not require e.g. PowerPoint. The graphic displays give a visual overview of the system. The graphic displays are supplemented by a short storey, telling the procedure of the system. In addition the drawings are followed up by a single page, navigation note with short instructions on how to carry out a specific procedure.

The evaluation was performed using a user survey of the course. The users were to complete a questionnaire, rating relevant statements on a scale from extremely satisfactory, very satisfactory, satisfactory, less than satisfactory and not satisfactory.

Results A survey conducted after the course showed that all 30 supervisors found the method extremely satisfactory, very satisfactory or satisfactory. 100 users on 6 different locations were subsequently educated in a period of 4 weeks, and reports from the system show that the system is being used as desired.

Conclusions We would recommend LIM as an educational model for IT systems, it was used successfully with a high degree of satisfied users.

No conflict of interest.

OHP-028 EFFECT OF A CLOSED SYSTEM DEVICE AND NEW CLEANING PROCEDURE ON SURFACE CONTAMINATION WITH CYTOSTATICS

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Background The potential for contamination associated with handling cytostatic drugs exists in the workplace despite compliance with the protective measures for the safe handling of cytostatics.

Purpose To investigate the efficacy of using closed system drug transfer devices and implementing a new cleaning procedure for environmental cytostatics contamination in the central cytostatics department.

Materials and Methods Wipe samples were taken from five defined areas in March, 2011: Laminar air flow (LAF) cabinet, workbench, floor in front of the LAF cabinet, transport box and the handle of the refrigerator located in the make-ready room. They were tested for contamination with 8 substances (5-Fluorouracil (5-FU), cyclophosphamide (CP), ifosfamide (Ifos), gemcitabine (Gem), etoposide (Eto), methotrexate (MTX), pacli-taxel (Pac), docetaxel (Doc)) using LC-MS/MS. After seven months the test was repeated on the same surfaces (except the refrigerator handle) after the implementation of PhaSeal closed-system drug transfer device and 0.1 m NaOH decontamination solution.

Results In the first test the level of substances wiped from the refrigerator handle was under the detection limit. The LAF cabinet

was the most contaminated area, where the 5-FU, Gem, MTX and CP levels were above the German reference value (0.1 ng/cm^2) and the Ifos and Doc contamination levels were also high. The levels detected on the other three surfaces, ranked in descending order were as follows: workbench, floor and transport box. 5-FU, Gem and CP were present on these surfaces in large quantities.

After seven months the levels of surface contamination showed significant improvement on every surface. MTX, CP, Ifos, Doc were not detectable in the LAF cabinet and the levels of 5-FU and Gem had reduced dramatically.

Conclusions The results suggest that implementing an appropriate decontamination method and preparing with closed system drug transfer devices can minimise environmental cytostatics contamination.

No conflict of interest.

OHP-029 EFFECTS OF A PHARMACIST'S INTERVENTIONS IN A SURGICAL UNIT

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Background In the hospital setting, preoperative and postoperative stages can be considered as vulnerable moments when patients receive multiple drugs before, during and after surgical procedures.

A pharmacist's inclusion in the clinical routine can contribute to detecting and solving drug-related-problems (DRPs) in these patients.

Purpose To implement and develop a working method that enables DRPs to be detected and solved in patients admitted for scheduled surgery.

Materials and Methods Prospective study design over a two-month period. (June–July 2012).

The pharmacotherapy of general surgery inpatients was evaluated by a pharmacist. For each patient, current and home medicines were reviewed. If detected, DRPs were mentioned to the doctor so he/she could assess the need for correction. Any DRPs identified were classified using the Pharmaceutical Care Network Europe (PCNE) system. (Latest revision, January 2010)

Results Average age of patients: 63 years.

Number of prescriptions looked through: 167 (Corresponding to 103 patients)

DRPs identified: 77 DRPs (68 in hospital pharmacotherapy and 9 in home medicines): 42 –Related to Treatment effectiveness (P1), 13-Related to Adverse reactions (P2), 19 Related to treatment costs (P3), and 3 in the group of other problems (P4).

Abstract OHP-029 Table 1 Causes of the DRPs identified

Causes	Number of Interventions*	Outcome of intervention
C1-Drug selection	27 (7-Inappropriate drug, 11-No indication for drug, 2-Indication not noticed, 7-Preventive drug not given) No clinically significant drug interactions were found.	Problem totally solved (PTS)
C2-Drug form	10 (Inappropriate drug form used)	PTS
C3-Dose selection	12 (5-Drug dose too low, 7-Drug dose too high)	PTS
C4-Treatment duration	10 (4-Too short, 6-Too long)	PTS
C5-Drug use/ administration process	8 (5-Inappropriate timing of administration, 3- Drug under-administered)	PTS
C6-Logistics	7 (3-Prescribing errors, 4-Dispensing errors)	PTS
C7-Patient	3 (2-Patient forgot to use the drug, 1-Patient used an unnecessary drug)	PTS

*64 interventions at prescriber level, 9 interventions at patient (or carer) level, 4 at drug level.

Conclusions The inclusion of a pharmacist in surgical units can lead to a more efficient and safe use of medicines. Moreover, suggestions were given due consideration by most of the doctors.

No conflict of interest.

OHP-030 EFFICACY OF HEALTH LITERACY IN THE SELF-EDUCATION OF DIABETIC PATIENTS

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Background The increased prevalence of chronic diseases, including diabetes, requires a critical review of models of care and the introduction of new strategies of intervention. Health Literacy (HL) is a tool for educating patients in order to increase their understanding of medical information and thus educate them about their treatment. Diabetic patients are educated to manage the disease in accordance with the perceived needs for better compliance with drug treatment and its outcomes.

Purpose To adopt a diagnostic-therapeutic protocol shared between the diabetologist and the pharmacist, and to promote the active inclusion of people with diabetes in the course of their treatment. The secondary aim was to activate an information, monitoring and evaluation system through clinical indicators.

Materials and Methods Overall, 70 patients (32 women and 38 men) aged between 35 and 87 used the HL tool themselves and were monitored in this study. Ten patients were treated with insulin + oral hypoglycaemic agents (OHA), 53 with OHA alone and 7 with insulin alone. All patients received a sheet containing clear instructions for the proper management of the disease and treatment. The patient underwent monthly clinical monitoring, and were urged to adopt the right behaviours at home: frequent monitoring of blood glucose, a healthy and balanced diet, moderate activity and preventive screening for diabetes complications.

Results Values of blood glucose test, HbA1c, body weight and waist circumference were reduced by 42.2%, 15.2%, 6% and 3.3%, respectively. Compliance was improved in 30% of patients (screening tests carried out on time). Overall patient satisfaction was high.

Conclusions Our experience confirms that the multidisciplinary HL tool is useful for improving the communication between doctor/pharmacist and the patient. It is important to consider that the patient learning should focus on simple terms and on the knowledge of complications, in order to obtain good management of diabetes.

No conflict of interest.

OHP-031 EFFICIENCY AND PROCESS QUALITY INDICATORS ON THE PREPARATION OF ANTIFUNGAL INTRAVENOUS MIXTURES IN A PHARMACY DEPARTMENT

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Background Our pharmacy department (PhDp) prepares IV mixtures (IVMs) centrally, for example antifungal drugs. 2 quality indicators (QIs) assess the prescription, distribution and administration process: %IVMs returned from clinical units (standard <20%) and %IVMs recycled (standard > 80%), considering that all returned IVMs are validated by a pharmacist to ensure their validity in terms of stability and storage conditions. Also, 2 efficiency indicators assess cost savings: savings from centralised PhDp preparation compared with preparation in clinical units, and savings from recycling antifungal IVMs. Global median %IVM returned is 11%.

Purpose To describe and evaluate this process and the efficiency of quality indicators.
Materials and Methods Prospective study. Period: 1 year (2011). Academic General Hospital (1,500 beds). Antifungal drugs: liposomal amphotericin B, anidulafungin, caspofungin, voriconazole. Variables: process and efficiency quality indicators. Data source: daily log sheet preparation and return of IVM, and antifungal and infusion solution direct costs; personnel costs weren't considered.
Results 3,643 antifungal IVMs were prepared: 35% caspofungin, 32% voriconazole, 21% liposomal amphotericin B, 12% anidulafungin. Process QI: 6.40% antifungal IVMs returned (mainly voriconazole: 10%) and 87% antifungal IVMs recycled (mainly caspofungin: 100%). Total savings: €222,351. Efficiency of the QIs: €155,694 savings from PhDp centralization (mainly voriconazole: €78,659) and €66,657 savings from recycling (mainly caspofungin: €33,025).
Conclusions The fact that process quality indicators comply with standards and the very large cost savings for the institution, support PhDp antifungal IVM centralization. Voriconazole IVM centralization allows more cost savings and caspofungin is the most recycled.

No conflict of interest.

OHP-032 EMTRICITABINE AND TENOFOVIR DISOPROXIL FUMARATE IN HIV-NAIVE PATIENTS: A PHARMACOECONOMIC STUDY

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Background Truvada, a fixed-dose combination of antiretroviral drugs (emtricitabine and tenofovir fumarate) indicated for HIV-1, was the 12th most expensive drug prescribed in Piedmont during 2009–2010, with a growth of 12%.

Since July 2011 the School of Hospital Pharmacy in Turin has developed a two-year pharmacoeconomic project regarding high-cost drugs.
Purpose To provide to the decision-makers with a management tool to evaluate the treatment costs of HIV patients.
Materials and Methods The legislation and articles in epidemiology and pharmacoeconomic journals were reviewed. Drummond's Weighted Checklist method was used to evaluate the pharmacoeconomic articles. A Budget Impact model, based only on the drug costs, was built. The treatment-naive population (290) was extrapolated from the incidence data in Piedmont in 2010. The treatment options relied on the US Department of Health and Human Services guidelines and on the pharmacoeconomic studies. The model suggested a combination of Truvada with: i) efavirenz (NNRTI, Sustiva), ii) atazanavir (PI, Reyataz)+ritonavir (PI booster, Norvir); iii) darunavir (PI, Prezista)+ritonavir (PI booster, Norvir).
Results The daily treatment cost for a treatment-naive patient varies from €21.78 to €30.64, while the annual expenditure varies from €7,949.17 to €11,184.45. The Budget Impact was calculated assuming that the 290 new HIV cases had been treated for one year with one of the therapeutic strategies provided. The variation in comparison with association i) were respectively +24.64% for combination ii) and +40.70% for combination iii). Treatment iii) was the most expensive (€324,3491.37) and increased the annual expenditure by 40.70% (€938,233.23) as compared with treatment i) (€2305,258.14).
Conclusions The Budget Impact analysis will be used to perform pre-assessments of expenditure in order to set up health care programmes for the allocation of the economic resources. A pharmacoeconomic analysis of cost-effectiveness will be performed between the associations Truvada + Reyataz and Truvada + Sustiva.

No conflict of interest.

OHP-033 EPIDEMIOLOGICAL STUDY OF INTOXICATIONS BY ALCOHOL AND DRUG ABUSE IN THE EMERGENCY DEPARTMENT OF LUGO HOSPITAL IN 2009

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Background Acute poisoning is a condition that generates great demand for care in emergency departments of hospitals.
Purpose To find out the epidemiology of severe acute intoxications and study the profile of the intoxicated patients in our hospital.
Materials and Methods Retrospective observational study. Inclusion criteria: patients with final diagnosis of acute intoxication during 2009. Sources: admission management software, clinical histories. Data recorded: age, sex, date of entry, type of toxic agent(s) involved, existence of psychiatric background and previous intoxications. Global analysis: SPSS package.
Results During the study period 1052 requests for analysis were processed with the following results: (see the table below)

Abstract OHP-033 Table 1

Drugs (% positive)	Sex distribution (% men)	Band age (years)	Majority of intoxications by day of the week (DW)	Months of the year with highest numbers of positives (M)
Ethyl alcohol (65%)	80%	50–59	Sunday	August, June, November.
Benzodiazepines (36%)	50%	40–49	Thursday	June and August
Cannabis (12%)	80%	20–29	Sunday>Friday>Saturday	June and August
Cocaine (6%)	80%	30–39	weekend consumption	August
Opiates (5.4%)	81%	30–39	weekend consumption	April = August

Amphetamines (0.19%): 2 men under the age of 20 and 30 years, M: January, DW: weekend. Barbiturates (0.38%): 4 positive, 75% men, A: 42–54. A temporal distribution (week, month year day) cannot be significant in so few cases.
Conclusions For a better understanding of the Spanish reality in terms of acute intoxication referrals, systematic multi-centre, clinical and epidemiological studies are necessary to demonstrate changes in the toxic substance used, the distribution by age, characteristics of subjects, etc. In order to adapt the health care resources, we need to know the diagnosis and any treatment that would contribute to improving the care of intoxicated patients. See table.

No conflict of interest.

OHP-034 ESTIMATION OF THE ADHERENCE TO BIOLOGICAL TREATMENT IN PATIENTS WITH PSORIASIS

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Background Biological agents have changed the treatment of psoriasis, and are used for long-term treatment. For this reason adherence to the treatment is a marker of success.
Purpose To quantify the adherence of patients with psoriasis to treatment with biologicals (adalimumab, etanercept and infliximab)
Materials and Methods Retrospective observational study of psoriasis patients who were prescribed biologicals. Sex, age, type of

biological agent, dose and adherence were examined. To calculate the adherence we used a record of prescriptions dispensed over a period of six months. We used the formula: % adherence = no. of units dispensed/no. of units theoretically needed ×100.
Results The sample included 62 patients, 45 males and 17 females with mean age of 50 years (range 12–81). 53.2% were using etanercept, 43.6% adalimumab and 3.2% infliximab. The adherence was high in the infliximab group (94%) and very similar in the other groups (etanercept 83.7%, adalimumab 87.4%). In the adalimumab cohort 11% had a reduced dose, in the etanercept group 9% had a reduced and 30% an increased dose. In all these groups the calculated adherence was quite similar.
Conclusions As described in the literature, adherence to biologicals was significantly higher compared with the adherence observed with other treatments for psoriasis. Infliximab had the highest rate, maybe because it is administered in hospital. There was no difference between adalimumab and etanercept. It is known that there is progressive loss of patient adherence to treatment, for this reason is important to focus the attention on this concept.

No conflict of interest.

OHP-035 EVALUATING SINGLE-INCISION SLINGS IN FEMALE STRESS URINARY INCONTINENCE: THE USEFULNESS OF THE CONSORT STATEMENT CRITERIA

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Background Unlike drugs, medical devices (MDs) are not submitted for health authority marketing authorization based on in-depth clinical evaluation: critical review on an evidence-based medicine approach is essential for practitioners. The Consolidated Standards of Reporting Trials (CONSORT) statement is an international consensus expert guideline aimed at improving the reporting quality of clinical trials reports.
Purpose To evaluate the usefulness and applicability of the CONSORT for journal articles reporting randomised controlled trials (RCTs) evaluating an implantable MD.
Materials and Methods Original articles published before 2012 reporting RCTs assessing single-incision slings (SISs) in the treatment of female stress urinary incontinence were searched for in PubMed and Embase databases. Reporting quality was assessed by two hospital pharmacists and two urological surgeons according to three CONSORT checklists: abstract (17 items), standard (37 items) and extension for non-pharmacological trials (20 items); the results were discussed to reach a consensus.
Results Among 135 articles retrieved, eight articles met the inclusion criteria and were assessed. Abstract scores ranged from 4.7 to 14.1 out of 20. Standard scores were greater than 10.0 out of 20 for most articles; the extension scores did not exceed 5.0 out of 10. Half the reported trials were not identified as randomised in the title. Three articles did not mention any confidence interval or standard deviation for outcomes. The interventions were incompletely described; only four articles reported the configuration of the devices. Four articles reported whether blinding was achieved but lack of blinding was never discussed as a potential source of bias. Few articles reported the operators and centres' characteristics and their impact on statistical analysis.
Conclusions The reporting quality of SISs RCTs should be improved because readers require complete, clear and transparent information to assess the relevance and applicability of results. Our study supports further use of the CONSORT criteria to enhance and assess the reporting quality of surgical trials.

No conflict of interest.

OHP-036 EVALUATION OF ANTIBIOTIC APPRIOPRIATENESS AND USE IN IMOLA HOSPITAL

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Background Misuse of antibiotics in hospitals may cause bacterial resistance as well as increased costs and unnecessary exposure of patients to drugs.
Purpose To evaluate antimicrobial consumption and appropriateness through a new antibacterial stewardship policy.
Materials and Methods The study was carried out in Imola Hospital (Bologna) and 2009–2011 drug consumption data were obtained from the pharmacy service. Data were analysed by clinical area and single wards and were expressed by ATC classification and defined daily doses per 100 bed-days (DDD). A form for personalised antibacterial treatment (ATf), including diagnosis and documented reasons for the choice of antibiotic, was introduced for levofloxacin, teicoplanin, meropenem, linezolid, tigecycline and daptomycin.
Results In 2011, overall antibacterial consumption was 78 DDD (+4% vs. 2010); the major increase was observed in medical units (MED: +9%) and paediatric/gynaecological units (+6%). Intensive care units/emergency department (ICUs/EDs) and surgical units (SUR) exhibited a decrease in consumption (–13%, −7%, respectively). The use of critical antimicrobial agents decreased: fluoroquinolones (19 DDD, –15%), carbapenems (3.5 DDD, −18%) and glycopeptides (3.1 DDD, –17%). The introduction of ATfs (May 2011) contributed to a decrease in the consumption of antibiotics (e.g. MED: 75 DDD semester I vs. 71 DDD semester II 2011; overall 2011: 73 DDD). The analysis of ATfs shows that critical antibacterial agents were mainly prescribed to treat respiratory tract infections (MED: 58%, ICU/ED: 44%, SUR 30%), urinary tract (MED e ICU/ED: 20%), skin and soft tissues (SUR: 35%, ICU/ED: 16%, MED: 6%) and intra-abdominal infections (SUR: 9%). Levofloxacin (55%) and meropenem (11%) were the most prescribed for respiratory tract infections, teicoplanin (6%) for skin and soft tissue infections.
Conclusions Our stewardship policy led to a reduction in the use of wide-spectrum antibiotics, so ATf may represent a valid method of rationalising the choice of antimicrobial treatment.
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No conflict of interest.

OHP-037 EVALUATION OF CHANGE OF ETANERCEPT SUBCUTANEOUS ADMINISTRATION DEVICE

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Background Etanercept is a soluble tumour necrosis factor receptor fusion protein used in a variety of arthropathies. A new administration device (pen) has recently been marketed.
Purpose To evaluate pain differences and preference between the etanercept syringe and pen as well as the relation between pain and demographic and anthropometric factors.
Materials and Methods All patients with the etanercept pen from 1 January 2012 to 31 March 2012 who had previously used the syringe were chosen. Gender, age, Body Mass Index (BMI), diagnosis, self-administration, pain perception (0 = no pain; 10 = maximum pain) and device preference were recorded. Statistical analysis: Student's t-test and variance analysis were used for comparisons of means, chi-square and Fisher's test for proportions, and non-parametric tests for pain.

Results 109 patients (43% men; 57% women) met inclusion criteria. Mean age was 54 ± 13.5 years and mean BMI 26.5 ± 4.8 kg/m^2. 58.7% had Rheumatoid Arthritis, 19.3% Ankylosing Spondylitis, 1.8% Juvenile Idiopathic Arthritis, 16.5% Psoriatic Arthritis and 3.7% Psoriasis. 82% self-administrated the pen, and 71% the syringe. The median pain with the syringe was 3 [interquartile range (IQR): 2–6] and with the pen was 4 [IQR: 2–5] (P = 0.008). 65% reported the same pain with both devices. 35% reported differences in pain and most of them (71%) had much pain (>5) with the pen and little pain (<5) with the syringe.

There was a statistically significant association of pain with gender: women had more pain with the pen (P = 0.03), but less with the syringe (p > 0.05). There was no association with BMI, age or diagnosis. 59% preferred the pen, 25% the syringe, and 16% did not mind.

Conclusions An association of pain with pen device and female gender was found. However there was no association with BMI, age or diagnosis. Acceptance of the pen and self-administration were higher even though pain was greater, so it is necessary to maintain both devices to assure adherence.

No conflict of interest.

OHP-038 EVALUATION OF QUALITY OF LIFE IN PATIENTS WITH MULTIPLE SCLEROSIS

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Background Several studies have evaluated quality of life (QoL) by filling in the EuroQoL-5D..In most of them, it is found that the two dimensions of EuroQoL-5D most associated with a poor QoL are pain/discomfort and anxiety/depression.

Purpose To find the dimensions of EuroQoL-5D that are more frequently associated with QoL in patients diagnosed with Relapsing-Remitting Multiple Sclerosis (RRMS).

Materials and Methods Observational, four-month, cross-sectional study (January–April 2012) to assess QoL in patients diagnosed with RRMS.

Sex, age and Expanded Disability Status Scale (EDSS) were gathered from Pacientes Externos (Farmatools programme 2.4 version).

Patients who filled in the EuroQoL-5D returned it to the pharmacy service.

Results 84 patients were included; 62 completed the questionnaire.

Mean age was 36.94 ± 8.67. 65.47% of patients were women, 34.52% were men. The mean EDSS was 2.03 ± 1.50.

The survey results of the questionnaire broken down by items were:

Abstract OHP-038 Table 1

		Number	%
Mobility	I have no problems walking	42	67.7
	I have some problems	20	32.3
	I am confined to bed	0	0
Personal Care	I have no problems with self-care	56	90.3
	I have some problems	6	9.7
	I am unable to wash or dress myself	0	0
Usual activities	I have no problems with performing my usual activities	42	67.7
	I have some problems	20	32.3
	I am unable to perform my usual activities	0	0
Pain/discomfort (P/D)	I have no P/D	28	45.2
	I have moderate P/D	33	53.2
	I have extreme P/D	1	1.6
Anxiety/Depression (A/De)	I am not anxious or depressed (A/De)	28	45.2
	I am moderately A/De	28	45.2
	I am extremely A/De	5	9.6

The mean value obtained in the questionnaire was 0.71 ± 0.19.

Conclusions As has been shown in previous studies, the two dimensions of EuroQoL-5D that most affected the QoL were pain/discomfort and anxiety/depression.

No conflict of interest.

OHP-039 EXPANDING THE INVOLVEMENT OF PHARMACY SERVICES VIA COMPUTERISED MEDICAL FILES

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Background Pharmacists are essential for the safe use of medicines, and have a very important role in providing comprehensive drug management. Their crucial responsibilities in medicines management and promoting quality control necessitate developing a computerised tool to improve their communication with other medical team members.

Purpose To develop a pharmacist interface, as a part of the computerised medical file 'Chameleon', to display all the information required by pharmacists for preparing and documenting their intervention.

Materials and Methods

Step 1: mapping the processes required for implementation of the system

Step 2: preparing a dedicated tool with two components:

1. A pharmacist interface: a screen designed to show all related data required for a clinical pharmacist to form his opinion regarding the medicinal treatment. The pharmacist intervention is documented in an assigned field 'pharmacist follow up', which is also displayed beside the 'physician follow up' field in the physician interface to save switching screens.
2. The pharmacy services as an advisory ward: the pharmacists' team is defined as an advisory ward that can be invited by the physicians. Requests for advice are displayed in a pharmacist work list.

Results The pharmacist interface was integrated into the 'Chameleon' and is used regularly. It is a convenient tool that displays all the information required for a professional pharmacist's opinion, and improves medical team communication by allowing this opinion to be viewed by other staff members. There is an ongoing process of assimilation and dissemination of the computerised availability of pharmacy advisory services. There are two topics in development: (a) physician feedback and reference regarding the pharmacist advice, and (b) the ability to monitor all revised cases.

Conclusions The computerised tool satisfies the pharmacist work process and improves communication with the medical staff. The final tool will generate statistics about its contribution to medical personnel and improve the quality of pharmacy services in this medical care hospital.

No conflict of interest.

OHP-040 FINANCIAL ASSESSMENT OF INTRAVENOUS MIXTURE PREPARATION

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Background Intravenous treatment is expensive so we studied two different working options.

Purpose To evaluate the savings that preparing intravenous mixtures centrally in the pharmacy service hypothetically made in 2011 in our hospital.

Materials and Methods We compared the real observed costs incurred by preparing the intravenous mixtures in the pharmacy service and the expected cost if the mixtures were prepared on the wards by using complete vials for each patient and dose, discarding the remainder of the dose.

We have focused the study on the intravenous mixtures area selecting those drugs which need to be prepared individually for the correct dose and those used in the paediatric and neonatology area due to the low dose needed and its variability; however we excluded drugs used in oncology and nutrition from this study.

Results During 2011, 4053 intravenous mixtures were prepared.

The centralised preparation of liposomal amphotericin B (1017 treatments) made an estimated hypothetical saving of €15,226; infliximab preparation (894) hypothetically saved €122,856.

Romiplostim (234) generated savings of €59,551 and tocilizumab (174) €11,280.

In the neonatology area the standard preparation of 200 IU epoetin beta from NeoRecormon 500 IU hypothetically saved €603 with 1623 treatments.

Agalsidase alfa, a high financial impact drug used in Fabry's disease, hypothetically made savings of €62,253 with 111 preparations.

Total savings generated by centralising the preparation of intravenous mixtures with these 6 drugs amounted to €271,770.

The median saving exceeded €67/treatment and €744/day. We achieved this situation by sharing vials and using the dose remaining from one treatment to prepare the next one.

Conclusions Centralization of intravenous mixtures allows us to increase efficiency and generate important financial savings, but in addition to increase the quality of healthcare, because it also involves us in pharmacotherapeutic monitoring and avoiding medicines errors. This practise also ensures drugs are handled correctly, which helps maintain their physicochemical and microbiological stability.

No conflict of interest.

OHP-041 FORMULARY DECISION-MAKING FOR BIOSIMILARS: CONSIDERATIONS FOR HOSPITAL PHARMACISTS

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Background It has been 6 years since the first biosimilar was approved for use in the European Union (EU). Given the likelihood that biosimilar monoclonal antibodies will be approved in Europe in the near future, it is timely to review the formulary selection criteria for biologicals and biosimilars.

The European Medicines Agency (EMA) has issued guidelines that define the regulation of biosimilars in Europe and recommend approaches to establish biosimilarity. However, several questions regarding the assessment of biosimilars for formulary inclusion remain unanswered, including those related to manufacturing and drug supply.

Purpose To aid hospital pharmacists in developing evaluation criteria for biosimilars under consideration for formulary inclusion.

Materials and Methods EU and United States biosimilar legislation, peer-reviewed literature, public data, EMA guidelines and formulary decision-making practises were reviewed to identify key considerations and evaluation criteria for including biosimilars in a formulary.

Results Biosimilars may differ in certain characteristics from their reference product and, therefore, require more extensive evaluation during formulary consideration than small-molecule generics. Recent drug shortages and stockouts throughout Europe underscore the need to evaluate manufacturer reliability and supply chain considerations in formulary reviews of biosimilars. Indications approved for the reference product may not be approved for the biosimilar and should be considered during formulary review. Therefore, we propose a checklist that includes criteria for product evaluation and manufacturer-related parameters, such as differences in administration devices, drug availability, inventory turns, history of shortages, recalls, inventory levels, manufacturing redundancy and supply chain security.

Conclusions Ensuring a stable, reliable supply of quality products is a critical component of healthcare. Product, manufacturer, and pharmacoeconomic information should be considered in formulary decision-making for biosimilars. A checklist of key product- and manufacturer-related information will be promoted thorough evaluation of biosimilars, permitting educated decisions regarding formulary inclusion.

No conflict of interest.

OHP-042 HEPARIN-INDUCED THROMBOCYTOPENIA (HIT): PRE-TEST CLINICAL SCORE (4TS) TO JUSTIFY DANAPAROID PRESCRIPTIONS? WHAT ELSE?

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Background HIT is a prothrombotic adverse drug reaction caused by heparin and requires an alternative anticoagulant: danaparoid. Because of its cost and the specific indication, the physicians must request two laboratory tests with prescriptions (LT: Platelet Aggregation Test, Anti PF4H) and a 4Ts assessment, in order to have danaparoid dispensed.

Purpose To find out whether prescriptions are justified and if we can use the 4Ts score as a basis for HIT detection.

Materials and Methods We analysed 5 years of prescriptions: 4Ts score results (the 4Ts assessment is used to arrive at a high (score 6 or more), intermediate (score 4–5) or low (score 3 or less) probability of HIT.

Of 72 hospitalised patients followed (LT and/or prescription), 34 had a LT score without danaparoid prescription (32 negative and 2 positive results). 38 had a prescription that had been dispensed. 32 patients of these 38 had a 4Ts score. Looking at the 4 Ts' results:

- 3.12% (1/32) patients had low score (LT not requested).
- 62.5% (20/32) came into the intermediate category (LT: 8/20 negative – 4/20 positive – uncertain 3/20 – not requested 5/20).
- 34.4% (11/32) came into the high-score group (LT: 4/11 negative – 4/11 positive – 1/11 uncertain – not requested 2/11).

In 60.5% of the cases (23/38), the prescription was justified by a high score or a positive LT test or HIT diagnosed before. In 39.5% of the cases (15/38), a danaparoid prescription wasn't justified: 7 patients still received danaparoid after negative LT results and 8 without a 4Ts score.

Conclusions In our hospital, positive predictive value doesn't match like it's written in the literature. The 4Ts score doesn't seem to favourably correspond with HIT laboratory testing results. A new scoring HIT Expert Probability Score is right now in validation. Will it be more suitable for our practise?

No conflict of interest.

OHP-043 HIP AND KNEE PROSTHESES IN REPLACEMENT SURGERY: REVIEW OF USE

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Background Total knee and hip arthroplasties are one of the most common and costly surgical procedures. They are performed to relieve pain and improve the patient's quality of life.
Purpose To describe the use of prostheses in hip and knee replacement surgery in a 1200-bed hospital.
Materials and Methods Descriptive retrospective study of the prostheses used in elective total hip and knee arthroplasties during year 2011.

Surgical orthopaedic interventions records and clinical histories were reviewed. Variables studied: sex, age, number of total hip and knee replacements performed: primary and revision (prosthetic replacement) procedures and reasons for revision surgery.
Results 94 total hip arthroplasties were carried out: 80 primary surgical procedures (85.1%) performed on 40 men and 40 women, with a median age of 64 years (20–84), and 14 revision surgical procedures (14.9%) performed on 4 men and 10 women, with a median age of 75 years (46–84). 2 of these patients had undergone primary surgery in the same year.

Reasons for prosthetic replacement were: aseptic loosening: 6 patients (6.4%), dislocation: 4 (4.3%), pain: 3 (3.2%) and infection: (1.1%).

140 total knee replacement procedures were carried out: 125 primary procedures (89.29%) performed on 28 men and 99 women, with a median age of 71 years (42–87), and 15 revision procedures (10.71%) performed on 2 men and 13 women, with a median age of 72 years (65–80).

Etiologic factors of revision were: stiffness: 5 patients (3.6%), instability: 5 (3.6%), pain: 2 (1.4%), aseptic loosening of the prosthesis: 2 (1.4%) and infection: 1 (0.7%).
Conclusions In most cases, both procedures are performed in patients younger than 75 years in order to improve their quality of life.

Total knee replacement surgery is more common than hip replacement. It is mainly performed in women and revision surgical procedures are less likely.

Prosthetic infection is the most important complication after surgery, but fortunately, is the least frequent cause of revision surgery.

No conflict of interest.

OHP-044 HOW FAMILIAR ARE JOB ROLES OF HOSPITAL PHARMACISTS TO PHARMACY STUDENTS?

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Background Pharmacists in a Clinical Centre in Serbia are involved in various educational programmes for pharmacy students.
Purpose To evaluate how much information pharmacy students had about the activities of pharmacists in hospitals.
Materials and Methods A survey containing 32 questions has been conducted among the 58 students of both genders, varying interests and academic achievement in the final year of study. 75% of questions were multiple-choice and the rest were related to specific cases; opinions and suggestions were requested as well.
Results 35 of the 58 respondents thought that pharmacists didn't participate in public procurement and 22 thought that pharmacists didn't participate in the supply of medical devices. 39 thought that a pharmacist made a decision on the use of the appropriate drug from a particular pharmacotherapy group, 46 thought that the hospital pharmacist decided on the posology of the appropriate drug, while 56 thought that pharmacists were regularly consulted by the medical staff on the dissolution of certain medicines (antibiotics and cytostatics). The same number also had an opinion that pharmacists were always consulted about drug interactions. 64% of students believed that they had sufficient knowledge of chemistry, pharmaceutical technology and pharmacotherapy, but insufficient knowledge in certain medical areas – anatomy, pathology and physiology. 78% of students thought that basics of hospital pharmacy should be introduced as an optional subject during undergraduate studies or there should be appropriate specialisation in this field after graduation.
Conclusions More than half of the students were not sufficiently informed about hospital pharmacy, but they were eager to learn things that would help them in their future practise. It suggests that fellow practitioners should be actively engaged in continuing education programmes for students, and developing better cooperation with the faculty of pharmacy in order to provide both theoretical and practical knowledge in the field of hospital pharmacy.

No conflict of interest.

OHP-045 IMPACT OF A MULTIDISCIPLINARY STAFF MEETING ON ANTIBIOTIC TREATMENT QUALITY FOR OSTEOARTICULAR INFECTIONS IN AN ORTHOPAEDIC SURGERY CARE UNIT

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Background Treating osteoarticular infections is difficult.
Purpose To evaluate professional practise, we studied the effect of a multidisciplinary staff meeting on the quality of antibiotic treatment in an orthopaedic surgery care unit.
Materials and Methods Via the coding process, we retrospectively studied patients hospitalised for osteoarticular infections (diabetic foot excluded) in the orthopaedic care unit of a general hospital in France. We compared antibiotic treatment conformity to good practise (bacteriology, dose, length of treatment, time taken to implementing microbiology report), length of hospitalisation and 6 month-outcome, for patients with osteoarticular infections, before (March 2007 to March 2009) and after (March 2009 to March 2011).implementation of the multidisciplinary staff meeting.
Results 85 patients were selected and 77 files were examined. Fifty-five medical records were actively devoted to osteoarticular infection and all of them were analysed: this worked out at 30 patients (32 infections) before the staff meetings and 26 patients (28 infections) after the staff meetings had started. Staff meeting decisions were reported in medical files in 72% of cases. Before staff meetings were instituted, antibiotic treatment was changed in 47% of cases, versus 96% since establishment of the staff meeting ($p < 0.0001$). Dose was optimum in 72% of infections before staff meetings were instituted, versus 89% afterwards ($P = 0.11$) and length of antibiotic treatment conformed to recommendations in 41% of infections before staff meetings, versus 86% after staff meetings had begun ($P = 0{,}0005$). The average time to respond to an antibiogram decreased from 2 days before staff meetings to 1.7 days after staff meeting ($P = 0.43$), and length of hospitalisation was 19.8 days before staff meetings versus 23.1 days after ($P = 0.49$). Recovery at 6 months accounted for 62% of patients before staff meetings, versus 76% after staff meetings ($P = 0.35$) and failure at 6 months concerned 29% of infections before staff meetings versus 24% after their institution ($P = 0.75$).
Conclusions Since the beginning of multidisciplinary staff meeting in our orthopaedic surgery care unit, antibiotic treatment has significantly improved concerning spectrum and duration of

treatment ($p \leq 0.0005$). With this limited sample, clinical impact at 6 months was not significant.

No conflict of interest.

OHP-046 IMPACT OF MULTI-LUMEN INFUSION DEVICES ON THE OCCURRENCE OF PHYSICAL DRUG INCOMPATIBILITIES: A CONTROLLED IN VITRO STUDY

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Background Drug incompatibility is a problem when managing patients in intensive care units. Patients receive many drugs simultaneously but through limited venous accesses. The recent marketing of new multi-lumen infusion access device may open the way to preventing incompatibility.
Purpose To evaluate the impact of multi-lumen infusion access devices connected to single-lumen central venous catheters on the occurrence of known drug incompatibilities through a controlled in vitro study.
Materials and Methods Two infusion devices were studied: 1) a standard set with six-gang-manifolds and its extension line and 2) a multi-lumen infusion access device with nine lumens (Edelvaiss-Multiline, Doran International, France). Six drugs were selected: three basic drugs (furosemide, pantoprazole and amoxicillin/clavulanic acid) and three acid drugs (amiodarone, dobutamine and midazolam). Two, four or six drugs and an infusion vehicle (saline, Ringer's or 5% glucose) were infused simultaneously. The infusion rate of the vehicle was initially set at 100 mL/h and decreased stepwise by 10 mL/h until precipitate formation occurred. Physical incompatibility was assessed by visual inspection and sub-visible particle count test as defined by the European Pharmacopeia according to the European Pharmacopeia. The lowest value of the vehicle infusion rate that satisfied the two tests was reported for each infusion set and for each drug combination.
Results The use of multiline access devices contributed to preventing drug incompatibilities when simultaneously infusing two and four drugs. Indeed, infusion vehicle flow rate gains oscillated between 10 and 40 mL per hour, in more than 55% and 25% of cases, respectively for two and four drugs. When infusing six drugs simultaneously, no differences were identified.
Conclusions Our main hypothesis is that fluid dynamics differ depending on the infusion device resulting in differences in the contact time between drugs. Under specified infusion conditions, the nine-lumen device prevents physical drug incompatibilities.

No conflict of interest.

OHP-047 IMPACT OF THE ECONOMIC CRISIS ON BIOMEDICAL RESEARCH: ANALYSIS OF THE WORK OF A CLINICAL RESEARCH ETHICS COMMITTEE

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Background Since 2008, the economic crisis has directly affected many activities, health and biomedical research being particular fields involved.
Purpose To evaluate the impact of the economic crisis on research at a Spanish hospital based on an analysis on the work done by the Clinical Research Ethics Committee (CEIC). To compare it with any effects on Spanish and European CTs.
Materials and Methods CEIC Minutes from a 500-bed university hospital were reviewed from 2000 to 2011, obtaining information from clinical trials (CTs) and observational studies (OS).

The financing of CTs was classified: 1) CTs promoted by the pharmaceutical industry, 2) by scientific societies with industry support, 3) by scientific societies with government support and 4) unfunded CTs. We compared two periods: pre-crisis (2000–2007) and crisis (2008–2011).

National scientific activity was obtained from a secondary data source from the information provided by the *Agencia Española de Medicamentos y Productos Sanitarios* and the European activity from EU Clinical Trials Registers (European Medicines Agency website).

Data analysis used conventional descriptive statistics.
Results 782 protocols were evaluated (average 71 protocols/year).

During 2008–2011 there was an annual average decrease of 13 CT in groups 1 and 2, compared with the period 2000–2007 (95% CI: 4–22 CT).

Regarding the OSs, there was an annual average increase of 36 OSs during the second period (95% CI: 24–49 OS). There were no statistical differences between the two periods for groups 3 and 4.

The total number of protocols increased by an average of 25 projects/year during the second period compared to the first (95% CI: 8–40 projects).

There were 2340 CTs in Spain during the first period and 3096 during the second (p = ns). CTs in Europe were 7,908 and 10,632 respectively (p = ns).
Conclusions The CEIC workload was maintained, even increased, but because of OSs and unfunded research. The crisis marked a turning point; funded studies decreased and OSs increased.

At the moment there are no noteworthy changes in Spanish or European CT activity.

Abstract OHP-047 Table 1

	Number of CTs	%
Group 1	407	52
Group 2	53	7
Group 3	32	4
Group 4	93	12
OS	197	25

* OS were analysed globally

No conflict of interest.

OHP-048 IMPLEMENTATION OF A PROTOCOL FOR SELECTION OF BIOLOGICAL THERAPIES IN RHEUMATOLOGY

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Background The Public Health System in our Autonomous Community has established a protocol for biological treatments (BTs) in rheumatoid arthritis (RA), spondyloarthropathies (SAPs) and juvenile idiopathic arthritis (JIA).
Purpose To evaluate the implementation of the BTs protocol and to analyse the use of these treatments.
Materials and Methods We analysed patients who had started treatment with BT or been switched from a previous biological treatment, since the implementation of the protocol (12/05/2011 to 29/02/2012). This document has different levels of decision based on both disease status and treatment effectiveness; RA: 1st level: infliximab or subcutaneous tumour necrosis factor inhibitor (anti-TNF) (etanercept or adalimumab); 2nd: tocilizumab or abatacept or rituximab; 3rd: golimumab or certolizumab pegol. SAPs: 1st level: infliximab or etanercept or adalimumab; 2nd: golimumab; 3rd: infliximab.

JIA: 1st level: etanercept; 2nd: adalimumab or abatacept. Data collected: age, sex, diagnosis, drug used after protocol implementation, previous treatments and reasons for changing. Data Source: medical records, pharmacy database. Statistical analysis: SPSS 15.0.

Results Of 455 patients receiving BT, 73 met the inclusion criteria: 53.4% were beginning their treatment, 46.6% were treatment changes. Median age: 51.1 (±11.5) years, 76.7% were women. The percentages by pathology and gender were: RA 56.9% (women: 95.1%), SAPs 43.1% (women: 51.6%) ($p < 0.05$). Patients starting treatment: RA: 52.7%, SAPs 47.3%. Administration routes and drugs used: RA: subcutaneous (95.0%) and etanercept (90.0%); SAPs: subcutaneous (94.5%) and etanercept (66.7%). Changes in treatment: RA 61.8%, SAPs 38.2%, drug used after switching: RA (adalimumab 33.3%, etanercept 28.6%, tocilizumab 14.3%, rituximab 9.5%), SAPs (golimumab 61.5%, adalimumab 30.8%, etanercept 7.7%). The reasons for switching were ineffectiveness (91.2%) and intolerance (8.8%).

Conclusions The overall level of compliance with the protocol was high. The most widely prescribed drug in treatment-naive patients was etanercept. Adalimumab was the most prescribed in patients who switched treatment. Lack of effectiveness was the main reason for changing treatment.

No conflict of interest.

OHP-049 IMPROVING COMPLIANCE AID DISPENSING FOR PATIENTS DISCHARGED FROM NORTH BRISTOL NHS TRUST (NBT) BY USING A 3RD PARTY DISPENSING PARTNERSHIP

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Background North Bristol NHS Trust (NBT) is a large teaching hospital split over two main sites. Despite NBT Pharmacy implementing an assessment tool to minimise inappropriate use of compliance aids, demand still doubled in 5 years to over 200 a month exceeding capacity and causing:

- Delayed discharges
- Inappropriate discharges
- Non-compliance
- Re-admissions
- Complaints

Purpose To improve the provision of compliance aids in accordance with the objectives of the Quality, Innovation, Productivity and Prevention (QIPP) programme by:

- Managing the increasing workload
- Reducing discharge waiting times
- Reducing length of stay
- Supporting patients managing medicines at home

Materials and Methods A phased and innovative solution of outsourcing work to a commercial community partner without significant upfront funding was devised. Initially a 'Small Tests of Change' pilot project was launched with a community pharmacy (Lloydspharmacy) to trial the provision of a dispensing service against a service level agreement. After proving the concept and refining the process this was expanded into an independently managed central facility (provided by Lloydspharmacy and the wholesaler AAH Pharmaceuticals) known as the 'The Hub' which serves NBT's multiple sites.

Results This innovative approach has enabled NBT Pharmacy in accordance with QIPP objectives to improve the quality of service and manage a doubling in workload within existing budgetary constraints. The Hub now supports 90% of NBT's compliance aid dispensing and the average turnaround time has reduced from more than 48 hours to 24 hours (see Table)

Conclusions NBT Pharmacy has developed an innovative and mutually beneficial partnership between an acute NHS Trust and a commercial service provider resulting in the successful management of increasing demand for compliance aids on discharge.

Abstract OHP-049 Table

Phase	Description	Turnaround SLA (Hours)	Monthly Rate (Peak)	Duration
Pre-Pilot	Performed in house.	N/A > 48	40	Pre – Feb 09
Phase 1	Pilot with Lloydspharmacy Community Branch.	22–46	74	18 Months
Phase 2	Pilot with managed central service provide by The Hub.	21–45	61	2 Months
Phase 3	Service extended to both NBT sites.	21–45	105	5 Months
Phase 4	Service levels increased to reduce maximum turnaround time.	21–26	206	Post Feb 11

No conflict of interest.

OHP-050 IN VITRO EVALUATION OF A NEW SAFETY CONNEXION FOR THE ADMINISTRATION OF ENTERAL NUTRITION: ENLOCK

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Background New ENLock standard connectors (between the administration tube/enteral feeding catheter-EFC) and ENPlus (between nutrition bag/administration tube) are designed to administer enteral nutrition (EN) safely and avoid unsafe connexions. These connectors will coexist for a while with devices not equipped with them. Compatibility data will be necessary to ensure they are used safely.

Purpose In vitro tests to evaluate the compatibility between devices with and without these connectors.

Materials and Methods The evaluation focused on 12 EFC references from 6 suppliers, 4 nutrition bags from 4 suppliers and one administration tube with an ENLock connexion at both extremities (Nutricia). Following the NF-EN-1615 and 1618 norms, five tests were performed in triplicate on each reference. (1) A leak test required eosin solution and simulated pressure of 50 kPa for 2 min in the connectors. Leaks were revealed by spots on philtre paper. (2) An EFC connector deformability test was performed by measuring the inner and outer diameter with callipers after one connexion/disconnection a day for 30 days. (3–4) Two penetration tests, ENLock/EFC and ENPlus/bag, were performed using a dynamometer, exerting a linear force and measuring the maximum force for connexion. (5) An EFC connexion resistance test was performed using a dynamometer exerting a linear traction and measuring the maximum force for disconnection.

Results No leaks were detected. The changes in the EFC connector internal and external diameters tested were respectively up to 30% and 6%. The tube connexion force to the EFC ranged from 37.8 N to 216.2 N and to the bag from 14.6 N to 20.1 N. Two suppliers' bags could not be connected to the ENPlus device. The tube disconnection force to the EFC ranged from 3.2 N to 44.8 N (limit value: 15 N).

Conclusions Important differences exist between suppliers. Some feeding lines don't meet the specific EN norms for these devices particularly as regards the maximum disconnection force so their use with incompatible devices can be risky.

No conflict of interest.

OHP-051 INCIDENCE AND SENSITIVITY OF PROTEUS MIRABILIS IN OSIJEK CLINICAL HOSPITAL CENTRE DURING THE PERIOD 2009–2011

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Background Proteus mirabilis is an opportunistic microorganism, which is an indicator of dirtiness on clinics and wards of the hospital.
Purpose To determine the number of isolates and sensitivity of P. mirabilis to antibiotics.
Materials and Methods Retrospective analysis of specimens from the Microbiology Department and antibiograms.
Results The number of isolates of Proteus mirabilis in 2009 was 358, 218 in 2010 and 168 in 2011. From urine: 130 in 2009, 89 in 2010 and 80 in 2012; from wound smears (decubitus, fistula, ulcers): 349 in 2009, 198 in 2010, 154 in 2011; tracheal swabs: 9 in 2009, 20 in 2010 and 14 in 2011. In the Anaesthesiology Clinic: 19 isolates were found in 2009 and 2010 and 17 in 2011; In the Surgical Clinic: 71 in 2009, 37 in 2010 and 27 in 2011; Paediatrics: 13 in 2009, 18 in 2010 and 12 in 2011; Neurology: 27 in 2009, 18 in 2010, 9 in 2011; Gynaecology: 13 in 2009, 12 in 2010, 11 in 2011; Infectiology: 41 in 2009, 16 in 2010, 8 in 2011; Dermatology: 36 in 2009, 7 in 2010, 3 in 2011, followed by Neurosurgery, Haemodialysis, Gastroenterology, Haematology and other clinics and wards with fewer than ten isolates yearly.

Sensitivity to carbapenems was 100%, to cephalosporins 86% in 2009, 93.7% in 2010, 96.4% in 2011; to penicillins 55% in 2009, 92% in 2010 and 70% in 2011; to fluoroquinolones 80.5% in 2009, 79.3% in 2010 and 89.6% in 2011; to aminoglycosides 81.4% in 2009, 87.68% in 2010, 95% in 2011; to sulfamethoxazole+trimethoprim: 60.7% in 2009, 66.3% in 2010, 65.4% in 2011: to nitrofurantoin: 5.3% in 2009, 5.4% in 2010, 3.6% in 2011.
Conclusions The number of isolates of *Proteus mirabilis* decreased in the period considered, due to new algorithms and protocols. If not in combination with other microorganisms, *Proteus mirabilis* is the only indicator of insufficient cleaning.

Sensitivity to penicillins, nitrofurantoin and cotrimoxazole decreased, but increased to fluoroquinolones, aminoglycoside and cephalosporins.

No conflict of interest.

OHP-052 INFUSION DEVICE EVALUATION: A METROLOGICAL APPROACH TO DEVICE CLINICAL PERFORMANCE AND SAFETY

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Background Gravity Infusion Devices (GIDs) are Medical Devices requiring European Conformity (CE) marking and have to comply with mandatory norm ISO8536–4, stating that an 'effective' GID has to permit the infusion of 1 L of NaCl 0.9% in less than 10 min. Considering their major importance for drug administration, this requirement is not satisfactory.
Purpose In addition to the normative tests, we designed an approach based on efficiency tests and statistical tools. Our aim was to provide users with rational data on their performance and safety, and help buyers to choose the appropriate one.
Materials and Methods We designed an in vitro study in which each GID was connected to a NaCl bag at a height of 70 cm and supplied the fluid at a rate of 2.7 ml/min. The rate was calculated by weighing NaCl bags at 15, 60, 120 and 180 min. Data were processed with XLSTAT for flow rate linearity (linear regression), stability (regression slope test), accuracy (student test) and precision (variance analysis). Cross comparison and Principal Component Analysis (PCA) enabled us to rank the GID in a 4 dimensional analysis.
Results 13 GID references were analysed. For each GID reference, 3 batches of 3 units were investigated. Mean flow rates ranged from 2.0 to 2.8 ml/h. Mean intra-reference rates varied from 7% to 31% and cross comparison analysis identified 4 different ratings in linearity, stability, precision, accuracy. Flow was not linear for 3 references, 3 were not satisfactorily accurate and 1 was not satisfactorily precise. PCA clustered 3 different groups, and we identified a group of 4 references suited for clinical use.
Conclusions In this study, we designed a repeatable method that will allow clinicians and buyers to assess GID performance. We demonstrated a large variability in performance between giving sets. The use of statistical tools appears suitable and important to select the best GIDs and for patient safety.

No conflict of interest.

OHP-053 INTRANASAL APPLICATIONS OF CAPSAICIN TO TREAT CLUSTER HEADACHE, A CASE REPORT

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Background Cluster headaches are one of the most severe types of head pain. Intranasal medicines for the treatment of headache have recently received increased attention. In this sense, capsaicin has been proven to be a useful agent for the treatment of several painful diseases, but no conclusive information is available about the effects of intranasal capsaicin in people with chronic cluster headaches.
Purpose To describe the development of a formulation for a case of Horton's headache refractory to other treatments, which was treated with intranasal capsaicin.
Materials and Methods A 59-year-old woman presenting cluster headache refractory to conventional therapy (anticonvulsants, antidepressants and deep brain stimulation) for four years. The treatment was authorised as compassionate use by the national regulatory agency for drugs. The preparation used contained capsaicin solution 0.075%, administered in a 1 ml insulin syringe. The patient received 0.1 ml of an emulsion containing capsaicin 0.3 mg dissolved in 80% saline solution, 10% paraffin oil, and 10% polyethylene glycol sorbitan monooleate (Tween 80), applied in both nostrils once a day for 7 days. The quality of the organoleptic properties was checked according to Good Manufacturing Practice. In the first week of treatment we administered half doses to reduce potential adverse effects as reported in the bibliography.
Results Intranasal capsaicin produces an intense burning sensation, lacrimation, and rhinorrhoea that lasts for about 20 minutes, although these symptoms progressively decrease and disappear after 5–8 applications. In this case, the burning sensation in the nose was not tolerated by the patient and the treatment was discontinued.
Conclusions We could not extract relevant data relating to efficacy of the treatment because side effects developed. There are no formal studies of optimal formulations or treatment regimens and further studies are needed to elucidate the role of capsaicin in the treatment of cluster headache.

No conflict of interest.

OHP-054 LIFTING THE QUALITY OF THE DAILY SERVICE, BY OBTAINING CONSENSUS BETWEEN PHARMACY TECHNICIANS WITH REGARD TO GENERIC DRUG PRESCRIPTIONS

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Background After structural changes in the clinical pharmaceutical services at Herlev Hospital (DK), there are now two different pharmacy technicians serving the same ward. This structural change revealed considerable differences in the daily routines and service. This was unsatisfactory to the wards and had a negative effect on the working environment.
Purpose To reach consensus about the level of daily service by focusing on changing prescribing toward generic stock drugs and thereby enabling all staff to conduct a uniform level of service.
Materials and Methods A new educational programme was drawn up and implemented. The educational focus was on drugs that had been obtained by an EU tender, changing prescribing habits toward generic drugs in stock, within ATC-group C and N, and interprofessional communication. Support tools for the new practise were introduced.

The impact of the intervention was measured by an anonymous questionnaire answered by the pharmacy technicians at Herlev Hospital.
Results The response rate was 75%.

The answers on the benefit of the new educational programme were:

No benefit at all: 0%, minor benefit: 8%, fair benefit: 53%, high benefit: 22% and no answer: 17%.

The answers on the benefit of the support tools were:

No benefit at all: 11%, minor benefit: 24%, fair benefit: 28%, high benefit: 28% and no answer: 9%.

All who answered the question (78%) agreed that a consensus had been reached on the daily services. There were variations in answers about shifting prescribing towards generic drugs in stock after the intervention, some experienced a considerable effect and others experienced no difference.
Conclusions The intervention was shown to be effective. Consensus was reached on the level of daily service. The staff is now more comfortable with the daily routines, but some variation in the day to day work still remains.

No conflict of interest.

OHP-055 MANAGEMENT OF HYPERTENSION IN TYPE 2 DIABETIC OUTPATIENTS

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Background The control of blood pressure is one of the main objectives in type 2 diabetes mellitus (T2D) management, as well as glycaemic control.
Purpose The first objective of this study was to describe the practise in hypertensive drug management in a cohort of DT2 patients from a diabetology department of a university hospital and to compare this practise with the current guidelines for hypertension treatment (HGs).
Materials and Methods This retrospective study examined T2D outpatients who came to the diabetology department between June and November 2010 for an annual cheque-up. Clinical and therapeutic data were extracted. Patients' blood pressure levels were measured by an automated procedure (Dynamap).
Results The analysis was carried out on 803 patients (age: 64.9 ± 8.9 yrs; 38.6% women). The combination of T2D with confirmed hypertension was frequent (82.9%) and higher than the national results (80%). This situation was associated with cardiovascular and renal complications for 21% and 22.4% of the patients, respectively. The average systolic and diastolic blood pressures were 132.9 and 71.3 mmHg, respectively. Recommended objective for DT2 patients (<130/80 mmHg) was reached for 44.6% of the patients. Mono, dual and triple therapies were in accordance with the HGs in 100%, 95% and 85% of the patients, respectively. The effect of these different combinations, illustrated by the median of the blood pressure levels, was better for monotherapies (128.5/70.3 mmHg) than for dual and triple therapies (132.5/72 and 131/70.8 mmHg, respectively). 19% of patients had to take at least 4 antihypertensive drugs and the median of their systolic and diastolic blood pressures were 135.5 and 71 mmHg, respectively.
Conclusions In DT2 patients, blood pressure control should be improved, with for example earlier detection of hypertension and/or therapeutic reinforcement. However, antihypertensive drug management seems to be in accordance with the French official guidelines. The development of new drugs and patient education programmes may improve patient adherence.

No conflict of interest.

OHP-056 MANAGEMENT OF THE VIAL RESIDUES IN AN INTRAVENOUS CHEMOTHERAPY UNIT OF A TERTIARY HOSPITAL

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Background Minimization of chemotherapy costs has become a rational goal in today's economic environment.
Purpose To assess the cost savings achieved by optimising vial residues during chemotherapy preparation.
Materials and Methods A longitudinal prospective study was conducted in the Intravenous Chemotherapy Unit of the Pharmacy Service between 15 January and 31 March of 2012. We selected the six drugs with more potential cost saving (bevacizumab, bortezomib, liposomal doxorubicin, panitumumab, rituximab and trastuzumab). Data were collected with the Oncofarm software: number of patients, number of preparations, theoretical and actual number of vials used. For economic estimates the retail price (RRP) was used.
Results During the study period, 365 preparations were administered to 190 patients; these required the potential use of 716 vials, but actually 545 vials were used, saving 219,538€ (33% of the cost without recycling excess vials).

Data analysis showed that 81% of the total savings were achieved with only 2 drugs: bevacizumab (50%, 80 vials, €110,556) and rituximab (31%, 50 vials, €67,752). Their high frequency of use (66% of preparations and 68% of patients), high cost and greater variability of prescribed doses, justifies these results.

Theoretical average costs of the preparations analysed without managing the residues of partially-used containers were 1,790 (SD:476) €/preparation and 3,568 (SD:642) €/patient. After savings were made the averages were 499 (SD:253) €/preparation and 965 (SD:389) €/patient. Rituximab (€836/preparation, €1,063/patient), bevacizumab (€700/preparation, €1,602/patient) and panitumumab (€625/preparation, €1,111/patient) were the drugs with greater savings.

We estimated the difference between potential savings if the adjustment had been perfect and the actual saving obtained (€21,135), possibly caused by the preparation process or expiry of some reconstituted vials

Conclusions Residues management is a common practise to improve the efficiency of the preparation process. Optimizing this process of updating medicines' stabilities, recording the opening date on the vial, checking expiries and storage conditions, achieved significant savings in the cost of treatments.

No conflict of interest.

OHP-057 MEASURES FOR PALIVIZUMAB COST CONTAINMENT ANALYSIS

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Background Prescription RSV (Respiratory Syncytial Virus) immunoprophylaxis with palivizumab involves high pharmaceutical costs associated with paediatric services. It is necessary to establish protocols aimed at reducing the cost associated with these treatments, adjusted to the best cost-effectiveness criteria.

Purpose To assess whether the prescriptions are consistent with indications of greater efficiency; to assess the impact of the revision of the criteria in the last vaccination campaign.

Materials and Methods We analysed the cost associated with the use of palivizumab in the last six years, the criteria for indication of prophylaxis, and the impact of the restrictions introduced last season. The number of doses that can be administered has been restricted: a limitation for the higher-risk months (Nov-Jan), and more cost-effective presentations (100 mg) are to be used.

We extracted from our hospital system (SAP) the dispensed prescriptions of palivizumab from September 2006 to February 2012 (5 vaccination campaigns) analysing the number of patients treated, number of doses per child, vaccination period, consumption distribution among different presentations, indication criteria and associated cost.

Results An examination of the last 6 vaccination campaigns shows the impact of the measures taken. We obtained a 35% cost reduction (€98,875.25) compared to the average in recent seasons, and a 28% decrease in the number of children treated. The priority of using 100 mg vials meant a 63% reduction in the use of 50 mg vials, which are less cost-effective. The largest decrease (10%) in prescriptions was in premature infants between 29 and 35 weeks gestation. No vaccinations were done in March.

Conclusions Establishing agreed more restrictive criteria used in the selection of patients to be treated, limiting the months in which the vaccine can be administered and the preferential use of 100 mg vials has brought about a 35% reduction in the cost associated with this treatment (€98,875.25) compared to previous campaigns.

No conflict of interest.

OHP-058 NEW RESPONSIBILITIES FOR PHARMACY TECHNICIANS: THE SKILLS MATRIX, A PERFECT TOOL FOR CHANGE MANAGEMENT

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Background Our teaching hospital has a level 3 maternity unit and a neonatal intensive care unit for 29 preterm infants. Over 3,000 bags of paediatric parenteral nutrition are prescribed annually. Their production is outsourced to another hospital. Until 2010, only pharmacy residents and pharmacists were in charge of this activity.

Purpose To design and implement a skills matrix to shift this activity towards the hospital pharmacy technicians.

Materials and Methods A multidisciplinary working group (a pharmacist, a chief technician, a pharmacy resident, two pharmacist technicians (PTs)) defined Standard Operating Procedures (SOPs) needed and skill levels according to our Process Map. They established a training programme and finally a Gantt chart.

Results Our matrix includes two levels: level 2 consists of the delivery of parenteral nutrition; level 1 also includes ordering and checking nutrition bags, the management of nonconforming products and monthly management.

Of the 11 pharmacy technicians, 100% gained level 2 and 55% level 1 between January and May 2011 as defined. The activity shift was fully completed after 6 months. SOPs were reviewed and approved entirely during 2011. Experience feedback meetings have been set on a regular basis with the clinical ward to maintain standards since June 2012.

Pharmacy technicians have expanded their skills and this has enabled us to save pharmacists' time (0.3 Full Time Equivalent). PTs were examined again in September 2012 in order to assess their skills and knowledge after one year, using interactive real-life exercises.

Conclusions The skills matrix is a simple and attractive management tool for identifying needs, assessing and developing individual skills. It provides not only a clear insight into individual skills but also into transversal competencies in a Pharmacy Department. It is particularly adapted to conducting change in a peaceful and positive manner and very important for annual individual assessment.

No conflict of interest.

OHP-059 OPTIMIZATION OF HIGH-IMPACT MEDICINES IN PAEDIATRICS

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Background High economic impact medicines are used off-label in paediatric situations, using adult presentations for lack of a paediatric form.

Purpose To justify preparing individualised medicines for paediatric use according to individual need; adaptation to increase safety and reduce costs.

Materials and Methods Retrospective review of high-impact medicines used in individualised treatment in paediatrics. Duration of study: 4 years. The medicines were included if they had been needed (adalimumab 35 months, anakinra 73 months and pegfilgrastim 50 months).

Data collection sources: Computer application in the pharmacotechnical area, software of the outpatient dispensing and management system. Personnel times were collected according to the Catalogue of Products and Billing (2nd edition 2009) and costs according to the Analytical Accounting Service. As these were standard sterile formulas the time and cost of pharmaceutical personnel were considered (standard operating procedure of a new product and successive validations), nurse (production) and technician (material preparation, labelling and packaging.

We compared the cost of dispensing the complete pharmaceutical form with individualised costs through sterile repackaging.

Variables studied: patients, different types of dosages, number of syringes made, number of syringes consumed and associated costs. For economic valuation the cost of the commercial presentation and the personnel involved in the making were considered.

Results The 3 medicines identified were repacked from the adult branded product formulations.

Abstract OHP-059 Table 1

Drug/Pathology	No. of patients treated	No. different dosages	Syringes made	Syringes consumed	Cost of full dosage form	Cost of individualization	Saving
Adalimumab/Rheumatoid Arthritis	3	2	70	35	€33,971.00	€17,519.31	€16,451.69
Anakinra/Juvenile Idiopathic Arthritis	6	9	2274	809	€58,680.57	€34,804.94	€23,875.63
Pegfilgrastim/Congenital Neutropenia	1	1	148	74	€92,352.00	€4,7263.84	€45,088.16

The results are expressed in the above table:

Conclusions Individualization of dosage represents both an optimization of resources and increased patient safety. Repackaging improves difficult-to-measure volume management, avoiding handling in unsuitable conditions by the patient.

No conflict of interest.

OHP-060 PAEDIATRIC CLINICAL RESEARCH: CURRENT SITUATION AND PHARMACEUTICAL CONSTRAINTS IN FRANCE AND CANADA

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Background Paediatric clinical research represents a challenge and faces particular pharmaceutical constraints.

Purpose The main objective was to describe the current pharmaceutical situation in paediatric clinical research in France and Canada. The secondary objective was to identify factors that discourage paediatric clinical research.

Materials and Methods Cross-sectional survey of 12 pharmacy departments from France and 12 from Canada with an online 50-question survey (June–September 2012). The median [minimum-maximum] was calculated for each country and compared using the Mann-Whitney or Fisher's exact test. Respondents were asked to rank, in order of importance from 1–10 (1 being the most important), factors that discourage paediatric clinical research.

Results There was a similar number of ongoing paediatric clinical trials in France and Canada (38 [10–81] vs. 20 [4–178], p = 0.205). A lower number of pharmacists per hospital was observed in France (17 [11.5–35] vs. 45 [18.9–76.8], p = 0.009), but a similar number of pharmacists were assigned to clinical trials (1.5 [1–3] vs. 1.9 [0.2–17.4], p = 0.921). Institutional protocols represented the majority of paediatric clinical trials in France (61% [14–100] vs. 25% [0–100]). Similar services were offered, but the majority of French respondents offered help with institutional protocol development (91% vs. 50%, p = 0.063). The majority of respondents reported that the payment provided by the investigators was insufficient to cover pharmaceutical support costs and that formulations were not easily obtained from manufacturers. Respondents from both countries ranked more highly the same factors that discourage paediatric clinical research, such as absence of financial interest from the pharmaceutical industry (median rank 2 [1–6] vs. 4 [1–10]), prohibitive cost versus profit ratio (2 [1–3] vs. 3 [2–9]), small patient cohorts per hospital (2 [1–7] vs. 4.5 [1–10] and the non-availability of appropriate drug formulations (3 [1–9] vs. 5 [1–10]).

Conclusions Similar constraints were identified in France and Canada. Further studies are required to identify relevant incentives to better support pharmacists' role in paediatric clinical research.

No conflict of interest.

OHP-061 PARENTERAL NUTRITION: STANDARIZED PROCESS FROM PRESCRIPTION TO PREPARATION

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Background It is widely recognised that Total Parenteral Nutrition (TPN) is essential for the patient's survival and not just for simple assistance. Therefore, it's important that sufficient attention is devoted to assessing the patient's nutritional status. The department of Pharmacy has always been involved in the management of TPN to support the clinical and therapeutic needs of the patient.

Purpose To facilitate the physician's delicate task of prescribing a balanced nutritional formula, identifying some standard formulas/recipes for parenteral nutrition bags.

Materials and Methods These standard prescriptions have been developed with a nutritionist and the Surgery team and they cover both peripherally administered (low osmolarity) and centrally administered (high osmolarity) solutions. Depending on the patient's clinical needs, we have standardised prescriptions with different volumes (2000 or 2500 ml). In addition to the patient's personal data and anthropometric information, these prescriptions already include all the necessary elements for a balanced diet, including calorie requirements, key macronutrients, proteins, water and micronutrients.

Results This review has provided standardised guidance and support to the medical staff in writing the prescriptions for TPN, also giving a range of choices in the initial nutritional approach to the patients. Standardized prescriptions offer a better balance of electrolyte content than those of ready-to use commercial formulations. This approach has improved familiarity with TPN throughout the hospital, by implementing the use of customised bags not only in critical care departments, leading to better cost management.

Conclusions The purpose of nutritional support is not only to avoid malnutrition and its complications, but also to change the pathogenic mechanisms of diseases. For a proper use of artificial nutrition it is necessary to have an in-depth knowledge of the problems of malnutrition. For this reason, it is essential to have a multi-disciplinary approach in which the pharmacist connects different functions.

No conflict of interest.

OHP-062 PATIENT-ORIENTED CARE IN PHARMACY CONSULTATION CENTRE: ANALYSIS OF PHARMACIST INTERVENTIONS

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Background The number of drugs used has increased in recent years. Some patients need an explanation of how to use their drugs and how to prevent medical errors. The pharmacy consultation centre in St. Ann University Hospital has offered a service for more than 11 years for in- and outpatients. They can consult pharmacists about their drug-related problems.

Purpose To analyse what the most frequent topics of consultations were in 2011 and 2012.

To find out how pharmacists provide counselling to patients by repeat cheque-up appointments.

Materials and Methods Patient records were examined retrospectively in 2011 and 2012 (January–September) looking at the number of visits, age and sex of patients, topics of patient questions. Pharmacists offered patients repeat cheque-up appointments to increase the compliance with recommendations.

Results The authors performed 85 consultations in the last two years for 47 patients (number of new patients: 25 in 2011, 22 in 2012). Median age was 64.5 years, 25 women and 22 men. Median

duration of consultation was 21 minutes. The most frequent topics of consultation: potential drug interactions 36%, correct use of drugs 19%, drug side effects 6.5%, weight loss 6.5%. Pharmacist interventions included the recommendation 'how to use it' 57.4%, replacement and/or discontinuatio of drugs 6.4%, diet and lifestyle change 14.9%. The number of patients who visited the consultation centre repeatedly according to the recommendations, was 17 (68%) in 2011 and 13 (59%) in 2012.

Conclusions Patient-orientated care in pharmacy consultation centre enables us to prevent the patients from using the drugs incorrectly. Analysis of the data showed a variety of interventions by the hospital pharmacists, who helped patients with their problems by several repeated consultations.

No conflict of interest.

OHP-064 PHARMACEUTICAL EXPENSES FOR WELFARE OUTPATIENTS AND POLITICAL REFUGEES IN A PAEDIATRIC ATHENS HOSPITAL, DURING 2011 AND FIRST HALF OF 2012

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Background In Greece the expense of public pharmaceuticals (medicines prescribed by hospitals and public insurance funds) in 2009 was 5.1 billion corresponding to 2.4% of GNP, while the corresponding average rate for OECD countries was 1.5%. In 2012 the target is 2.88 billion. In addition, following the country's enrolment in the financial stability mechanism in 2010, the NHS (National Health System) was substantially enlarged because of the increased demand for public health system services while simultaneously there were cuts in NHS financing due to austerity measures.

Purpose To record and evaluate the pharmaceutical expenses due to the outpatients covered by Social welfare and the political refugees which all were served by the paediatric hospital pharmacy during 2011 and the first half of 2012.

Materials and Methods Information was acquired from the hospital pharmacy computerised data system.

Results During 2011,1250 prescriptions covered by welfare insurance were dispensed, of which 91% concerned children of Greek citizenship, and 9% immigrant children with political refugee documentation (mainly from Nigeria, Iraq, Afghanistan, Ethiopia and Syria).

The total cost was 113,525 euro. The first semester of 2012 830 prescriptions were dispensed costing 96,180 euro of which 86.5% were for children of Greek citizenship and the other 13.5% was for children with refugee status.

Conclusions

1. The pharmaceutical expenses concerning children covered by the welfare system and refugee children are increasing rapidly (especially for refugee children)
2. Given the current crisis in Greece, we urgently have to devise an effective policy to control the increasing pharmaceutical expenditure.

No conflict of interest.

OHP-065 PHARMACEUTICAL SERVICES IN HOSPITALS IN SERBIA

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Background The role of hospital pharmacists is changing worldwide. Pharmacists are becoming more and more involved in the treatment of patients and the provision of pharmaceutical care (PC). Consequently, increased numbers of pharmacists in hospitals are necessary and/or better organisation of traditional activities.

Purpose To identify the number and categories of pharmaceutical services and time frame for such activities in order to improve the organisation of pharmaceutical services in hospitals.

Materials and Methods The research was conducted in 21 hospital pharmacies out of 61. Data were collected through a questionnaire, which contained 51 pharmaceutical services classified into 12 categories. Services were defined by the Section for hospital pharmacies in Serbia in accordance with the conclusions of the global conference regarding the future of hospital pharmacy (Basel 2008).

Pharmacists were asked if they practise certain types of service, how often and how much time they consume for each service they practise.

Results The average number of pharmacists in a hospital pharmacy was two but varied between 1 and 6. A pharmacist provided on average 30 services per day (15–42). On average during workdays pharmacists devoted most of their time to: data processing (28%; 2.1 h), dispensing drugs (23%; 2 h), ordering (12%; 1 h) and supply (10%; 45 min), while the share related to PC was only 8% or 35 minutes per day.

Conclusions The results of research showed that supply and storage of medicines are the most frequent and time-consuming activities. Therefore, not enough time is left for patients and PC. Finally, in order to improve pharmaceutical activities in Serbia it is necessary to increase the number of pharmacists in hospitals, consolidate procurement across the region and streamline data processing services.

No conflict of interest.

OHP-066 PHARMACOECONOMIC EVALUATION OF FOLLICLE-STIMULATING HORMONE (URINARY VS. RECOMBINANT) IN CONTROLLED OVARIAN HYPERSTIMULATION

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Background Controlled ovarian hyperstimulation (COH) is mainly based on management of follicle-stimulating hormone (FSH). FSH may be obtained from the urine of menopausal women (u-FSH) or through recombinant biotechnology (r-FSH).

Purpose To conduct a pharmacoeconomic evaluation of different FSH (u-FSH vs. r-FSH) in COH.

Materials and Methods We conducted a bibliographic review to compare the efficacy of u-FSH and r-FSH in COH (Database: PubMed, keywords: FSH and COH, randomised and controlled clinical trials, from 2005 to 2011). The efficacy indicators were: progression rate in pregnancy (pregnancy remained at 12 weeks) and the number of mature oocytes obtained. We determined the cost per unit of efficacy (using current Spanish drug prices in 2012) and the incremental cost-efficacy ratio (ICER) with their sensitivity analysis. Setting: Assisted Reproduction unit in tertiary teaching hospital that serves an average of 340 patients per year. Statistical analysis powered by SPSS 15.0.

Results We analysed 10 clinical trials in women being treated with COH. The pooled data of the progression of pregnancy was 26.2% (FSH-r) vs. 22.3% (FSH-u) (difference = 3.9%; 95% CI = 1.2–5.9), and the average number of mature oocytes was: 9.0 (FSH-r) vs. 7.1 (FSH-u) (difference = 1.9; 95% CI = 0.7 to 4.1). The cost per pregnancy for r-FSH was €2,832.3 (€1,628.2–€3,754.3) and €2,332.5 (€1,526,1–€2,884.7) for u-FSH, so that the ICER in the pregnancy rate was 128.1 (85.1–147.4). The cost per number of mature oocytes

obtained for r-FSH was €82.3 (€78.3–€98.1) and €73.3 (€67.6–€81.7) for u-FSH, so the ICER in mature oocytes obtained was 4.7 (4.0–15.2).

Conclusions According to scientific evidence r-FSH appears to be more effective in women undergoing COH; however, this slight increase in efficacy does not seem to compensate for the difference in price, the result being that u-FSH is more cost effective.

No conflict of interest.

OHP-067 PRESCRIPTION PROFILE ANALYSIS OF PROTON PUMP INHIBITORS IN A TERTIARY HOSPITAL

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Background In October 2011, selection criteria for proton pump inhibitors (PPIs) were published, recommending the use of omeprazole as a drug of choice because, at equipotent doses, it is the most cost-effective drug, compared to other PPIs.

Purpose To describe the prescription profile of PPIs for different consultants and in patients who are discharged from hospital.

Materials and Methods Information about the prescriptions for PPIs issued during 2011 was obtained from the pharmaceutical software. The data were analysed and classified according to therapeutic group, active principle, number of defined daily doses (DDDs), service and number of prescriptions. The percentage DDD of each active principle with respect to the PPI group as a whole was also investigated.

Results During 2011, 9.654 prescriptions were written. Gastroenterology was the Medical Service with the most prescriptions, followed by Internal Medicine and Otolaryngology. The percentage DDD of each PPI prescribed in each service, related to the whole of the PPIs was:

- **Gastroenterology**: 26% omeprazole; 14% pantoprazole; 18% lansoprazole; 16% esomeprazole; 26% rabeprazole. Total, 2213 prescriptions.
- **Otolaryngology:** 55% omeprazole; 22% pantoprazole; 2% lansoprazole; 7% esomeprazole; 14% rabeprazole. Total, 1074 prescriptions.
- **Internal Medicine:** 82% omeprazole; 7% pantoprazole; 0,5% lansoprazole; 10% esomeprazole; 0,5% rabeprazole. Total, 619 prescriptions.

Conclusions Omeprazole is the PPI with the highest percentage of DDD prescribed, nevertheless prescriptions for it are on the low side (less than 30% in Gastroenterology and Otolaryngology, and less than 85% in Internal Medicine); this means that there is still a lot more room for improvement. The Service which made the best selection of IPPs was Internal Medicine, followed by Otolaryngology, and finally Gastroenterology.

Despite the low number of prescriptions made in hospital, compared to the ones prescribed in Primary Care, there is still a lot of work to be done to improve the selection of IPPs prescribed in hospital.

No conflict of interest.

OHP-068 REPEAT AUDIT OF LMWH USE IN THROMBOPROPHYLAXIS ON AN ORTHOPAEDIC SURGERY WARD, EMERGENCY CENTRE, BELGRADE

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Background The Guideline for Prevention of Deep Venous Thromboembolism in Orthopedic Surgery, based on current European and American Guidelines, was introduced in late 2009 on the Orthopedic Surgery Ward, Emergency Centre, Belgrade.

Hospital pharmacists were actively involved in writing, and monitoring the implementation of, the guideline.

Purpose The first audit of implementation of the guideline was in March 2010. The aim was to show if all patients were receiving thromboprophylaxis according to the guideline; and whether thromboprophylaxis was being recommended for patients after discharge from hospital.

The aim of the repeat study was to estimate if there were differences in implementing the guideline.

Materials and Methods Monitoring of prescriptions for patients in hospital and recommendations for thromboprophylaxis on the discharge documentation.

This study covered the period from January to March 2012 and compared results with the same period in 2010.

Results 2010 year: Total number of patients 104; 97% of patients received the recommended anticoagulant treatment during hospitalisation, and 85% patients received the recommended anticoagulant treatment after hospitalisation.

2012 year: Total number of patients 143; 96.5% of patients received the recommended anticoagulant treatment during hospitalisation, and 91.5% of patients received the recommended anticoagulant treatment after hospitalisation.

Conclusions During the monitoring period 3% of patients did not receive the recommended thromboprophylaxis during hospitalisation in 2010, and 3.5% of patients in 2012.

By continuous monitoring of recommended thromboprophylaxis after release from hospital, it was concluded that 15% of patients failed to receive the recommended treatment in 2010, and 8.4% in 2012.

The repeat audit two years later showed a similar percentage of thromboprophylaxis prescribing during hospitalisation, and significant improvement in thromboprophylaxis recommendations at the discharge of patients from hospital.

No conflict of interest.

OHP-069 RETROSPECTIVE STUDY ABOUT PATIENTS WITH A STOMA AND THEIR NEEDS IN THE HEALTH DISTRICT OF PATTI (MESSINA)

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Background Serious conditions of the bowel and bladder often require the formation of a stoma. It is estimated that 650,000 people in Europe live with a stoma. A person with a stoma not only needs post-operative medical care, but also appliances and accessories to increase his quality of life. In the Local Health Authority (LHA) of Messina appliances and accessories are given, for free, every month by the Hospital/District Pharmacies.

Purpose To point out, for the Health District (HD) of Patti, which is one of seven HDs in the LHA of Messina, the number of patients with a stoma, the types of appliances and accessories used, and with what difficulties we assist patients.

Materials and Methods Through the retrospective interrogation of an administrative database it was possible to assess the number of patients with a stoma who live in the HD of Patti and, particularly, those who received appliances and accessories from 01/01/2011 to 31/12/2011. For each patient the gender, age, kind of stoma, type and amount of appliances and accessories were recorded. All data gathered were analysed with 'Statistica' software. During the delivery of devices patients were also interviewed about problems they had experienced. All answers were collected and reviewed anonymously.

Results 70 patients were recorded, mainly with a colostomy. The incidence in the HD population was 1:715 inhabitants. 55.7% of patients were males and the average age was 74.3 years [39, 94].

There was no difference between the number of patients with a one or a two-piece appliance. Closed appliances are most commonly used; 75% of patients had experienced at least one appliance leakage/year; 57.15% needed adhesive paste, 36% a skin protection barrier. Only 10% had difficulty in removing the stoma appliance causing skin stripping and ulceration.

Conclusions In the Patti HD hospital pharmacists can play a role in supporting and guiding patients and their carers by providing information, education and counselling on how to best manage their stoma in daily activities, in order to achieve an acceptable quality of life.

No conflict of interest.

OHP-070 SATISFACTION WITH ELECTRONIC PRESCRIBING IN A GENERAL HOSPITAL

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Background Electronic prescribing (EP) is a useful tool for improving the safety and adaptability of the prescription process. Surveys enable us to find out the satisfaction of users and potential areas for improvement.

Purpose To find out how satisfied doctors and nurses of the Internal Medicine Service (IMS) were with EP.

Materials and Methods In 2010 the 'Mambrino XXI' electronic medical record, which is an EP module, was implemented in a 100-bed general hospital.

In 2012 the Pharmacy Service developed an anonymous and confidential survey that was given to the doctors and nurses of the ISM. The questionnaire included 6 questions rated with a Likert scale (1: very bad/strongly disagree, 2: bad/disagree, 3: Regular/indifferent; 4: good/agree, 5: very good/strongly agree): 1. How do you consider the ease of use? 2. How does the speed of the application seem to you? 3. Are the alerts for allergies and duplications useful? 4. Do you think it prevents medication errors and improves safety? 5. Is the design of printed orders satisfactory? 6. What do you think about the support from the Pharmacy Service?

An overall satisfaction question was also included with 4 answers: very satisfied, satisfied, dissatisfied, very dissatisfied.

Results 6 doctors and 10 nurses completed the questionnaire. The average score was 3.7 for question 1; 2.9 for question 2; 3.9 for question 3; 3 for question 4; 3.1 for question 5 and 4.1 for question 6; 6 respondents were very satisfied, 5 satisfied and 5 dissatisfied.

Conclusions The survey evaluated aspects of practise use, safety and Pharmacy Service support. More than two-thirds of doctors and nurses of the ISM were satisfied with the EP. There are opportunities for improve all the aspects investigated, especially the programme speed, the perceived safety and the design of printed medical orders.

No conflict of interest.

OHP-071 STUDY OF GLUTAMINE USE IN ADULT PARENTERAL NUTRITION

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Background Intravenous glutamine supplementation in patients with catabolic stress is widespread in clinical practise, although there is no clear consensus on its use.

Purpose To study the use of glutamine in adult parenteral nutrition to adapt it to the available scientific evidence and to assess the economic impact of parenteral nutritional treatment.

Materials and Methods Retrospective observational study of units of parenteral nutrition (PNU) produced during 2011.

We studied the three services that used PN most: Digestive Surgery, Digestive and Intensive Care Unit (ICU).

Data collection source: Software in parenteral nutrition area. Pharmacy Management System.

Study Variables:

Protocols produced by service (number of each PNU protocol, protocol type, number of patients with each protocol and duration of nutrition).

Individualized PNUs produced by service (number of PNUs, number of patients and duration of PN).

Cost of each protocol and glutamine cost therein.

Results Of all adult PNUs produced in accordance with a protocol, 58% were stress protocols.

PNU per service (including individual):

Digestive Surgery: 80% of the total number of PNUs were stress PNU and corresponded to 68% of the patients. There is scientific evidence to recommend the use of glutamine in patients undergoing major abdominal surgery.

Digestive: 52% of the total number of PNUs were stress PNU and corresponded to 54% of the patients. Glutamine use was associated with acute pancreatitis and inflammatory disease, although clinical studies are insufficient to recommend this.

ICU: 63% of the total number of PNUs were stress PNU and corresponded to 72% of patients. There is evidence of clinical benefit with high recommendation.

Glutamine cost varies between 45.4%–55.7% of the total cost per PNU.

76.5% of the total cost of protocolized PNUs corresponded to stress protocols.

Conclusions An opportunity for improvement is identified in the use of glutamine. We propose a detailed study of the prescription/indication to rationalise its high use and associated costs.

No conflict of interest.

OHP-072 STUDY OF USE OF COLISTIN IN A SERBIAN CLINICAL CENTRE

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Background Colistin (polymyxin E) is a mixture of cyclic polypeptides colistin A and B and it remains one of the last-resort antibiotics for multidrug resistant species of Pseudomonas and Acinetobacter. The increased use of Colistin was noticed at the end of 2011.

Purpose To analyse the use of Colistin due to increased bacterial resistance and difficulties in supply, as no licence has been issued for marketing authorization of this medicine in Serbia.

Materials and Methods A retrospective descriptive study of patients who started Colistin treatment from January to September 2012. We reviewed those forms that recorded: patient demographic data, posology, duration, kind of treatment and type of infection. All data were collected in an Excel database.

Results In this period, 86 patients were prescribed Colistin (55% men). In 74% cases the posology was 1M IU/8h, and in 26% was 2M IU/8h; mean duration of treatment was 18.07 days, but in 38% patients we did not get data about duration of treatment. Colistin

was used in the following departments: ICU (74%), Surgery (7%) Internal Medicine (5%), and other several wards (14%). Colistin treatment was started empirically in 16% of patients. Microbiological diagnosis (Pseudomonas sp. that were aminoglycosides and carbapenems-resistant, and multi-drug resistant Acinetobacter baumannii) was the reason for Colistin treatment in 84% of patients.

Conclusions Due to the increased number of patients in a seriously difficult, life-threatening conditions caused by severe nosocomial infections it is necessary to establish strict control over Colistin prescribing (an antibiogram based on blood culture or cerebrospinal fluid, council of infectiology experts etc.). The possibility of getting it registered in Serbia and included on the list of reimbursed drugs should be investigated. It is also necessary to monitor carefully, and to improve our active communication with, the main wards in order to promote the rational use of antibiotics.

No conflict of interest.

OHP-073 SURVEY OF INTERFACE MANAGEMENT MEASURES REGARDING MEDICINES

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Background The need to improve medicines management at the interface of hospital and primary care is generally acknowledged. But knowledge of good practise on how to bridge that gap is scant.

Purpose To learn about existing policies, mechanisms and measures of cooperation between the hospital and primary sector (hereafter called interface management).

Materials and Methods A survey was performed with the PHIS (Pharmaceutical Pricing and Reimbursement Information) network comprising competent authorities for pharmaceutical pricing and reimbursement as well as hospital pharmacists from 27 countries (25 EU Member States, Norway and Turkey). PHIS network members were asked to inform in writing, preferably by drafting a report according to a predefined template, of medicines management in the in-patient sector and interface management measures in their country. We reviewed 19 published PHIS Hospital Pharma reports, two draught reports and information provided by six further countries (data as of 2009/2010). During a network meeting in February 2012, network members from eleven countries provided updated information on interface management measures in their country on a poster.

Results Only 17 countries reported interface management initiatives. Measures included joint reimbursement lists, hospital drug formularies being coordinated with the list of recommendations for medicines in the primary care, joint development of recommendations/guidelines; joint Drugs and Therapeutics Committees (DTC) and hospital DTCs with a representative from the social health insurance; (obligatory) transfer of information on pharmacotherapy between the sectors, including IT solutions; patient education and counselling; special funding schemes, financial incentives for cooperation projects; pharmacy liaison services, hospital discharge programmes and medicines reconciliation.

Conclusions As in most cases the implementation of the reported measures would require a change in the organisation and funding of the pharmaceutical system, it cannot be done by the hospital pharmacists alone. Improved dialogue between the sectors is urgently needed.

No conflict of interest.

OHP-074 THE CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN AZIENDA SANITARIA PROVINCIALE SIRACUSA: ECONOMIC CONSIDERATIONS RELATED APPROPRIATENESS OF PRESCRIPTION

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Background In Italy respiratory diseases are the third cause of death, 50% of which is caused by Chronic Obstructive Pulmonary Disease (COPD). COPD is an irreversible inflammation that causes narrowing of the airways and has a slow and progressive course. In Siracusa the high incidence of COPD may be due to the petrochemical plants in the area. Drug treatment allows us to improve quality of life and to reduce mortality, but often the prescriptions do not adhere to the GOLD Guidelines (GL) for COPD treatment.

Purpose To assess the budgetary impact of the treatment used and of the GOLD GL treatment.

Materials and Methods The authors obtained, by administrative databases and mathematical models:

- The prescriptions of medicines for COPD (ATC R03) in 2010 in Azienda Sanitaria Provinciale (ASP) Siracusa;
- The number of patients with COPD;
- The number of patients for each stage of severity;
- The budget impact of the treatment used and the GOLD GL treatment, which recommends:
- using SAMAs/SABAs(short-action antimuscarinics/antiadrenergics) in the mild stage;
- adding LAMAs/LABAs(long-action antimuscarinics/antiadrenergics) from the moderate to very severe stage;
- to add FDCs (fixed combination drugs)/ICSs (inhaled corticosteroids) in severe and very severe stages.

Results 5895 patients had COPD, of whom:

- 1484 in mild stage;
- 2672 in moderate stage;
- 1155 in severe stage;
- 584 in very severe stage.

The spending for drugs prescribed for COPD was €2,702,627 of which €1,787,967 was for FDCs/ICSs.

If the prescriptions were 100% adherent to GOLD GL spending would have been €1,309,304, of which €434,029 for FDCs/ICSs, with a saving of €1,393,323.

Conclusions If the prescriptions of FDCs/ICSs adhered to GOLD GL, spending would have been 50% less. The adherence to GOLD GL ensures the patient a proper prescription and allows high savings. The authors are developing a training-information project aimed at encouraging doctors to prescribe appropriately.

No conflict of interest.

OHP-075 THE COST OF MANAGING INTRACRANIAL ANEURYSMS BY EMBOLIZATION IN MOROCCO

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Background The overall prevalence of intracranial aneurysm is thought to be between 0.5 to 6% of population, based on angiographic study and autopsies. The frequency of detection and treatment of these aneurysms has increased due to the greater use of non-invasive diagnostic imaging techniques.

Purpose To demonstrate the cost of care by embolization of intracranial aneurysm and to understand relation between the cost and clinical patient parameters.
Materials and Methods Between January 2010 and April 2012 48 patients were treated by embolization of cerebral aneurysms. The cost of pharmaceutical products (drugs and medical devices) was assessed by using the micro-costing method that takes into account all direct costs and the overall cost of care was calculated using data from the hospital's information system.
Results In total, 48 patients were treated, mean age 52.4 ± 12.5 years. The sex ratio M/F = 0.71. 26 patients were covered by health insurance (52.2%). The median overall stay within 10 days [5–11] in ICU was 1 day [1 to 2] and in the medical unit was 6 days [3 to 9.75]. The overall average cost of treatment was €9,697.8, varying from €4,784.3 to €32,172.3. The cost of pharmaceutical products was on average 57.6% of the overall cost. While the average cost of consumables was €5,612.4 with a range of €2,499.1 to €16,370.8. Length of stay does not influence the overall cost of care, but the cost is influenced by the amount of embolization material.
Conclusions The cost of pharmaceutical products in the endovascular treatment of intracranial aneurysms remains high and represents a major handicap for the development of this technique in countries with low coverage by health insurance. As we mentioned before, this latter overall cost is especially influenced by number of embolization materials and number of aneurysms.

No conflict of interest.

OHP-076 THE INCIDENCE OF BACTEREMIA DUE TO CATHETERS AND THE COST OF ANTIBIOTICS BEFORE AND AFTER IMPLEMENTATION OF THE ZERO BACTEREMIA PROJECT

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Background Primary bacteraemia and bacteraemia caused by catheter infections entail a high pharmaceutical cost. The 'Zero Bacteraemia Project' (BZP) for central intravenous catheter (CVC) use in invasive therapies showed a decrease in the number of bacteraemia cases and a financial effect on hospitalizations.
Purpose To study the number of primary bacteraemia and bacteraemia cases caused by catheter infections among patients hospitalised in our Intensive Care Unit (ICU) and the pharmaceutical cost after implementation of the CVC guides. We compared these data to those obtained from 2007–2008.
Materials and Methods We retrospectively studied 2353 patients who were admitted to our Intensive Care Unit. 1280 patients were studied before BZP (2007–2008) and 1073 after BZP implementation. The BZP implied: catheter insertion with maximal sterile barrier precautions in ICU, correct hand washing, hygienic precautions when using CVCs and the removal of unnecessary catheters. We compared the pharmaceutical cost in antibiotics in both periods. We also studied the five most-used antibiotics in this hospital for the treatment of catheter-related infections suffered by the sample group in this ICU. The data were obtained by the programme 'ENVIN-ICU'.
Results A total of 35 pre-BZP and 13 post-BZP catheter-related bacteraemia cases were detected. 5.14 and 2.17 bacteraemia cases for every 100 patients with CVC. A 37% reduction was observed in the incidence of bacteraemia. The pharmaceutical cost just in antibiotics for the 35 patients infected during the first period amounted to 3100.68 euros. However it dropped to 2388.93 euros during the following period. A 23% saving was observed on the antibiotics consumption.
Conclusions The data from this study show that the use of the 'Zero Bacteremia' policy in the process of inserting and monitoring CVCs is useful to reduce the number of infections. A statistically significant decrease in the number of bacteraemia cases and a monetary saving in antibiotics were found too.

No conflict of interest.

OHP-077 THE ROLE OF PHARMACISTS IN AN ITALIAN MODEL OF ECONOMIC SUSTAINABILITY AND INNOVATIVE TREATMENTS

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Background Italy is one of the European countries where a Risk Sharing Scheme between healthcare institutions and pharmaceutical companies has been widely implemented. It is a new model proposed to accelerate the authorisation and the availability on the market of new drugs. Since September 2007, the Italian drug agency has developed a web register to record data to monitor patients who receive medicines under a Risk Sharing Scheme: the physician prescribes medicines from a list of high-cost oncology drugs and the Italian drug agency validates each prescription and e-mails the hospital pharmacy to release the drug. The non-responding patients are documented in the web register by the health authorities and the pharmacist applies for reimbursement to the pharmaceutical company. Since 2011, Sicily Region has had a hospital pharmacist officially appointed in each pharmacy department to be in charge of obtaining refunds from manufacturers for undocumented non-responding patients and to supervise the pay-back procedures.
Purpose To quantify the amount clawed back from manufacturers after the appointment of the Risk-Sharing pharmacist.
Materials and Methods We detected and examined unresponsive patients recorded in the Registro AIFA-onco. The pay-back procedures were subsequently completed.
Results The number of registered patients increased by 83% and 451 non-documented patients were recorded: 190 Erlotinib, 103 Sorafenib, 57 Sunitinib, 38 Lapatinib, 14 Everolimus, 1 Pemetrexed, 20 Bevacizumab, 20 Cetuximab, 12 Gefitinib, 2 Vinflunine, 16 Lenalidomide, 3 thalidomide, 1 Panitumumab, 7 Bortezomib, 4 Azacitidine, 3 Trabectedin.

The ex-factory expense was €6,340,011.66: €431,063.89 recovered, €145,678.92 is waiting for reimbursement and €136,220.50 has been denied reimbursement.
Conclusions The appointment of a pharmacist enabled us to monitor pay-back procedures and assess responding and non-responding patients reliably.

No conflict of interest.

OHP-078 TREATMENT OF POSTOPERATIVE ANAEMIA IN ORTHOPAEDIC SURGERY: A BUDGET IMPACT ANALYSIS FROM A HOSPITAL PERSPECTIVE

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Background Standard postoperative anaemia management includes oral iron or intravenous iron supplementation (iron sucrose complex, ISC), erythropoietin therapy and blood transfusion. Introduction of a new intravenous iron formulation (ferric carboxymaltose, FCM), more expensive than ISC but with simplified administration modalities, could have economic consequences for hospitals.

Purpose To assess the budget impact of introducing FCM in the current practise for treating postoperative anaemia in orthopaedic surgery.

Materials and Methods A budget impact model (BIM) was built from a hospital perspective. Study population consisted of patients who underwent total hip or knee replacement in 2011. Costs are estimated by micro-costing for treatment costs and questionnaire for nursing costs. A reference case is based on the present patient case-mix. Simulations consider different substitutions: simulation A 100% ISC for FCM, simulation B 100% ISC and 50% oral iron for FCM and simulation C 100% ISC and 100% oral iron for FCM. One-way sensitivity analysis is applied to simulations.

Results Population: 314 patients (210 women) underwent 327 operations (205 total hip replacements), mean age was 71.6 years. Costs per treatment: oral iron €0.57, ISC €60.48, FCM €82.46 and transfusion €431.13 (no patient received erythropoietin treatment during hospitalisation). Average costs per patient: reference case €161.63, simulation A €169.83, simulation B €195.93 and simulation C €219.85. Total costs per year: reference case €44 124.20, simulation A €46 364.85 (+5%), simulation B €53 488.94 (+21%) and simulation C €60 018.12 (+31%). Discussion: BIM is very sensitive to variations in transfusion rate, moderately sensitive to variations in treatment costs and insensitive to variations in nursing costs. Economically, simulation A is feasible for many patients, simulation B is feasible, but simulation C is not.

Conclusions FCM will be added to the hospital formulary. A further study is needed to define substitution modalities in the real-life situation. BIM has contributed to this decision-making process.

No conflict of interest.

OHP-079 TUMOR NECROSIS FACTOR BLOCKERS IN RHEUMATOLOGY; CONVENTIONAL VERSUS OFF-LABEL DRUG DOSAGE

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Background Drug dosage modifications are a common clinical practise regarding Tumor Necrosis Factor (TNF) blockers, using posologies not specified on the authorised product information summary. This practise has a significant financial impact on the healthcare system.

Purpose To revise and investigate actual drug dosages in our Hospital's rheumatology service for conventional TNF blockers.

Materials and Methods The Pharmacy Service analysed the internal data record for rheumatology patients treated during April 2012 and for at least one year with infliximab (IFX), etanercept (ETN) or adalimumab (ADA). Off-label indications were excluded. Therapeutic indication, initial and current posology were recorded.

Results Number of patients by drug;

IFX	ETN	ADA
128	152	121

Number of patients by indication:

RA	AS	PA	JIA
208	109	79	5

RA: Rheumatoid arthritis, AS Ankylosing spondylitis, PA psoriatic arthritis, JIA: Juvenile idiopathic arthritis

Regarding posology, 261 patients (65%) were on a conventional dose (CD), 93 (23%) on a reduced dose (DR) and 47 (12%) on an increased dose (DI)

Percentage of patients by drug on CD, DR or DI was;

Treatment/posology	CD	DR	DI
IFX	33%	35%	32%
ETN	79%	21%	–
ADA	82%	14%	4%

Percentage of patients by indication was;

Indication/posology	CD	DR	DI
RA	65%	19%	16%
AS	59%	32%	9%
PA	72%	24%	4%
JIA	80%	20%	–

Conclusions Only 65% of patients using TNF blockers on rheumatology use a CD while a quarter of them have a reduced posology.

Infliximab is the drug that requires more dosage modifications, on almost 2/3 of patients.

AS and PA are the indications that allow more DR.

Drug dosage revisions at the end of the first year of treatment allow an important number of patients to reduce their dose while controlling their disease and it is a relevant efficacy instrument.

No conflict of interest.

OHP-080 USE OF CHEMOTHERAPY NEAR THE END OF LIFE

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Background Appropriately timed cessation of chemotherapy is integral to the patient's quality of life.

Purpose To describe and evaluate the use of chemotherapy in cancer patients in their last days of life.

Materials and Methods Retrospective observational study that included all cancer patients who died in our hospital in 2011. Information sources used were: a) Mambrino for the age, date of death of the patient and clinical charts; b) Oncofar to record the type of cancer, the last cycle of intravenous (IV) chemotherapy received, the historic administration, lines of treatment and the percentage of the last dose received; c) APD-Athos to review data from the patient's hospital stay and outpatient oral cytostatics dispensing. We collected for each patient their demographics, pharmacotherapy, the temporal interval between the last chemotherapy administration and death of the patient and the number of days in hospital one month before death.

Results A total of 94 patients (30% female) died in 2011 in our hospital. Of these, 10 patients didn't receive chemotherapy, 10 received IV chemotherapy combined with oral, 4 received oral chemotherapy alone and 70 IV chemotherapy alone. Tumours with the highest number of deaths were non-small cell lung cancer (21), head and neck cancer (11) and colorectal cancer (10). The most common last chemotherapy regimens were combinations of carboplatin (16) (especially with pemetrexed and paclitaxel), gemcitabine (11) (mostly alone), combinations of cisplatin (9), paclitaxel (9) (alone or combined with carboplatin) and monoclonal antibodies (9) (in 67% combined with bevacizumab); the most frequent oral chemotherapy drugs were erlotinib (4) and temozolomide (3). Of the 80 patients who received IV chemotherapy, 27.5% (22) received chemotherapy in the last 14 days of life, another 27.5% (22) received chemotherapy between 15 and 30 days before death, 21.25% (17) between 31 and 60 days, 13.75% (11) between 61 and 90 days and 10% (8) more than 90 days before death. In addition, 14% (12)

started a new IV chemotherapy regimen a month before death. About lines of treatment, 45.25% (38) of the patients received first-line chemotherapy, 20.25% (17) in second line, 21.4% (18) in third line and 13.1% (11) received more than 3 lines of chemotherapy. In 48.75% (39), the percentage of the last dose of IV chemotherapy administered was ≤ 80%. All patients were admitted to the Oncology floor at some point in the last 30 days of life, with an average stay of 9.73 days.

Conclusions The percentage of patients receiving IV chemotherapy in the last 14 days of life and that of those who started with a new regimen a month before death are much higher in our hospital than in similar studies. In view of the results obtained, more than half of these patients received IV chemotherapy in the last month of life. This makes us ask ourselves what factors contributed to this decision to treat, were the benefit and toxicity correctly assessed and was it is really necessary to have active cancer treatment in the last days of life?

No conflict of interest.

OHP-081 USE OF LOW THERAPEUTIC UTILITY DRUGS IN AN INSTITUTION BEFORE THEIR USE WAS RESTRICTED IN THE SPANISH HEALTH SYSTEM

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Background Low therapeutic utility drugs (LTUDs) are those with controversial efficacy that provide little improvement for the disease or the symptoms.

These drugs have recently been removed from the system financing Spanish healthcare, with the aim of controlling healthcare expenditure.

Purpose To assess the use of these drugs in institutionalised older people and find out how the new law may be affecting it.

Materials and Methods This was a retrospective transversal study. We choose one day at random and checked all treatments prescribed that day.

The following data were collected: drugs, sex, age and LTUDs.

The data were obtained from the SAVAC programme and processed in Excel.

Results A total of 175 residents were included, mean age 89 years old.

LTUDs were administered to 65 people (37%).

There were 1812 different drugs, of which 88 (4.9%) were LTUDs, measured as number of dosage units.

Drug consumption in primary care (PC) is measured by number of packs, not as number of dosage units. During the study, PC consumption of LTUD accounted for 6.86% of the total.

The LTUDs prescribed were: 26 items (30.3%) acetylcysteine, 18 (21.5%) topical diclofenac, 12(14.4%) citicoline, 10 (12.0%) trimetazidine, 9 (10.8%) pentoxifylline, 4 (4.9%) piracetam, 2 (2.5%) ambroxol, 1 (1.2%) acetaminophen plus codeine, 1(1.2%) escine and 1(1.2%) inhaled mesna.

Conclusions Institutionalized older people use fewer LTUDs than patients from PC.

Mucolytic agents and topical NSAIDs are on top of the list, accounting for 50% of the LTUDs used.

Nearly 40% of institutionalised people will have to pay for these 5% of their drugs, or these medicines will have to be removed from their treatments.

Better designed studies should be done to clarify the real efficacy and efficiency of this large group of drugs.

No conflict of interest.

OHP-082 USE OF STANDARD PROTOCOLS FOR TOTAL PARENTERAL NUTRITION IN A TERTIARY UNIVERSITY HOSPITAL

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Background One of the clinical pharmacist's main functions in parenteral nutrition is to ensure the quality and safety of the solutions prepared. It is too laborious to do this with each preparation. So in our hospital it was decided to design 21 standard Total Parenteral Nutrition (TPN) protocols.

Purpose To analyse the prescriptions for TPN and their compliance with the standard protocols available.

Materials and Methods A retrospective study was conducted over a period of one year (October 2011–October 2012). The composition of all TPN administered to adults was recorded, as well as the addition of various drugs such as insulin or somatostatin. Data were obtained from the pharmacy service's nutritional database.

Results 629 adult patients were treated with TPN and received 8342 bags of TPN; 3129 (37.5%) fitted the standard protocols. The changes in the composition of TPN in non-standard TPN bags were: glucose added to 117 (2.3%) bags, lipids in quality 2276 (44.4%) and in quantity 374 (7.5%), nitrogen to 223 (4.3%); electrolytes: sodium to 238 (4.6%), calcium to 7 (0.1%), magnesium to 181 (3.5%), potassium to 3054 (59.6%) and phosphorus to 245 (4.8%); volume to 117 (2.3%), somatostatin to 545 (10.6%) and insulin to 862 (16.8%).

Composition of protocols ranged from: nitrogen: 6 to 20 g, increasing the amount of nitrogen from 2 by 2 g, glucose: 150–200–250–300 g, lipids 0–50–75–100 g, kcal non-protein/g nitrogen from 87.5 to 187.5 and volume 1350–2000–3000 mL. All protocols contained the same amount of electrolytes (sodium: 75 mEq, potassium: 60 mEq, calcium: 15 mEq, magnesium: 15 mEq, chloride: 90 mEq, acetate: 75 mEq and phosphorus: 10–20 mMol), vitamins and trace elements.

Conclusions 61% of administered TPN needed to be modified with respect to standard protocols in order to meet the nutritional requirements of individual patients. So we are considering revising the protocols regarding the quality of lipids and amount of potassium.

No conflict of interest.

OHP-083 USTEKINUMAB FOR THE TREATMENT OF PSORIASIS IN A TERTIARY HOSPITAL

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Background Ustekinumab is a fully human IgG1κ monoclonal antibody against interleukin 12 and 23 indicated for the treatment of moderate to severe plaque psoriasis in adults who have failed to respond to previous treatment. The recommended posology is an initial dose of 45 mg (90 mg with a body weight >100 Kg) subcutaneously, followed by the same dose 4 weeks later, and then every 12 weeks thereafter.

Purpose To analyse the use of ustekinumab in our hospital since its launch.

Materials and Methods Retrospective longitudinal study of all the patients with psoriasis treated with ustekinumab since its launch in January 2009 in a tertiary hospital. Data was obtained from the records of outpatients who get their medicines from the hospital pharmacy, and before February 2010, we used records of

ustekinumab prescriptions that required validation from the inspection service.

Main outcome measures: gender, age, dose, time in treatment, previous use of a biological antiTNF, changes in frequency of administration, induction posology at the beginning.

Statistics: Descriptive analysis of qualitative and quantitative data, unpaired t-test with SPSS 17.0.

Results The review consisted of 57 patients (56.1% men) with a mean age of 52 (SD 12.9) for men and 43 years old (SD 19.2) for women (P = 0.05). In 9 patients (one woman) the dose used was 90 mg. In 35 cases (61.4%) the patients received a previous treatment with biological antiTNF and in 12 patients the treatment started every 12 weeks directly (without induction). The physicians changed the frequency in 10 patients (17.5%): 5 with doses every 16–20 weeks and 5 with interruptions with a mean of 7.6 months.

Currently 11 patients have stopped the treatment and the average time of treatment is 19.3 months (SD 9.9).

Conclusions Ustekinumab was the first-line biological treatment in 38.6% of patients.

A significant number of patients used 90 mg, and it could be interesting to evaluate whether a 45 mg dose would be sufficiently effective to reduce the cost.

No conflict of interest.

OHP-084 WHAT CONCEPTS ARE USED TO DESCRIBE THE COOPERATION MECHANISMS BETWEEN THE HOSPITAL SECTOR AND PRIMARY CARE? ANALYSIS OF TERMINOLOGY

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Background Cooperation between the hospital sector and primary care is addressed under different names which hampers sharing and identifying existing practises and policies in this field.

Purpose To get a better understanding of the concept of medicines management at the interface of the hospital and primary care sectors (hereafter called interface management).

Materials and Methods Narrative literature review searching Medline, EMBASE, GoogleScholar, Web of Science (ISI), supplemented by hand searching (snowballing) to detect grey literature and contacts with policy makers, researchers and hospital pharmacists to identify further references. Search terms included interface (management), seamless care, continuous care, transitional care, transition in combination with medication, medicines, drugs and pharmaceuticals. Interventions that did not address medicines were excluded; the search period was 1990 to September 2012.

Results In English-language literature, the most commonly applied terms are seamless care, integrated care, comprehensive care, transmural care, transitional care and continuity of care for which, in most cases, generally accepted and repeatedly quoted definitions exist. A more recent terminology is 'interface management'. In many cases, specific projects such as hospital discharge programmes are described without any explicit reference to overall concepts such as interface management or seamless care. Tools such as medicines reconciliation and/or patient counselling can be used to improve medicines management at the interface but they are not necessarily used as specific interface management measures.

Conclusions Even in the English-language literature, the mechanisms of cooperation between the hospital sector and the primary care are referred to under different names. It is recommended to include specific interface management measures as search terms in a literature review on interface management since overall concepts such as seamless care and interface management are likely to yield few results. Terminology work to increase clarity in this field is needed.

No conflict of interest.

Clinical pharmacy and clinical trials (including case series)

CPC-001 A CLINICAL PHARMACIST FOR OUTPATIENT CONSULTATIONS IN A HEART FAILURE CLINIC

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Background Heart Failure (HF) is a severe chronic condition requiring polymedication, which is associated with a risk of non-adherence to chronic Heart Failure (CHF) treatment.

We recently demonstrated that a clinical pharmacist (CP) can be successfully integrated into a cardiology department to improve HF patient care by supervising the treatment. In addition, in 2009 we developed a dedicated CP outpatient consultation integrated in the Heart Failure Clinic (HFC) at our institution.

Purpose To provide a description of the role of the CP in an outpatient HFC.

Materials and Methods 325 patients with HF are monitored at our HFC. All patients are seen by the CP during a dedicated consultation, which includes the following: 1) preparation of the patient's file; 2) the complete history of medical treatment is checked; 3) the record of drugs is updated; 4) vital signs and electrocardiography are performed by the HF nurse. The patient is then seen by the cardiologist who updates the treatment plan. The patient is then seen by the CP who draws up and issues a plan to put the new treatment into practise, which includes scheduling phone contact for drug uptitration. Finally, the CP and the HF nurse ensure that the plan is followed by weekly scheduled phone consultations.

Results Each HF patient is seen at the outpatient clinic for approximately 45 minutes. On a yearly basis, the CP establishes 584 pharmaceutical plans and performs 197 phone consultations for follow up, resulting in 97 changed treatments.

Conclusions The integration of a CP into the HFC is important to improve management of HF through dedicated outpatient consultations, implementation of treatment plans and checking the patient's adherence.

No conflict of interest.

CPC-002 A MULTICENTRE RETROSPECTIVE STUDY TO EVALUATE THE ECONOMIC IMPACT OF THE PRESCRIBING MODELS FOR TRASTUZUMAB IN THE PIEMONTE REGION

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Background In recent years, there has been a rapid and constant increase in the costs of cancer treatment but, with limited health care resources, it is essential to consider the economic implications of different health interventions.

Abstract CPC-002 Table 1 Qualitative evaluation of pharmacoeconomics study

Economics Evaluation T in adjuvant	Study Design	Data Collection	Analysis and Interpretation of results	Final Score	Total relative score
Blank	24/26	27/45	35/48	86	72.3%
Chen	23/26	30/45	37/48	90	75.6%
Dedes	24/26	31/45	35/48	90	75.6%
Essers	24/26	30/45	35/48	89	74.8%
Garrison	24/26	31/45	36/48	91	76.5%
Kurian	25/26	31/45	37/48	93	78.1%
Liberato	26/26	33/45	39/48	98	82.3%
Lidgren	26/26	34/45	38/48	98	82.3%
Millar	25/26	32/45	35/48	92	77.3%
Neyt	25/26	31/45	34/48	90	75.6%
NICE	26/26	42/45	40/48	108	90.7%
Norum	25/26	28/45	34/48	87	73.1%
Shiroiwa	26/26	31/45	38/48	95	79.8%
Skedgei	25/26	27/45	37/48	89	74.8%
Van Vlaenderen T in MBC	24/26	31/45	36/48	91	76.5%
Poncet	24/26	32/45	31/48	87	73.1%
Norum J	25/26	33/45	35/48	93	78.1%
Elkin	26/26	37/45	40/48	103	86.5%
Lidgren	26/26	36/45	38/48	100	84%
NICE (2002)	26/26	42/45	40/48	108	90.7%

Purpose To evaluate the economic impact of the different prescribing models for trastuzumab on overall costs for breast cancer treatments in the Piemonte Region.

Materials and Methods We systematically reviewed the MEDLINE-indexed, English-language literature to identify published, peer-reviewed economic analyses of trastuzumab in HER2± treatment of breast cancer. We rated study quality as per the Drummond criteria.

Direct medical and unit costs were calculated from the perspective of a Regional health care system. We derived patient data by consulting a Regional administrative database and screening by File F File C and SDO for each patient treated in 2010. To obtain valid data, it is necessary to combine the data from this study into a single model, with an epidemiological measure from the Piemonte Cancer Registry. It is recommended to use an empirical Bayesian analysis to conduct this study because there is no single estimator for the parameters.

Results The search strategy identified 948 articles, of which 340 were citations. From the 608 remaining, 23 articles were considered suitable for full review based on the inclusion criteria. Of these, 15 considered adjuvant trastuzumab treatment only, seven examined metastatic breast cancer treatment and one considered treatment with trastuzumab beyond progression. The analysis of the accuracy of information provided by the information systems showed us that there was only 40% correspondence with the administrative database within Molinette Hospital.

Conclusions Preliminary results confirm the difficulty of obtaining accurate data from the administrative systems. We hope to obtain precise data on trastuzumab prescribing, and thus offer complementary information to cost-effectiveness analysis before the launching of a generic drug.

No conflict of interest.

CPC-003 A RETROSPECTIVE ANALYSIS OF THE SWITCHES FROM ORIGINATOR AND BIOSIMILAR RECOMBINANT HUMAN ERYTHROPOIETINS IN CHRONIC KIDNEY DISEASE

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Background Erythropoiesis stimulating agents (ESAs) has been shown to be highly effective in anaemia in chronic kidney disease (CKD). Various biological ESAs are available such as epoetin alfa, beta, darbepoetin alfa and C.E.R.A, including three biosimilars, epoetin alfa, zeta and theta. National regulations are trying to promote the prescription of the biosimilars, especially in ESA-naive patients. Switching between products is not recommended and the pharmacist can't replace one epoetin with another. However, changes do occur in clinical practise.

Purpose In the Pharmacy Department of the Palermo Local Health Unit (LHU) we observed that nephrologists frequently switch patients but not in order to reduce costs. Therefore, the aim of this study was to calculate the prevalence and patterns of switching and to evaluate the reasons for them and the results for these changes.

Materials and Methods Distributing all the epoetins, after a discharge or a DH (docetaxel/trastuzumab) regimen and ensuring appropriate continuity of care, the Department collected and retrospectively analysed an electronic database with all the prescriptions for both non-dialysis-dependent CKD or dialysis patients. Furthermore, haemoglobin levels (Hb) were collected, if available, from the paper prescriptions. The period of observations was January 2011–June 2012.

Results 2,711 patients received an epoetin for CKD (from a population of 750,550). 368 patients (13.6%) had been switched. Of this group, only 194 patients were evaluable (98 female, mean age 73.57+-SD:14.21). The inclusion criteria were: receiving ESAs for at least four months; less than 60 days between two prescriptions. Treatments were less commonly switched from biosimilars than originator formulations. Only in 7 cases did nephrologists cite the lack of efficacy of the ESA previously administered, with demonstrated worsening of the patient's clinical status (Aranesp 4, Mircera 2 and NeoRecormon 1). In 9 cases we assumed lack of efficacy of the first ESA, based on measurement of the haemoglobin (Hb) values. In the following prescription the clinicians switched and reported an Hb level lower than the first (≤10 g/L). In 24 cases, the ESAs varied with the prescriber. There was no reason for the switch or it was made for trivial reasons. 5 changes from the biosimilar were the pharmacist's wrong decision, due to not checking the patient's last prescription on the database. 5 changes from Mircera occurred after the announcement of a worldwide shortage. Only in 9 cases had the clinicians decided to shift toward a biosimilar on cost grounds. In the remaining cases, Hb levels remained stable before and after the switch. We can also state that no spontaneous reports of adverse drug reactions regarding ESAs have been received.

Conclusions Our results demonstrates that all the switches were well tolerated. This may support the use of biosimilars in terms of safety and efficacy and switches towards less expensive epoetins. The decision to start ESA treatment with a biosimilar must be considered, and it will also be possible to change pretreated patients.

No conflict of interest.

CPC-004 A REVIEW OF PHARMACISTSÍ INTERVENTIONS IN A NEUROLOGY DEPARTMENT

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Background The adult Department of Neurology is a 42-bed unit that includes an inpatient neurology ward, an inpatient stroke unit and a 10-bed neurological intensive care unit. The computerised physician order entry system available in our hospital is Omnipro. It enables the pharmacy resident to consult the cause of hospitalisation, nurse care, surveillance of medical parameters and to analyse prescriptions.

Purpose To describe the pharmacists' interventions (PIs).

Materials and Methods The resident validated prescriptions every day, could consult medical files in the Neurology ward and attended medical clinical rounds twice weekly. When a problem was identified in a prescription, the resident discussed it directly with the physician. Every PI was collected using a validated record sheet (Conort *et al*, J Pharm Clin, 2004).
Results The resident made 95 interventions during the eighteen-week study period. The physician acceptance rate of these recommendations was 92%. The most commonly identified drug-related problems were: inappropriate administration (19%), non-indicated drug (17%) and under dosage (12%). Nervous system drugs (24%), alimentary tract and metabolism drugs (17%) and cardiovascular drugs (14%) were the most frequently involved.
Conclusions The regular presence of the pharmacy resident on the neurology ward enabled him to be well integrated and to become familiar with inpatient specificities in the neurology department. Collaborative working relationships between pharmacists and physicians are the key to success and to reducing the number of potentially inappropriate prescriptions. The high physician acceptance rate is a good indication of intervention relevance. Recurrent problems were identified during this study. Data on interventions were presented to the pharmacy and therapeutic committee.

No conflict of interest.

CPC-005 A STUDY TO EVALUATE USTEKINUMAB IN PATIENTS WITH MODERATE TO SEVERE PLAQUE PSORIASIS

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Background Ustekinumab is a monoclonal antibody that binds with specificity and affinity to the p40 subunit of cytokines IL-12 and IL-23.
Purpose To determine the short and long-term effectiveness of ustekinumab in patients with moderate to severe plaque psoriasis.

To determine the change from the baseline in the Dermatology Life Quality Index (DLQI).

To describe the safety profile of ustekinumab in clinical practise.
Materials and Methods We reviewed the medical records of 31 patients who had been prescribed ustekinumab between October 2009 and July 2012 in our hospital. We noted the PASI (Psoriasis area severity index) and DLQI scores before and during the treatment and the adverse events reported by patients in their cheque-ups.

Clinicians typically consider at least 75% improvement (PASI75) in the disease to be a clinically meaningful improvement indicative of success.
Results Data were unavailable in 3 patients.

42.4% (12) of patients were male and the median age was 44 years. The median baseline PASI score was 17.89 and the mean duration of psoriasis was 23.22 years.

15 patients (54%) completed a DLQI questionnaire. The median baseline DLQI score was 15.93 and the median DLQI score during the treatment was 1.26.
7 patients (25%) reported adverse events:

- 4 patients (14.4%) upper respiratory tract infection.
- 2 patients (7.2%) dyslipidaemia.
- 1 patient (3.6%) liver enzyme alteration.
- 1 patient (3.6%) basal–cell carcinoma.
- 1 patient (3.6%) generalised desquamative erythema.

There was only one adverse event that forced the suspension of treatment (generalised desquamative erythema).

Conclusions In our study, ustekinumab demonstrated a rapid onset of action and a high effectiveness, stable safety and a great improvement in the quality of life in patients with moderate to severe plaque psoriasis on up to 34 months of continuous therapy.

Abstract CPC-005 Table 1

	16 Weeks n = 28	6 Months n= 23	12 Months n= 17	18 Months n = 14	24 Months n = 13	30 Months n= 10
PASI75(%)	82.1	91.3	94.1	92.9	76.9	90
PASI90(%)	71.4	69.6	47.1	50	46.2	50

No conflict of interest.

CPC-006 ADEQUACY OF CRITERIA FOR STARTING NATALIZUMAB IN PATIENTS WITH MULTIPLE SCLEROSIS

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Background Natalizumab is a monoclonal antibody authorised as second-line treatment after failure with interferon beta or in rapidly evolving severe relapsing-remitting multiple sclerosis (RRMS). Due to its high cost and safety profile, the appropriate selection of patients who will benefit most is of paramount importance.
Purpose To evaluate the adequacy of criteria for starting treatment with natalizumab in patients with multiple sclerosis (MS) based on the protocol approved in a tertiary hospital.
Materials and Methods Observational, retrospective analysis of patients treated with natalizumab between 2008 and 2011. Study data were obtained from clinical records.
Results 31 patients were treated with natalizumab, 26 women (83.9%) and 5 men (16.1%). Mean age was 38.8 years (SD = 9.1). Mean time between diagnosis and natalizumab start was 7.8 years (SD = 5.9). 29 patients (93.5%) had RRMS, 1 secondary-progressive MS (SPMS) and the other an intermediate disease between RRMS and SPMS. The mean number of relapses before treatment started was 3.7 (SD = 1.5) and the mean score for the expanded disability status scale was 3.3 (range 1–6). 27 patients (87.1%) had previously been treated with immunomodulatory drugs (interferon beta). In 4 patients (12.9%) natalizumab was first line treatment. All were diagnosed with rapidly evolving severe RRMS with gadolinium-enhancing lesions in brain magnetic resonance imaging and more than 2 disabling relapses in the previous year. At the end of the study 22 patients continued treatment and 9 had finished. These latter patients were categorised in two groups: short treatment duration (4 patients, median 5 months) and long treatment duration (5 patients, median 24 months).
Conclusions In our population, adequacy of criteria for starting treatment with natalizumab is appropriate and the drug was used for the authorised indications in more than 90% of patients.

No conflict of interest.

CPC-007 ADHERENCE PROBLEMS IDENTIFIED BY MOTIVATIONAL INTERVIEWING AND MEDICINES REVIEW IN STROKE PATIENTS

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Background Poor adherence to secondary prevention medicines occurs frequently in patients suffering a stroke or Transient

Ischemic Attack (TIA). To improve the adherence of these patients, a complex individualised pharmacist intervention was designed and is being used in an ongoing study investigating the effect on medicines adherence and new stroke events. The present work is a subanalysis of this study.

Purpose To examine adherence-related issues in stroke/TIA patients identified by use of a complex pharmacist intervention including medicines review and motivational interviewing.

Materials and Methods The study is being performed at the Neurology Ward and the Emergency Ward, Odense University Hospital, where patients treated for TIA or acute ischemic stroke are randomised to a complex individualised pharmacist intervention or a control group. The pharmacist intervention consists of 3 components: 1) A medicines review focused on potential adherence-related problems followed by recommendations to the ward physicians 2) A motivational interviewing consultation where the content is based on issues raised by the patient 3) A follow-up telephone call one week after discharge with standardised adherence questions to uncover potential non-adherence.

Results Twenty-four patients received the pharmacist intervention. Among the topics covered, 7 potential adherence-related problems were identified. Four of the recommendations were accepted by the physicians, 2 were refused and there was no response to one. The issues most commonly addressed in the consultations were change of lifestyle (79%), medicines management (67%) and adverse reactions (58%). Other issues included effectiveness of the medicines (50%), adherence aids (42%) and information about the disease (8%). According to the standardised questions, one patient had adherence problems at the one-week follow-up phone call.

Conclusions A complex pharmacist intervention can be used to identify potential adherence-related problems in stroke patients.

No conflict of interest.

CPC-008 ADHERENCE, TOLERABILITY AND QUALITY OF LIFE ASSESSMENT IN PATIENTS TREATED WITH TELAPREVIR

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Background The addition of NS3/4 protease inhibitors to the standard of care treatment (SoCT) for genotype 1 hepatitis C (pegylated interferon and ribavirin) has increased the treatment response rate as well as the frequency and severity of adverse events (AEs). These may reduce the effectiveness or even cause the discontinuation of treatment.

Purpose To evaluate adherence, tolerability and quality of life (QoL) in triple treatment patients (TT) (telaprevir + SoCT) in comparison with SoCT patients.

Materials and Methods Observational, prospective study performed in a 780-bed teaching hospital from February to September 2012. Prescription of TT was based on National Spanish Health System recommendations. A printed questionnaire was offered to patients (SoCT or TT) when they started on treatment and was given back three months later. The Questionnaire consisted of three parts: SMAQ (Simplified Medicines Adherence Questionnaire), Side Effects Profile Test (SEPT) (score from 1 to 5) and QoL Spanish version of the Chronic Liver Disease Questionnaire-Hepatitis C Virus (CLDQ-HCV) (score from 1 to 28). Statistical analyses were performed using SPSS 15.0 (non-parametric test).

Results A total of 53 hepatitis C patients started drug treatment during the study (26 TT vs. 27 SoCT). We obtained 12 questionnaires on TT (46.1% response rate, median age 52.4 years, 65.5% women) and 10 questionnaires of SoCT (37.0% response rate, median age 49.3 years, 58.1% women). Only 2 TT (16.6%) were non-adherent and 5 SoCT (50.0%) ($p = 0.002$). Data collected from SEPT showed a mean global score value of 2.2 in TT and 2.3 in SoCT ($p = 0.356$). The CLDQ-HCV mean global score was 15.9 in TT and 14.2 in SoCT ($p = 0.128$).

Conclusions Better adherence in TT is probably due to patient expectations and highest motivation for the new drug. Perhaps, this also affects to similar groups rates in SEPT and CLDQ-HCV.

No conflict of interest.

CPC-009 ADMINISTRATION OF DABIGATRAN REMOVED FROM THE CAPSULE

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Background Dabigatran, an oral anticoagulant classified as a direct thrombin inhibitor, is used for the prevention of stroke and systemic embolism. However, it has limitations in its method of administration; dabigatran should not be removed from the capsule and administered through a tube because of its unstable bioavailability.

Purpose To report a case that required dabigatran to be administered through a tube after removal from the capsule.

Materials and Methods A 79-year-old Japanese male with normal hepatic and renal function was receiving warfarin for the prevention of systemic embolism due to atrial fibrillation. When he started S-1 treatment as an adjuvant treatment for gastric cancer, PT- and INR levels exceeded the scale. Because this elevation was thought to be due to the interaction between warfarin and S-1, warfarin was replaced with dabigatran. After switching anticoagulants, PT-INR and aPTT stabilised. Subsequently, however, the patient fell and experienced paralysis due to medullary damage. We tried to administer dabigatran through a tube after removal from the capsule while carefully monitoring the blood levels. Although the typical daily dose of dabigatran is 220 mg, the daily dose in the present case was set to 150 mg in consideration of elevated blood concentration due to removal from the capsule. The dabigatran concentration 4 h after the first administration (peak) and before the second and third doses (trough) was measured by ultra-performance liquid chromatography/mass spectrometry.

Results The dabigatran concentration was 115.8, 62.45, and 80.05 ng/mL 4 h after the first administration and before the second and third doses, respectively, which is similar to data obtained in a clinical study using healthy Japanese volunteers. aPTT was 38–48 s.

Conclusions We were able to administer dabigatran after removal from the capsule through a tube at two-thirds the regular dose and maintain a similar dabigatran blood concentration to that obtained in a clinical study through careful monitoring of dabigatran plasma levels.

No conflict of interest.

CPC-010 ADVERSE EFFECTS AND EFFICACY OF ATROPINE 0.3% EYE DROPS IN PREMATURE INFANTS UNDERGOING SYSTEMATIC SCREENING FOR RETINOPATHY: AN OBSERVATIONAL STUDY

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Background Systematic retinopathy (ROP) screening using dilated eye examination is currently performed in the neonatal intensive care unit (NICU). In France atropine 0.3% eye drops are currently used as a mydriatic agent, but no systematic assessments of clinical tolerance and efficacy have been described in the literature.
Purpose To assess the occurrence of clinical changes in infants at different time periods preceding and following atropine drops and eye examination, as well as the mydriatic efficacy of atropine in this context.
Materials and Methods Prospective pilot study, in one NICU (June–September 2012). Atropine 0.3% eye drops (one per eye) were instilled in accordance with French good practise guidelines. Data collection was performed at 3 consecutive periods (P1: H-24 to H0 pre-atropine, P2: H0 to H_24 post-atropine, and P3: H_24 to H48 post-atropine), and included: abdominal distension, number of episodes of regurgitation or vomiting, necrotizing enterocolitis (NEC), somnolence, number of episodes of severe oxygen desaturation (<70%), bradycardia (<100 bpm) and tachycardia (>180 bpm). Assessment of efficacy was based on possibility for screening or not. McNemar's Exact Test and Wilcoxon-signed rank Test were used for the binary and continuous variables respectively. Significance was set at $p < 0.05$.
Results 18 children were screened (median gestational age at birth 27.2 weeks (IQR: 25.6–28.7), median corrected age 33.3 weeks (IQR: 32.3–34.3)). None of the variables showed a statistically significant difference between P1 and P3. Occurrence of abdominal distension ($P = 0.03$), number of tachycardia ($P = 0.05$) and oxygen desaturation events ($P = 0.03$) were more frequent in P2 than in P1. No differences were found in thte occurrence of other variables between P1 and P2. No NEC was diagnosed. Effective pupillary dilatation was obtained in 78% of cases.
Conclusions Our study suggests that atropine is an efficient mydriatic agent for ROP screening dilated eye exam in preterm neonates. Type and timing of the symptoms in our study suggest systemic muscarinic effects of atropine. A reduction in the concentration of the atropine eye drops could improve tolerance.

No conflict of interest.

CPC-011 AN AUDIT OF THE ADULT NUTRITION SUPPORT TEAM IN THE MANAGEMENT OF REFEEDING RISKS IN A UK TEACHING HOSPITAL

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Background In June 2010 a report, 'A Mixed Bag – An enquiry into the care of hospital patients receiving parenteral nutrition', was published by the National Confidential Enquiry into Patient Outcome and Death (NCEPOD). They reviewed 870 adult case notes and found inadequate assessment and monitoring in 54% and metabolic complications in 40% of patients.
Purpose In early 2011 the adult nutrition support team (NST) wrote the clinical guidelines on the prevention and management of refeeding syndrome. The aim of this audit was to evaluate the impact of the NST in the management of refeeding risks in adult patients who required parenteral nutrition (PN).
Materials and Methods Adult PN records from April 2011 to March 2012 were assessed retrospectively by NST members using the NCEPOD Parenteral Nutrition Audit Tool. Microsoft Excel spreadsheets were used to record information on assessment and management of refeeding risks.
Results 259 PN records were reviewed. 54% (140/259) patients were assessed and monitored by NST and 44% (114/259) by critical care teams. The NST found a risk of refeeding syndrome in 31.4% (44/140) of patients prior to starting PN. The non-medical prescribers (NMPs) of the NST prescribed intravenous electrolyte infusions to 88.6% (39/44) of patients who were at high refeeding risk (see Table 1). Four patients had BMI less than 16 kg/m^2. The NMPs prescribed the lowest calorie feed (1250 ml Nutriflex Peri 5.7) and the infusion rate was reduced by 50% for the first two days in order to minimise metabolic complications.
Conclusions All adults referred to the NST for parenteral nutrition were reviewed and assessed for refeeding risk. The NMPs prescribed a range of intravenous electrolyte infusions to 88.6% of patients who were at high refeeding risk. This proactive prescribing approach by NMPs prevented the development of metabolic complications associated with low electrolyte levels prior to starting PN.

Abstract CPC-011 Table 1

Pre-PN electrolyte serum levels	Patient number (%)
Magnesium less than 0.7 mmol/L	18 (46.1%)
Phosphate less than 0.8 mmol/L	11 (28.2%)
Potassium less than 3.5 mmol/L	4 (10.3%)
Potassium and Magnesium below minimum levels	6 (15.4%)

No conflict of interest.

CPC-012 AN ITALIAN COST-EFFECTIVENESS ANALYSIS OF PACLITAXEL ALBUMIN (NAB-PACLITAXEL) VS. CONVENTIONAL PACLITAXEL FOR METASTATIC BREAST CANCER PATIENTS: THE COSTANZA STUDY

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Background Paclitaxel albumin (nab-paclitaxel) is a nanoparticle albumin-bound paclitaxel formulated with the aim of increasing the therapeutic index in metastatic breast cancer (MBC). When compared to conventional paclitaxel, nab-paclitaxel has reported longer time to progression, higher response and overall survival, lower incidence of neutropenia, no need for premedication and a shorter time of administration.
Purpose To investigate nab-paclitaxel's cost effectiveness vs. conventional paclitaxel for MBC patients in Italy.
Materials and Methods A Markov model with progression-free, progressed, and dead states was developed to estimate costs, outcomes and quality-adjusted life-years (QALYs) over 5 years from the Italian National Health Service (INHS) viewpoint. Patients were assumed to receive nab-paclitaxel 260 mg/m^2 3-weekly (q3w) or conventional paclitaxel 175 mg/m^2 q3w. Data on health care resources consumption was collected from a survey performed on five Italian centres. Resources were valued at Euro (€) 2011. Published utility weights were applied to health states to estimate the impact of response, disease progression and adverse events on QALYs. Three sensitivity analyses tested the robustness of the base case incremental cost-effectiveness ratio (ICER).
Results Compared to conventional paclitaxel, nab-paclitaxel gains an extra 0.165 QALYs (0.265 life-years saved) and incurs additional costs of €2505 per patient treated. This translates to an ICER of €15,189 (95%CI: €11,891; €28,415).

One-way sensitivity analysis confirms the stability of the ICER for nab-paclitaxel despite the variations in the cost of taxanes.

Threshold analysis shows that the ICER for nab-paclitaxel exceeds €40,000 only if cost per mg of conventional paclitaxel is set to zero.

Probabilistic sensitivity analysis highlighted that nab-paclitaxel has a 0.99 probability of being cost effective for a threshold value of €40,000 and is the optimal alternative from a threshold value of €16,316 onwards.

Conclusions Based on those findings, nab-paclitaxel can be considered highly cost effective when compared to the acceptability range for ICERs proposed by the Italian Health Economics Association (€25,000;€40,000)

No conflict of interest.

CPC-013 ANALYSIS OF ANTIFUNGAL USE AND COST IN A SPECIALIST HOSPITAL DURING THE LAST THREE YEARS (2009–2011)

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Background Although antifungals constitute a small part of the antimicrobial drugs used in hospitals, proportionally their cost is high. Therefore, the use of antifungal analysis is important in order to achieve optimal clinical outcomes by appropriate management of resources.

Purpose To analyse antifungal use and cost in a specialty hospital over the last three years (2009–2011).

Materials and Methods Antifungal consumption was analysed in economic terms and number of Defined Daily Doses (DDDs). Data was processed for the whole hospital and broken down by clinical unit. WHO-ATC/DDD Index 2012 was used for DDDs calculations. Results were expressed in DDD/100 Stay-days (DDDs/100SD). Stay-days data were obtained from hospital healthcare activity records. Use data collected were: J02AA-antibiotics antimycotics for systemic use, J02AC-triazole antimycotics for systemic use, and J02AX-other antimycotics for systemic use. Consumption values were extracted from the pharmacy management SINFHOS computer application. DDDs automatically were calculation was made using EDUS_SUR application.

Results During last three years, antifungal use expressed in DDDs/100SD was 6.72% of anti-infective drugs used. The cost of antifungals represented 43.59% of the total cost of antimicrobials. 85% DDDs were prescribed by Haematology (105.55 DDDs/100SD), Intensive Care (43.38 DDDs/100SD), Infectious Diseases (12.49 DDDs/100SD), and Oncology (5.92 DDDs/100SD). Antifungal use went up especially in Infectious Diseases, which increased from 7.74 DDDs/100SD in 2009 to 21.72 DDDs/100SD in 2011. Of the antifungal agents, the most prescribed were fluconazole (10.46 DDDs/100SD) and amphotericin B (6,00 DDDs/100SD), followed by voriconazole (1.36 DDDs/100SD) and caspofungin (1.35 DDDs/100SD). The selection of antifungals evolved: fluconazole use increased from 1.31 to 3.71 DDDs/100SD, and amphotericin-B use increased from 1.31 to 2.90 DDDs/100SD, while caspofungin use decreased from 0.63 to 0.33 DDDs/100SD.

Conclusions The cost of systemic antifungals represents nearly half of anti-infective drugs expenditure in our hospital.

Efforts to assure optimal use of antifungals must be reinforced In Haematology, Intensive Care, Infectious and Oncology, by proposing clinical guides or protocols for prophylactic and treatment use.

No conflict of interest.

CPC-014 ANALYSIS OF ANTIRETROVIRAL THERAPY IN ADULT HIV PATIENTS IN A TERTIARY HOSPITAL

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Background Current guidelines (GESIDA/PNS-2012) for antiretroviral therapy (ART) in adults recommend the combination of 3 drugs for the treatment of chronic HIV infection.

Purpose To analyse the ART in adult HIV- infected patients monitored in our hospital.

Materials and Methods A retrospective and descriptive analysis was conducted at the Outpatient Hospital Pharmacy studying the types of ART in HIV adult patients treated on 1 January 2012. Dates were obtained from the electronic outpatient database.

Results 1226 patients were receiving ART. The type of therapy was: monotherapy in 40 patients (3.3%), dual therapy in 37 (3%), triple in 1107 (90.3%), quadruple in 32 (2.6%), quintuple in 7 (0.5%), sixfold in 2 (0.2%) and sevenfold in 1 (0.08%). 156 different treatments were observed with 22 drugs. The most common ART combinations were 2 nucleoside reverse transcriptase inhibitors (NRTI) plus a non-nucleoside reverse transcriptase inhibitor (NNRTI) in 585 patients (47.7%), followed by 2 NRTIs plus a protease inhibitor (PI) in 345 (28.1%) and 3 NRTIs in 75 (6.1%). 43.2% (530) received PI therapy and, mainly, boosted.

The combinations tenofovir-emtricitabine or lamivudine-efavirenz were the most frequently prescribed in 358 patients (29.2%), followed by abacavir-lamivudine-efavirenz in 89 (7.3%), tenofovir-emtricitabine-lopinavir-ritonavir in 80 (6.6%), tenofovir-emtricitabine-darunavir-ritonavir in 74 (6%) and abacavir-lamivudine-zidovudine in 72 (5.9%).

All patients received oral treatment and 3 of them subcutaneous treatment with the T-20 fusion inhibitor. 621 patients (50.7%) received once-daily treatment (49.3%), 604 twice-daily and one patient three doses daily. Regarding the number of dosage forms, 337 (27.5%) patients were taking one, 273 (22.3%) five, 238 (19.4%) three, 77 (14.4%) were taking two.

Conclusions On January 2012, 76% of our hospital HIV patients treated with ART were taking triple combinations of 2 NRTIs + 1 NNRTI or 1 PI.

All patients except one received once or twice daily treatment and 42% took 1 or 2 dosage forms/day.

No conflict of interest.

CPC-015 ANALYSIS OF ANTIRRETROVIRAL TREATMENT ADHERENCE

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Background The effectiveness of antiretroviral treatment (ART) depends on several factors. Non-adherence is the main cause of treatment failure.

Purpose To evaluate ART adherence in our hospital's HIV patient cohort and its effect on the efficacy of ART; as well as to determine the effect of several treatment-dependant factors.

Materials and Methods From July to November 2011, all HIV patients taking ART who came to the infectious diseases outpatients were included. Adherence to treatment was estimated as the (percentage) difference between units of medicines that should have been dispensed and units that were recorded in the Pharmacy

service as having been dispensed in the last year. The following variables were collected: sex, age, daily number of tablets (T), dose regimen (once daily OD, twice daily TD), ART combination with Nucleoside Reverse Transcriptase Inhibitors (NRTI), Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTI) and Protease Inhibitors (PI/r), adherence and viral load (VL). A patient was considered to be adherent when adherence was *90%. The ART was considered effective when VL was *50 copies/mL.

Results N = 835, 566 men (67.9%), 268 women (32.1%) Mean age = 46.7 ± 8 years Mean Adherence = 92.2 ± 11.3% (* units dispensed/units that should have been dispensed) Adherent patients = 76.3% (No. adherent patients/No. patients) × 100 Mean tablets/day, adherent patients = 3.2 (* no. tablets/day taken by adherent patients/No. adherent patients) non-adherents = 3.7 (This means that non-adherent patients take more tablets/day than adherent patients) Efficacy of ART: 89.5% of adherent patients, 70.1% of non-adherent patients Adherents (%) according to: – • Sex: men = 79.3%, women = 69.8% – • Daily number of tablets: 1T = 81.1%, 2T = 82.4%, 3T = 81.9%, 4T = 74.5%, 5T = 6.9% 6T = 72.2% and >7T = 76.3% – • Dose Regimen: OD = 80.2% and TD = 72.2% – • ART combinations: § 2NRTI+NNRTI = 80.7% § 2NRTI +PI/r = 64.8% § PI/r = 89.4%.

Conclusions The success of the ART is considerably higher in adherent patients (89.5%) than in non-adherents patients (70.1%). Simplifying the ART (OD, fewer tablets) is a strategy able to increase the number of adherent patients. Monotherapy with PI/r improves the adherence to ART.

No conflict of interest.

CPC-016 ANALYSIS OF PHARMACISTS' INTERVENTIONS ON INPATIENT PRESCRIPTIONS AND A CONSIDERATION OF THE ROLE OF HOSPITAL PHARMACISTS

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Background The hospital pharmacist's role has changed steadily and is turning away from dispensing functions toward active involvement in pharmaceutical care. Intensifying verification of the prescriptions by dispensing pharmacists can contribute to improving the drug treatment of many more patients. Therefore, the system of inpatient prescription review by dispensing pharmacists was developed. Collaborative clinical pharmacist services in inpatient care have generally resulted in improved care and interaction with the health care team on patient rounds, patient interviews, medicines reconciliation, patient discharge counselling and follow-up. All these have resulted in improved outcomes.

Purpose The purpose of this study was to examine the record of interventions by pharmacists who didn't use a prescription review programme, the record of interventions by pharmacists who did use this programme, and the record of interventions by clinical pharmacists who participated in rounds. Thereafter, the purpose was to discuss the necessity for a change of role of hospital pharmacists.

Materials and Methods A retrospective study, analysis of intervention records by prescription error, type of pharmacist intervention, the significance of error, chi-square test SPSS v19, $p < 0.05$. Significance was classified as B2: could have resulted in significant morbidity or mortality if not prevented; B3: low potential for negative patient outcome.

Results The rates of pharmacist intervention in the three groups were 0.3%, 0.4% and 0.7%. Considerably different results were shown in the three groups of records on the types of prescription error, the type of pharmacist intervention and the significance of the error. The percentages of significance B2 in three groups were 28%, 37%, 80%, and those of B3 were 72%, 63%, 20%.

Conclusions In view of the results so far achieved especially in the significance of error, the role of clinical pharmacists participating in rounds has had a much more significant therapeutic effect on inpatients. The addition of clinical pharmacist services collaboratively in the care of inpatients generally resulted in improved care. Interacting with the health care team on patient rounds, interviewing patients, medicines reconciliation, and providing patient discharge counselling and follow-up have all resulted in improved outcomes. So, continuing efforts on effectiveness of all kinds of hospital pharmacists' work, such as automation of dispensing, are necessary.

Abstract CPC-016 Table 1

Analysis group	Group 1	Group 2	Group 3
Total prescriptions (n)	406,527	421,505	109,628
Prescriptions to be reviewed (n)	310,947	328,481	93,063
Intervention by pharmacist (n)	928	1,247	681
Rate (%)* (intervention/prescriptions to be reviewed/month)	928/310,947 =0.3	1,247/328,481 =0.4	681/93,063 =0.7

No conflict of interest.

CPC-017 ANALYSIS OF SURVIVAL IN PATIENTS WITH ADVANCED NON-SMALL CELL LUNG CANCER

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Background Non-small cell lung cancer (NSCLC) accounts for most cases of lung cancer. Approximately 40% of patients with NSCLC present with advanced-stage disease at the time of diagnosis.

Purpose To analyse the median overall survival in patients with NSCLC stage IIIB or IV.

Materials and Methods Retrospective observational study. Patients with NSCLC stage IIIB or IV who started treatment between 01/01/2011 and 30/06/2011. Data source: Patient medical records, oncology programme (Oncowin) and outpatient dispensing record programme (SAVAC and Farmatools). Data recorded: age, gender, age at diagnosis, stage, histology, chemotherapy, number of chemotherapy cycles and number of prior chemotherapy regimens.

Results Thirty patients were included with a median age at diagnosis of 63 years (IC95% 60–66). 73.3% were male. The stage at time of diagnosis was IV in 80% of patients. The most common histology was adenocarcinoma (50%), 30% squamous cell carcinoma, 10% large cell and another 10% other histological type. Platinum-based chemotherapy was the first line treatment in 66.7% of the patients and for the remaining 23.3% it was vinorelbine alone or in combination. Six patients received maintenance treatment, three with erlotinib, two with pemetrexed and one with bevacizumab. The median progression-free survival time was 4 months (IC95% 2.9–5.1) in patients receiving maintenance treatment and 3 months (IC95% 0.8–5.2) in patients who were not given maintenance treatment. The median overall survival time was 6 months (IC95% 1.2–10.8) for patients with maintenance treatment and also 6 months (IC95% 3.1–8.8) in patients without maintenance treatment.

Conclusions Platinum-based chemotherapy remains the standard treatment.

According to the latest guidelines issued by ESMO the role of maintenance is not yet defined. In our study only a few patients were candidates for this treatment.

The median overall survival time found in our study was similar in the two groups.

No conflict of interest.

CPC-018 ANETH: AN ORIGINAL TOOL FOR ASSESSING, PROMOTING AND IMPROVING YOUR PATIENT EDUCATION (PE) PROGRAMME

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Background In France, the annual self-assessment of PE programmes is recommended by the Regional Health Agencies. This analytical approach, necessarily time-consuming and structured, is a challenge for any team. However, it is a preliminary step in any process of qualitative and quantitative improvement.
Purpose First to provide a tool enabling teams to formalise and describe their work processes and to record work done and resources data in order to identify margins of progress leading to an improved action plan.
Materials and Methods A survey of quality criteria was conducted according to the recommendations available in France about PE programmes. The quantitative criteria were those requested by regional agencies. Several successive versions have been developed. Each was tested by a group of programme coordinators and updated as necessary.
Results The final tool is provided in the form of a user-friendly Excel document. The first input sheet is simply used to identify the programme. The following three input sheets are designed to record qualitative data (process), quantitative data (tasks accomplished), and the achievement of programme objectives (effectiveness). The output summary sheet shows graphical results and highlights the strengths and weaknesses of the programme, as well as quantitative changes from the previous year. The last sheet allows you to edit a report containing the main recorded items.
Conclusions AnETh appears to be easy to use and provides an original interface for identifying and evaluating PE activities in order to improve actions. It provides a simple method for meeting the requirements of self-assessment and certification and, in the current context of financial constraints, it may be used as a useful activity and resources report. Future versions may incorporate an interface with the usual recording software, in order to skip data collection.

No conflict of interest.

CPC-019 ANTICOAGULANT THERAPEUTIC EDUCATION: A NEW MORE SUCCESSFUL METHOD?

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Background More than 1% of the French population is treated with anticoagulants. This class of medicines is the leading cause of iatrogenic illness. For this reason anticoagulant therapeutic education (ATE) is a priority for our hospital. Since 2010, an ATE programme has been implemented in the cardiology department but only a few patients have been interviewed so far.
Purpose To find a new method that would be more effective in treating patients and also easier to implement for the pharmacist, who is in charge of informing the health staff.
Materials and Methods Since all the patients' records are computerised, we worked with the computing department to include the ATE programme in the patients' records. We start by interviewing the patients being treated with anticoagulants. Then, we explain to them what the treatment consists of and we give them an explanatory booklet which informs them about the signs of overdose, risky situations and adverse effects. It also provides them with information regarding their diet and the steps they have to follow when forgetting a dose. We call the patients one month after the interview was carried out to assess the results.
Results The new method was implemented in March 2012. Of the 12 patients we interviewed, 8 patients answered our questions and 2 of them had stopped their treatment. The 6 patients still on treatment knew that the treatment follow-up required doing blood tests. 4 of them knew what to do if they got an abnormal INR result. 3 of the 6 patients kept their anticoagulant treatment card in their wallet. All the patients took their medicine at fixed times in the evening. They appeared to be satisfied with the programme. The booklet helps them to commit to memory the concepts explained to them. Including the ATE in the patients' computerised records was shown to make the pharmacist's work easier. The presentation of the process to the managers from the different departments was a success.
Conclusions These encouraging results highlight the advantages of this new therapeutic education method which makes the pharmacist's work easier. We plan to introduce ATE in all departments and to assess this implementation over the next six months.

No conflict of interest.

CPC-020 ASSESSMENT OF MEDICINES ADMINISTRATION IN INSTITUTIONALISED PATIENTS WITH DYSPHAGIA OR FEEDING DISORDERS

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Background Dysphagia is the most common oesophageal disorder in the elderly, particularly in patients living in institutional settings, such as nursing homes. Pharmacists have an important role in patient safety by suggesting alternative methods of administration, dosage forms or therapeutic agents that might be available in a more suitable formulation.
Purpose Implementation of individualised medicines administration guides for geriatric patients with dysphagia or enteral tube feeding.
Materials and Methods A total of 154 institutionalised patients were included in a transversal prospective study carried out in 2 nursing homes over a period of 6 months. A comprehensive geriatric assessment was performed by an interdisciplinary team and all patient medicines profiles were reviewed. Pharmacist recommendations and prescription adaptations were then used to write individualised medicines administration guides for all dysphagic patients.
Results Medicines administration problems were identified in 52 out of 154 patients (33.7%). Their mean age was 84.5 ± 9.2 years, and most of them were female (73.9%). Polypharmacy was high among this population (75%) as defined by taking more than five drugs (mean 6.6 per patient).

Dysphagia was the main problem for medicines administration (86.5%), while other factors such as blinded medicines (7.7%) or enteral tube feeding (5.8%) were less frequent.

The specialist pharmacist made 135 recommendations and prescription adaptations of which 94 (69.6%) involved changes on drug administration: crush tablets (42; 44.7%), change dosage forms (30; 31.9%), dissolve tablets and oral forms (11; 11.7%), change of therapeutic agent (9; 9.6%) and withdrawal of medicine (2; 2.1%). Acceptance among physicians and nurses of medicines administration guides for all 52 patients was high (98.9%).

Conclusions Pharmacists play an important role in adapting treatments of patients with dysphagia and feeding disorders, therefore ensuring safe administration of drugs. The implementation of individualised medicines administration guides supports individualised care and is generally well accepted.

No conflict of interest.

CPC-021 ASSESSMENT OF PATIENT KNOWLEDGE IN A REHABILITATION WARD AND CREATION OF A TEACHING AID IN THE TREATMENT OF PAIN

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Background The management of pain is one of the priorities of our hospital, which specialises in follow-up and rehabilitation care. A lack of knowledge about the pain and its treatment can limit the patient's adherence to painkillers and lead to side effects or overdose.

Purpose To create a teaching aid on the treatment of pain. It was written with the cooperation of two doctors. A questionnaire was developed to assess patients' knowledge of the painkillers they had been prescribed.

Materials and Methods A list of open questions about painkillers was developed:

- name of their painkiller (International Nonproprietary Name (INN), trade name),
- the dosage, when to take the drugs, the maximum daily dose/time interval between doses,
- the meaning of 'sustained-release drug' and 'orodispersible',
- side effects and how to avoid them, contraindications, possible drug interactions,
- how to use painkillers depending on the intensity of the pain,
- withdrawal from tramadol and codeine,
- alternatives to pain treatment.

Eleven patients were interviewed.

Results Overall, patients knew the trade name of their painkiller (72%) but only 9% of patients knew the INN. 72% could quote the exact dose. 54% of patients knew the maximum daily dose and the period of time between doses. Nearly all patients didn't know the meaning of 'sustained-release drug' and 'orodispersible' (81% and 91%). The use of painkillers depending on pain intensity was well reported in 5 cases (45%). Side effects and how to avoid them, contraindications and possible drug interactions, were not well known subjects. Finally, 27% of patients quoted alternatives to pain treatment.

Conclusions This assessment enabled us to target patients' lack of knowledge about painkillers and to develop a booklet providing all the information required. This leaflet has been checked by doctors. Patients who were part of this study gave feedback on the booklet, which will now be distributed to patients.

No conflict of interest.

CPC-022 ASSESSMENT OF THE RELEVANCE OF FLUOROQUINOLONE PRESCRIPTIONS IN THE INTERNAL MEDICINE DEPARTMENT AND IMPACT ON ANTIBIOTIC STEWARDSHIP

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Background In our hospital, the consumption of fluoroquinolone (FQ) antibiotics has increased since 2004. Moreover, the development of quinolone-resistant strains of Escherichia coli and their spread have become a worrying issue. The FQs available in our hospital are norfloxacin (Nor), ofloxacin (Oflo), ciprofloxacin (Cip), levofloxacin (Levo). Cip and Levo access are restricted by the hospital formulary. The Antimicrobial MultiDisciplinary Team (AMDT), composed of the pharmacy resident and a clinical microbiologist, reviews all prescriptions daily before dispensing.

Purpose To assess the relevance of FQ prescriptions in the department of Internal Medicine and then to initiate a thoughtful consideration of non-restricted fluoroquinolones.

Materials and Methods Over a six-month period, all cases of FQ prescriptions for acute infections were analysed by both a pharmacy resident and a bacteriologist. Appropriateness of prescriptions was determined by using a therapeutic suitability index, which investigated relevance of FQ and drug prescribed, dosage adjustments, duration of treatment and route of administration.

Results Forty-three prescriptions were assessed. Ofloxacin was the most prescribed FQ representing 72% of the prescriptions, followed by ciprofloxacin (16%), levofloxacin (7%) and norfloxacin (7%). Fewer than 33% of prescriptions adhered to guidelines for all items. Another antibacterial family should have been prescribed in 11% of cases (3 Oflo and 2 Nor). The drug prescribed was judged debatable in 25% of cases (9 Oflo and 2 Cip). Dosage was not adapted to renal function in 4 prescriptions. Route of administration was justified for all prescriptions.

Conclusions These results were presented to the antibiotic control committee. Because of the overuse and misuse of ofloxacin, it has been decided to restrict its access, which will lead to improve quality of fluoroquinolone usage.

No conflict of interest.

CPC-023 ASSESSMENT OF THE WHOLE INTERCEPTIVE AND POST-FERTILISATION EFFECTS OF POSTCOITAL LEVONORGESTREL

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Background Taking into account the whole interceptive effect, anovulatory potency and timing of administration, it's possible to calculate what proportion of interceptive (contraceptive±contragestive) effects of levonorgestrel take place as anovulatory action. However, we don't know the actual interceptive effect, because clinical trials didn't use a placebo group.

Purpose To discover the interceptive effect after a single dose of levonorgestrel, and then calculating the proportion of its anovulatory and possible post-fertilisation effects.

Materials and Methods A recent systematic review pulled data from 6,794 women. Levonorgestrel administered the fifth day after intercourse showed a probability of pregnancy of 5.2%, slightly lower than the 6–8% calculated by an estimation method. Using this cohort as a control group, we estimated the interceptive effect

and extrapolated it in Mikolajczyk & Stanford's graph (2007) to find out what proportions result from anovulatory or post-fertilisation effects.

Results The pregnancy rate was 1.0% taking the pill 1–4 days after intercourse (66 pregnancies in 6,564 women), and 5.2% if it was taken on the fifth day (12 in 230 women). It shows a minimum reduction in the probability of pregnancy of 80.7% (IC95 64.9–89.4%).

In a conservative approach, administering the pill 24 h after intercourse, we obtained an anovulatory effect of 50%. However, taking into account epidemiological data showing lack of effect on pregnancy rates at a population level, we could assume an actual decrease that could be in the lower top of the confidence interval (64.9%). Extrapolating this effect, we obtained a contribution of 65% for the anovulatory mechanism.

Conclusions As an alternative pre-fertilisation effect is unlikely, we postulate at least 35% post-fertilisation effects for post-coital levonorgestrel. This is statistically compatible with the previous contradictory Noe *et al*'s data, as they observed only 35 women.

No conflict of interest.

CPC-024 ASSESSMENT OF WARD-BASED CLINICAL PHARMACY SERVICES IN JIMMA UNIVERSITY SPECIALIST HOSPITAL, ETHIOPIA: THE CASE OF INTERNAL MEDICINE

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Background Patient-centred clinical pharmacy practise has developed internationally to expand the role of a pharmacist well beyond the traditional roles of compounding, dispensing and supplying drugs, though it is poorly developed in Africa. Implementation of patient-centred practise is an important goal for maximising the utility of the profession. But, studies on the work done by pharmacists in inpatient wards in resource-constrained settings are scarce.

Purpose To assess ward-based clinical pharmacy services in an internal medicine ward of Jimma University Specialist Hospital.

Materials and Methods The study was carried out on the internal medicine ward from March to April, 2011 at Jimma University Specialist Hospital. It was a prospective observational study. Clinical pharmacy interns providing pharmaceutical care to inpatients twice per week over a 2-month period were documented. Interventions optimising rational drug use and their acceptance were recorded. The clinical significance of interventions was evaluated by an independent team (1 internist, 1 pharmacologist). Results of the study were reported in the form of findings and percentages.

Results A total of 149 drug-related interventions for 48 patients was documented. Of these, 133 (89.3%) were clinical pharmacy intern-initiated interventions and 16 (10.7%) were interventions initiated by another health care professional. The most frequent drug-related problems (DRPs) underlying interventions were unnecessary drug treatment 36 (24.2%), additional drug treatment needed 34 (22.8%) and noncompliance 29 (19.5%). The most frequent type of intervention was change of dose/instruction for use, 23 (15.4%). 68.4% of interventions were fully accepted and 29.3% were partially accepted. Interventions with major and moderate clinical significance numbered 46 (49.5%) and 25 (26.9%) respectively.

Conclusions A clinical pharmacist contributes to improved inpatient treatment, even with a modest contribution such as participation in the pre-round meeting and the ward round twice per week.

Abstract CPC-024 Table 1 Characteristics of interventions documented by clinical pharmacists, JUSH, Ethiopia, March–April 2011

Category of drug-related problem*	Interventions, n (% of total)
Unnecessary drug treatment	36 (24.2%)
Additional drug treatment	34 (22.8%)
Ineffective drug	4 (2.7%)
Dose too low	18 (12.1%)
Adverse drug reaction	16 (10.7%)
Dose too high	12 (8%)
Noncompliance	29 (19.5%)
Total	149 (100%)

*Classification according to Polle ***et al***, 2004

No conflict of interest.

CPC-025 AVERAGE DURATION OF TREATMENT WITH DIFFERENT TNF INHIBITORS

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Background Alpha tumour necrosis factor inhibitors (TNF inhibitors) represent an important advance in immune-mediated inflammatory diseases. The first three drugs marketed and most used nowadays within this family are: infliximab, etanercept, and adalimumab.

There is no apparent superiority between any of these drugs and it is known they often loss their efficacy over time. Therefore, it could be of interest to find out if any of them (under usual clinical conditions) has a longer period of time without loss of efficacy.

Purpose To compare the different treatments with TNF inhibitors, in order to find out which has the longest average duration (in days) before loss of treatment response finally requires a change in the treatment.

Materials and Methods All patients who began the treatment with TNF inhibitors between March 2007 and March 2012 and who had a change in treatment were analysed retrospectively with pharmacotherapy management software.

Patients who had stopped the treatment after presenting immediate adverse reactions in the first administration were excluded. The mean durations of treatment were compared using the Student's *t*-test for unpaired data

Results In total 309 patients were analysed. The three TNF inhibitor drugs most used were etanercept (Average duration 574.47 ± 461.51, N = 125), infliximab (Average duration 470.82 ± 469.64, N = 95) and adalimumab (Average duration 454.92 ± 378.89, N = 95). We found a significant difference between etanercept versus adalimumab (P.value = 0.0412), but not in the case of etanercept versus infliximab (P.valour = 0.0997).

These results are coincident with Dr. Hetland's study in 8074 patients (1). They also agree with the study presented by J.A Markenson in 2418 patients (2). However our study results do not resemble those of G. Lapadula's study (3).

Conclusions The average duration of treatment before requiring a change of drug is higher with etanercept than infliximab and adalimumab, but only is statistically significant with adalimumab. These results should be considered in the design of TNF inhibitor prescribing guidelines.

No conflict of interest.

CPC-026 BENEFITS OF INCLUDING THE CLINICAL PHARMACIST AS A MEMBER OF THE HEALTH TEAM IN THE NEUROLOGICAL CLINIC

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Background Hospital pharmacists are necessary members of the health team in neurological clinics, to implement rational treatment. Hospital pharmacists are qualified by their knowledge of modern organic approaches to the pharmacotherapy of neurological disorders.

In neurological patients, medicines regimens are frequently very complex; specialised calendars or dosing tables and verbal counselling, could be of great benefit to patients. Recording the pharmacotherapeutic history, the efficiency of direct neurological examinations, evaluation of treatment, counselling and provision of drug pharmacokinetic consultations, are the tasks of hospital pharmacists.
Purpose To survey neurological patients on the current method of providing health care.
Materials and Methods Patients were given a questionnaire. They stated that health professionals often objectively do not have enough time for detailed conversations, either in hospital or in pharmacies.
Results The results indicated that an additional member of the health care team is needed, who would be involved in monitoring treatments targeted on the disease, drug interactions, as well as educating patients about medicines. The most revealing answers were:

1. Would the inclusion of a hospital pharmacist in charge of the neurological disorders improve your treatment? 12% DO NOT KNOW, 14% NO, 64% YES.
2. Are you in compliance with treatment? 17% YES, 27% DO NOT KNOW, 66% NO.
3. Do you think that you needed more information about the disease and the treatment received? 71% YES, 12% DO NOT KNOW, 17% NOT.

Conclusions This study aimed to draw attention to new needs in the health system of Montenegro as the health systems develop. The importance of hospital pharmacists has already been identified, and we anticipate that this and future studies on this topic improve health care in this region.

No conflict of interest.

CPC-027 CARDIOVASCULAR RISK PROFILE OF A SPANISH HIV-INFECTED COHORT ON ANTIRETROVIRAL THERAPY AND THE EFFECT OF PROTEASE INHIBITORS

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Background There is evidence that antiretroviral therapy (ART) increases cardiovascular risk (CVR). The use of protease inhibitors (PIs), specially indinavir and lopinavir/ritonavir, has been associated with a higher incidence of myocardial infarction.
Purpose To characterise the CVR profile of an HIV-infected cohort on ART from the northwest of Spain. To determinate the effect of exposure to protease inhibitors (PIs) and exposure time (ET) to ART in CVR.
Materials and Methods Cross-sectional study including HIV patients on ART who were treated at our hospital between March and May 2012. We recorded demographics, ART history and CVR risk factors. CVR was estimated using the Framingham function calibrated for the Spanish population (REGICOR). CVR categories were: low (<5%); intermediate (5–9%); high (10–14%); very high (>15%). Five PI exposure groups were defined: a) no PI exposure (NoPI); b) exposure to PIs but not indinavir or lopinavir/ritonavir (PInoINDnoLPV/r); c) exposure to indinavir (IND); d) exposure to lopinavir/r (LPV/r); e) exposure to indinavir and lopinavir/r (IND+LPV/r).
Results 89 HIV patients were included in the study (83.1% males, mean age 47.4 ± 7.8 years). Smoking prevalence was 51.7%, hypertension 39.3%, dyslipidaemia 24.7%, low HDL cholesterol 67.4%, diabetes 4.5%. Mean global CVR was 4.01%±2.50. The proportion of patients with a low CVR was 70.8%; intermediate 25.8%; high 2.2%; very high 1.1%. Mean CVR according to PI exposure was 4.06 ± 2.60 (NoIP); 3.52 ± 2.29 (IPnoINDnoLPV/r); 5.05 ± 2.99 (IND); 3.50 ± 2.28 (LPV/r); 4.29 ± 1.50 (IND+LPV/r). Significant differences were found when we compared the group IND with the groups IPnoINDnoLPV/r ($P = 0.02$) and LPV/r ($P = 0.03$). The effect of ET was significant only for indinavir exposure ($P = 0.02$).
Conclusions Our HIV population presents low CVR. Smoking, hypertension and low HDL cholesterol are the outstanding modifiable risk factors in our cohort. Indinavir exposure and ET to indinavir increases CVR in our population, but no differences were found with lopinavir/r or other PIs.

No conflict of interest.

CPC-028 CENTRALIZED THERAPY REVIEW: DEVELOPMENT AND VALIDATION OF A SCREENING TOOL TO DETECT POTENTIAL INTERVENTIONS

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Background The Centralized Therapy Review study (CenTRe study), a prospective observational study carried out in the pharmacy dpt. from University Hospitals Leuven in 2011[1], showed that for almost 1 in 4 prescriptions potential interventions containing treatment corrections or pharmacotherapeutic advice could be made by the dispensing pharmacist.

Based on these findings, the development and validation of a standardised screening tool to retrieve potential interventions during drug dispensing is the obligatory second step in the implementation of Centralized Therapy Review in routine daily practise.
Purpose To develop and validate the CenTRe 2 list, a standardised screening tool, used at the level of drug distribution, to review prescriptions and retrieve potential interventions in a standardised way.
Materials and Methods The CenTRe 2 list was developed by consensus by a team of ten clinical pharmacists, the CenTRe group. It is mainly based upon findings from the CenTRe study, supplemented with evidence from the literature [2–22].

Content was validated using the content validity index method [23–25] by a panel of experts (4 clinicians specialising in pharmacology, intensive care and geriatrics and 8 pharmacists who were not member of the CenTRe group).

Inter-rater reliability was calculated using Cohen's kappa statistic [26]. A case format was used: all potential interventions retrieved by 12 pharmacists, which screened 20 treatment regimens using the CenTRe2 list, were compared with a gold standard.
Results The CenTRe 2 list retained 8 topics as valid (I-CVI $\kappa^{*3}0.75$ and S-CVI/ave = 0.95) and passing the inter-rater reliability test ($\kappa_{average} = 0.92$ and 0.73; $\kappa_{median} = 0.93$ and 0.72).
Conclusions The CenTRe 2 tool is a valid and reliable tool for screening treatment regimens for potential interventions in a standardised way. A prospective observational study, using the CenTRe 2 tool, has been conducted to establish its utility in optimising patient treatment.

No conflict of interest.

CPC-029 CHARACTERIZATION OF PATIENTS NON-ADHERENT TO HIGHLY ACTIVE ANTIRETROVIRAL THERAPY (HAART) BETWEEN 2010–2011

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Background Thanks to the introduction of Highly Active Antiretroviral Therapy (HAART), a decrease has been observed in the number of hospital admissions, the incidence of opportunistic infections and mortality associated with HIV/AIDS. However, adherence to treatment continues to play a crucial role. In fact, a failure of HAART often leads to changes in laboratory parameters, development of resistant strains and the need to change treatment regimens. This study aims to analyse the impact of the failure of treatment changes on laboratory parameters and treatment regimens.
Purpose To characterise patients who had been included in the government's subsidised programme who were later excluded by their inability to follow treatment.
Materials and Methods Retrospective observational study. 50 patients, who had been taking HAART since January 2007 and abandoned it between January 2010 and December 2011, were randomly selected and analysed. The control group consisted of 50 adherent patients who began taking HAART since January 2007.
Results Preliminary data indicate that our patients are mainly male with a median age range of 40 years old. There was a need to change the treatment regimen in 83% of the patients due to their inability to follow treatment correctly. Even though the viral load was undetectable in 54% of the patients, 70% couldn't achieve a CD4 count above 350 cells/μL. The main reasons for the lack of adherence are drug and/or alcohol addiction (38%), distance to the hospital (13%), psychological causes (13%), adverse drug reactions (13%) and unknown reasons (25%).
Conclusions The patients' inability to follow HAART correctly often leads to the need to change the treatment regimen. Considering the present data, it's extremely relevant to characterise the non-adherent population, in order to improve adherence to HAART.

No conflict of interest.

CPC-030 CLINICAL CASE OF AN ADVERSE DRUG REACTION DUE TO THE ADMINISTRATION OF AN ESTROGENE/GESTAGENE COMBINATION DRUG

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Background Different European countries have different Summary of Product Characteristics (SmCP) for the same registered drug, which leads to an unequal level of safety information.
Purpose To describe an ADR in a child after administration of Fedra (gestodene + ethinylestradiol) not reported in the Italian SmCP case report.
Materials and Methods The Paediatric Emergency department of our hospital admitted a 15-year-old girl with frequent hand, foot and facial paresthesias on the right side of the body.

The patient had been treated with Fedra for 10 days due to menstrual irregularity.
Results At admission, the general status of the patient, monitored by blood, clotting test and imaging studies (CT and brain MRI) appeared within the normal. During the hospitalisation oestro-progestin treatment was suspended with gradual resolution of symptoms and negative neurological follow-up.

A report of these ADRs has been submitted to the Agenzia Italiana del Farmaco (AIFA) and to the database of MEAP project (monitoring adverse drug reactions in paediatric patients).

Applying the Naranjo algorithm this ADR (frequent hand, foot and facial paresthesias of the right side of the body) was classified as 'possible'.

However, in the AIFA database there are 33 ADRs related to the administration of the combo 'gestodene + ethinylestradiol' related to the nervous system, including paresthesias.

These reactions are not mentioned in the Italian SmCP, when in the British SmCP they are classified as 'well-known side effect' for the same combination, registered under the trade name of Triminulet.
Conclusions This case study suggests the importance of pointing out all the symptoms, even the minor ones not yet known, especially in the paediatric patients, to better evaluate the safety profile of the drug in this particular population.

No conflict of interest.

CPC-031 CLINICAL TRIALS QUALITY: MEDICAL JOURNAL PUBLICATION INVOLVEMENT

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Background Clinical Trials (CTs) resulting in publication in biomedical journals is a strategy to guarantee good quality research. Clinical research promoters are obligated to publish either positive or negative results; regretfully this good practise is not as common as it should be. Cardiology and Oncology boards are the two services carrying on the highest number of CTs in our hospital.
Purpose To cheque the CT publication index carried out by Cardiology and Oncology Clinical Services, to analyse the journals' impact factor (IP) where CTs have been published. Finally we evaluated if the published results were positive or negative.
Materials and Methods A retrospective observational study has been carried out considering all data within the period from 2002 and 2007, in the pharmacy CT unit. The study only assessed open clinical trials of Cardiology and Oncology services.

A systematic search was performed of medical journals indexed in PubMed and Clinicaltrials.gov databases until Oct. 2012.

The following variables were collected for each CT: code, journal, publication data, IP and CT results. Every CT not proving the hypothesis described in the initial protocol was considered to be a negative result (NR).
Results 229 CTs were analysed. CT/medical specialty: oncology 168 (73.4%), cardiology 61 (26.6%). CTs already closed: Oncology 85 CTs (50.6%), cardiology 46 (75.4%). CTs already published: 61 (26.4%), oncology 22 (36.1%), cardiology 39 (63.9%). CTs published with positive results: (43 CTs) 70.5%. Oncology 17 (77.3%), Cardiology 26 (66.7%). CTs were published in journals with IP between 2.022 and 53.298. Mean IP was 18.479 (17.406 SD).
Conclusions Fewer than 26.4% of clinical trials initiated in the two Medical Services have been published.

A high percentage of CTs initiated have never been published. Only 29.5% of all published CTs were published with a NR. This may suggest a low level of NRs result in journal publication.

The Publication IP ranges widely between low and high scores. Nevertheless we consider the mean IP to represent a high standard of publication.

No conflict of interest.

CPC-032 CLOPIDOGREL FOR THE TREATMENT OF CHILDREN WITH A SYSTEMIC-TO-PULMONARY ARTERIAL SHUNT

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Background Clopidogrel is a thienopyridine drug that acts by binding selectively and irreversibly to the adenosine diphosphate P2Y12 receptor on platelets. Platelet aggregation is consequently inhibited. Clopidogrel is used to prevent ischemic events in patients at risk, when other drugs fail or are not tolerated. Paediatric use is not authorised because of limited information about efficacy and safety.
Purpose To illustrate our experience in the three-month use of clopidogrel in children with a systemic-to-pulmonary arterial shunt, prior to definitive surgical intervention.
Materials and Methods On February 2012 a temporary systemic-to-pulmonary arterial shunt was placed in a four-month-old patient, affected by Tetralogy of Fallot with hypoplasia of the infundibulum and pulmonary valve. We administered two antiaggregant drugs, ASA 18 mg and clopidogrel 0.2 mg/Kg once a day, because of the high risk of thrombotic closure of the shunt. We chose an extemporaneous preparation of type 5 capsules with lactose as a diluent. After that, four other children (from 2 months to 4 years old) were treated with clopidogrel, mostly in association with ASA or together with enoxaparin.
Results We prepared capsules from 0.75 to 3.5 mg. For all patients we obtained authorization by the Ethics Committee and the parent's informed consent. After surgery, the children were observed for 7–8 days depending on clinical follow up and complications. We checked the blood count and shunt patency with clinical observation, analysis and echocardiogram. After discharge, patients were first recalled 10–15 days later, then after 1–2 months to see the doctor, have an ECG, blood tests and echocardiogram. Pt was not necessary. No serious side effects were observed.
Conclusions Paediatric clopidogrel treatment is rapidly increasing. A wider number of cases, a comparison with other professional experience, and, most of all, controlled clinical trials, would be desirable.

No conflict of interest.

CPC-033 COMPARING EFFECTIVENESS OF FIRST-LINE DISEASE MODIFYING DRUGS IN RELAPSING-REMITTING MULTIPLE SCLEROSIS PATIENTS

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Background Immunomodulatory drugs represent the best therapeutic option in first-line treatment of relapsing-remitting multiple sclerosis (RRMS). This group includes glatiramer acetate (GA) and three formulations of Interferon β (IFNβ): subcutaneous IFNβ1a (scIFNβ1a), intramuscular IFNβ1a (imIFNβ1a) and subcutaneous IFNβ1b (scIFNβ1b). Several studies have reported similar efficacy among IFNβ and GA preparations, while other have concluded that some differences exist between them.
Purpose To compare the effectiveness of first-line disease modifying drugs (FL-DMD) in patients with RRMS.
Materials and Methods In this retrospective and observational study we included treatment-naive patients with RRMS who had started treatment with FL-DMD between 1996 and 2011. Patients receiving other immunosuppressant drugs were excluded. Data were collected from medical records and pharmacy computer applications. Patients were classified in four groups: those treated with imIFNβ1a, scIFNβ1a, scIFNβ1b or GA. The annualised relapse rate (ARR) and degree of disability for each group were determined in the pre-treatment and treatment periods. The time to first relapse (TFR), proportion of relapse-free patients (RFP) and proportion of patients without progression of disability (DPFP) in each group were compared.
Results We identified 72 patients who had started treatment with DMD: 22 with imIFNβ1a, 13 with scIFNβ1a, 26 with scIFNβ1b and 11 with AG.

Mean ARR in the pre-treatment and treatment periods were the following (mean±SD): 0.73 ± 0.40 and 0.10 ± 0.16 for imIFNβ1a. 0.81 ± 0.43 and 0.21 ± 0.32 for scIFNβ1a. 0.56 ± 0.33 and 0.11 ± 0.20 for scIFNβ1b and 0.73 ± 0.34 and 0.17 ± 0.28 for GA. TFR in each group were respectively 5.8 ± 4.2. 3.8 ± 2.8. 5.3 ± 3.8 and 2.4 ± 1.6 years. We found 59.1%, 61.5%, 61.5% and 63.6% RFP in each group and 90.9%, 92.3%, 88.5% and 81.8% DPFP respectively. No statistical differences were found in TFR, RFP or DPFP among groups.
Conclusions No differences were found among the different first-line treatment options in terms of reduction of disease activity or progression of disability.

No conflict of interest.

CPC-034 COMPARISON OF EFFECTIVENESS AND SAFETY OF PRIMARY PROPHYLAXIS WITH BIOSIMILAR FILGRASTIM VS REFERENCE MEDICINAL PRODUCT IN PATIENTS TREATED WITH R-CHOP

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Background Prophylactic administration of filgrastim can reduce the risk of febrile neutropenia (FN) in oncological patients undergoing myelosuppressive chemotherapy.

According to approved guidance on biosimilar drugs, clinical comparability can be obtained from results extrapolated from other indications.

Due to this simplified pathway, concerns about safety and effectiveness in some clinical settings may remain.
Purpose To compare the effectiveness and safety of biosimilar filgrastim (B) with the reference medicinal product (RMP) in patients with haematological malignancies treated with the R-CHOP regimen and undergoing primary prophylaxis (PP) with filgrastim.
Materials and Methods A single-centre, retrospective and transversal study was performed: from March 2010 to October 2010 (RMP) and March 2011 to February 2012 (B).

Main endpoints were incidence of FN (per patient and per cycle), time to absolute neutrophil count (ANC) recovery, incidence of NP in first cycle (1stCy), number of hospitalisation days related to FN. Other endpoints and patient-related risk factors for FN were evaluated.
Results The results seem to support equivalence of effectiveness between these drugs. We did not find any safety-related incidents. More patients are being included to increase the sample size and allow statistical significance. These results may further support the use of the more cost-efficient option.

No conflict of interest.

Abstract CPC-034 Table 1

	N (R-CHOP)	% Pt_PP	% Pt_FN	% Cycles_FN	Incidence FN_1stCy	Incidence FN_other Cy	2nd_Prophylaxis	AvrDays Hosp/FN episode	AvrDays to ANC recovery
RMP	75	37.3 (28/75)	28.6 (8/28)	7.7 (14/181)	0.18	0.06	30(40)	8.4	12.6
B	104	27.9 (29/104)	24.1 (7/29)	5.9 (10/168)	0.10	0.05	34(32.7)	9.2	8.6

Mean age = 72 y (both); Gender = 46.4%m, 53.6%f (RMP); 31%m, 69%f (B); NHLB = 75% (RMP), 72% (B)

CPC-035 COMPASSIONATE USE: PHARMACOVIGILANCE

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Background The compassionate use of drugs in Italy is a way of using drugs available in foreign countries but not in Italy. They have the authorization for the same therapeutic purpose but are not available on the market, however they are in clinical trials (CTs) or have been tested in phase III or – if the patient is in a critical condition – have been successful in phase II CTs.

As regards evaluating the efficacy of the treatment, a basic aspect of the CT is to evaluate the safety of the drugs used. Great attention is focused on this theme with sponsored CTs; in fact by law (decree 211/2003) the subjects liable for pharmacovigilance are expressly listed and stress is put on reporting adverse drug reactions (ADRs). Regarding the use of compassionate drugs, there are no laws regulating the reporting of ADRs.

Purpose To find out how any reports of possible ADRs emerging from compassionate studies are managed in ordinary clinical practise.

Materials and Methods For this purpose the database used in our organisation was essential: all of our centre's CTs are listed there. The number of CTs classified by type (for profit, not-for-profit, compassionate) was extracted, focusing on the compassionate use CTs in particular. Then the number of patients treated was drawn from it as well as the pathologies and the ADRs pointed out during meetings with the physicians.

Results From this analysis it appeared that in our centre 197 studies (st) are active: 147 are for profit, 27 not-for-profit and 23 compassionate. Among these last ones, 8 are active in the sarcoma department, 5 in haematology, 3 in paediatrics, 6 in medical oncology and 1 in urology. The pathologies being examined are: GIST 4 active sts, 6 patients (pts), Hodgkin's lymphoma 1 st (2 pts), T-cell lymphoma 1 st (1 pt), myeloma 2 sts (1 and 15 pts), thyroid carcinoma 1 st (1pt), bone metastases 1 st (4 pts), melanoma 2 sts (1 and 30 pts), villonodular tenosynovitis 1 st (4 pts), prostatic adenocarcinoma 1 st (4 pts), breast cancer 2 sts (3 and 2 pts), leiomyosarcoma 1 st (2 pts), myxoid liposarcoma 1 st (6 pts), brain stem glioma 1 st (8 pts), NET 1 st (17 pts), acoustic neuroma 1 st (1 pt), idiopathic myelofibrosis 1 st (1 pt), LLC 1 st (1 pt). Although the CTs for compassionate use are fewer than other kinds of trials and require a very low number of treated pts – also because it is a matter of a named patient use and in particular conditions – this does not justify not reporting ADRs. As such drugs are used for critical pts and often for non-approved uses, it seems useful to focus on this aspect, as it allows to more and better investigations on the side of the safety of the drugs.

Conclusions The results obtained underline the necessity of better awareness of the problem. As far as our centre is concerned, the results led us to hold meetings with the physicians and to plan interventions in order to make them aware of the problem and in order to start a process of pharmacovigilance with compassionate-use drugs.

No conflict of interest.

CPC-036 CONNECTION BETWEEN BONE FRACTURES, VITAMIN D LEVEL AND LOW-ENERGY FALLS IN HOSPITALISED ELDERLY PATIENTS

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Background The ageing of the population in developed countries is a growing problem today. Prevalence of chronic diseases, such as osteoporosis, increases with age. It is estimated that 900,000 people (9% of the population) above the age of fifty suffer from osteoporosis in Hungary. This condition greatly increases the risk of fractures of vertebra and the hip bone, which often lead to fatal consequences. Many studies have proven that a low vitamin D level increases the risk of bone fractures. Adequate vitamin D level is essential to prevent bone loss and structural damage of the bone matrix, which also prevents fractures.

Purpose To compare vitamin D levels of hospitalised hip fracture patients with hospitalised non-fractured patients, as well as to detect the prevalence of low-energy falls, and to analyse the differences between the groups.

Materials and Methods The fractured group was recruited from the Traumatology Department and the control group was recruited from the Internal Medicine Department. The control group was matched according to age and gender. Vitamin D levels were measured with an ELISA kit and were expressed in ng/ml. Subjects were asked about previous falls during a personal interview.

Results Twenty-two patients were in the fractured group (mean age 84.09 years, SD ± 6.78) and 33 patients were in the control group (mean age 80.52 years, SD ± 6.56). The mean vitamin D level was 33.13 ng/ml in the fractured group and 39.7 ng/ml in the control group (P = 0.230). However, the vitamin D level was under the normal range (30–60 ng/ml) in the majority of patients in both groups. Patients of the fractured group reported considerably more falls within one year than the control group.

Conclusions Since the difference in vitamin D levels was not significant between the investigated groups, other risk factors could be responsible for fractures besides the low vitamin D level. A noteworthy factor may be falls, because more than half of the fractured patients reported multiple falls in the previous year.

No conflict of interest.

CPC-037 CONTINUITY OF CARE IN PAEDIATRIC PATIENTS: PROSPECTIVE STUDY AT HOSPITAL DISCHARGE

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Background A variety of problems can occur at hospital discharge. Optimization of this multidisciplinary process is essential to ensure a high quality of care.

Purpose To assess drug problems encountered by paediatric patients at hospital discharge; prospective clinical study.

Materials and Methods

- Inclusion of French-speaking paediatric patients (<12 years) discharged from the emergency department (ED; collected for 2 weeks) and a medicine ward (MED; collect for 2 months)
- Semi-structured phone interview of parents (drug supply, knowledge of the treatment) at 72 hours
- Questionnaire for community pharmacists

Results 109 patients were included (ED 64; MED 45). 88% were interviewed (ED 88%; MED 89%). 68% of questionnaires were returned to us (ED 59%; MED 89%).

79% of parents said they obtained all drugs immediately (ED 86%; MED 70%). The main reasons for not obtaining a drug were: drug not in stock (50% of cases; ED 38%; MED 58%), and not going to the pharmacy (20%; ED 25%; MED 17%). 65% obtained them later (ED 50%; MED 75%), of which 60% were obtained within a day (ED 38%; MED 50%). The total number of drugs prescribed was 241 (ED 124; MED 117). Global parents' knowledge of treatment indications (71% of drugs; ED 65%; MED 87%), duration (52%; ED 31%; MED 73%), doses (71%; ED 56%; MED 87%), and frequencies (69%; ED 53%; MED 85%) were good.

Pharmacy questionnaires showed similar results with drugs obtained immediately in 82% of cases (ED 89%; MED 61%).The main reasons for not obtaining drugs were: drug not in stock 48%, compounded drugs 24%, and parents' refusal 10%.

Results Compared to the emergency department, obtaining all the prescribed medicines was more difficult for patients leaving the medical ward but parents' knowledge of the treatment seemed to be higher. Interventions to improve drug supply and knowledge of the treatment by parents will be implemented and evaluated.

No conflict of interest.

CPC-038 CURRENT SITUATION ON PRESCRIPTION OF CARBAPENEMS IN GERIATRIC CARE UNITS

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Background Carbapenems (CBPs) are being used more and more because of the increasing prevalence of extended-spectrum beta-lactamase (ESBL)-producing Enterobacteriaceae. Due to the extensive misuse of these antibiotics, some bacteria have developed CBP-resistant mutations. This epidemiological situation should make us wonder about prescribing CBPs.

Purpose To describe prescribing patterns of imipenem/cilastatin, ertapenem and meropenem in elderly inpatients: context and impact of an interdisciplinary approach to prescriptions analysis.

Materials and Methods A retrospective study of CBP prescriptions was performed over a ten-month period (March-December 2011) in geriatric departments (313 beds). Data were collected from the electronic medical records, bacteriological analysis results and email exchanges between the infectious diseases physician (IDP), bacteriologists and pharmacists (prescription monitoring system). The following items were noted: patients, prescriptions and bacteriological characteristics.

Results 55 patients were included with a total of 61 CBP prescriptions. The mean age was 83 (sex ratio 0.72). 71% of patients accumulated between 2 and 5 risk factors of multidrug resistant bacteria. Imipenem was the most-used carbapenem (n = 35; 57%) compared to ertapenem (n = 23; 38%) and meropenem (n = 3; 5%). Major indications were urinary tract infections (n = 37; 61%) and pneumonia (n = 15; 25%). 59% of infections were nosocomial. 39% of CBP prescriptions were written after a first-line antibiotic had failed (ceftriaxone most of the time). The overall duration of carbapenem therapy was 11 days. Microbiologically-documented infections and ESBL bacteria accounted for 69% (n = 42) and 51% (n = 24) of prescriptions, respectively: 5 of the ESBL strains isolated were community-acquired bacteria. 61% (n = 38) of prescriptions were reassessed by an IDP: 29 (76%) were in accordance with recommendations; 7 (18%) were stopped or changed for a narrow-spectrum antibiotic.

Conclusions CBP prescriptions seem relatively well controlled in geriatric care units due to multidisciplinary analysis of the prescriptions. Nevertheless, evaluation of the impact of monitoring prescriptions for use of CBPs requires longer follow-up.

No conflict of interest.

CPC-039 DELPHI APPROACH TO DEFINING AND CONTEXTUALISING MEDICINES WASTAGE IN THE MALTESE POPULATION

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Background Reducing wastage, including medicines wastage, is a paramount objective in promoting appropriate use of finite resources and preventing negative consequences. A systematic review of the published research on medicines wastage identified a lack of standard terminology and definitions.

Purpose The aim of this study was to apply an expert panel approach to achieve consensus in defining 'medicines wastage' in the context of the Maltese population.

Materials and Methods The Delphi technique, a multi-staged survey attempting to achieve consensus, was employed. An expert panel comprising 26 professionals and six patients was recruited and communicated by email. Round 1 had initial open-ended questions on the panel's understanding of the term 'medicines wastage' along with views on factors likely to be associated with wastage. Responses were analysed thematically. In round 2, respondents were requested to rank eight definitions of 'medicines wastage' in order of preference. Themes related to associated factors were presented as 5-point Likert statements.

Results The first two rounds of data collection are complete. Twenty-seven consented to participate, 23 of whom have responded to both rounds. Of the eight options for defining 'medicines wastage', the highest ranked was '…refers to any medicine which expires or remains unused throughout the whole medicines supply chain. It also refers to the unnecessary or inappropriate consumption of medicines by patients, or the unjustified non-adherence to treatment guidelines by healthcare professionals. Medicines wastage imposes a financial burden on patients themselves and the state's economy and requires adequate education of all people concerned.' Themes related to factors associated with wastage included: physical/environmental; social/psychological (patient/practitioner); and cultural.

Conclusions This research has generated a definition of 'medicines wastage' and a series of associated statements for further investigation. The research process followed in this study can easily be adapted and is therefore also highly relevant to hospital pharmacy practise across Europe.

No conflict of interest.

CPC-040 DESIGN AND ASSESSMENT OF AN E-LEARNING COURSE TO TRAIN CLINICAL PHARMACISTS IN VITAMIN K ANTAGONIST (VKA) CONSULTATIONS

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Background Since 2009, clinical pharmacists have been performing about 150 vitamin K antagonist (VKA) consultations annually in all wards of our hospital. This 24-hour service requires the training of about 15 to 20 pharmacists per year. A very comprehensive but time-consuming training course had been set up.
Purpose To design and implement an E-learning course to train clinical pharmacists for VKA consultations.
Materials and Methods A database of 70 questions (Qs) (35 Level 1 Qs for beginners paired to 35 Level 2 Qs for advanced learners). Each set was divided into 5 themes (biology, side effects, drug interactions, hospital practise and medicines). The training involves six steps (from S1 to S6)

- An assessment of knowledge before training (S1, 10 quizzes level 1)
- Theoretical training using a slideshow (S2)
- 4 role-plays involving a patient and a pharmacist (S3)
- A reassessment of knowledge (S4, 10 quizzes level 2)
- A practical evaluation of running a VKA consultation at the bedside is performed by the pharmacy resident (S5). The score required to complete this step is ≥8 out of 9.
- A satisfaction questionnaire (S6)

The validation method was performed with 10 pre-registration pharmacy students (PRPs).

E learning was developed according to SCORM standards.
Results The individual progression of PRPs was significant (increase of 2.1 points/20, significant $p < 0.025$). A high level of satisfaction and autonomy was expressed when training was completed.

The shift towards e-learning for steps S1 to S4 was much appreciated, particularly distance learning, free access to slideshow, learning flexibility, flash animation for role play. Performances observed for trained consultants at the bedside during S5 were very similar to those obtained prior to E-learning.
Conclusions Anticoagulant monitoring and related patient education is a major issue. Training consultant pharmacists is particularly critical. We demonstrated that E-learning can save much time while providing efficient, customised training to healthcare professionals. Our course will be soon extended to two teaching hospitals belonging to the same group.

In 2013, details of new oral anticoagulants will be added to the course.

No conflict of interest.

CPC-041 DIRECT AVOIDANCE OF MEDICINES COSTS BY PHARMACEUTICAL ANALYSIS OF HOSPITAL PRESCRIPTIONS

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Background Computerized Physician Order Entry has been set up in two digestive surgery wards in our University hospital since 2012. Clinical pharmacists analyse hospital prescriptions via this software, in order to promote good use of drugs.
Purpose To estimate avoided medicines costs, in relation to pharmacist interventions, from April to June 2012 in two surgical wards (41 inpatient beds).
Materials and Methods We focused on four types of pharmaceutical recommendations (1-to discontinue a medicine, 2-to start medicines for an untreated condition, 3-to modify a dose regimen, 4-to substitute one medicine for another). Data extracted were: daily dose, price per unit (for drug substitutions we calculated the difference between the prices of the drugs) and average length of stay. We hypothesised that our interventions had a cost impact for half of the inpatient's stay. Cost impact was calculated as follows: (Added or avoided daily dose) X (price per unit) X (half of the average length of stay).
Results 1706 prescriptions were analysed and 340 pharmacist recommendations were accepted by physicians (20%). 238 of these recommendations were among the four types listed above. 155 interventions had an impact on cost: 83% led to a cost reduction (total reduction of Euros 1949) and 17% led to an increased cost (total Euros 571). The 1378 Euros saved represent an economy of 3.6% on the total cost of medicines for these two wards between April and June 2012. Extrapolated to the entire hospital, this saving could add up to Euro 2.5 million each year.
Conclusions Medicines costs can be reduced by pharmaceutical interventions. The financial evaluation of Clinical Pharmacy practise is necessary and further studies are needed to calculate avoidable indirect costs.

No conflict of interest.

CPC-042 DRUG-RELATED PROBLEMS IN A CARDIOLOGY DEPARTMENT – IDENTIFYING TRENDS

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Background Since the spring of 2010, periodic medicines reviews have been performed by a clinical pharmacist in four cardiology wards at Aarhus University Hospital, Skejby. Any drug-related problems (DRPs) identified have been detected and classified using the Danish DRP database. In the database, the DRPs identified are categorised and grouped according to ATC code and type of drug-related problem; interaction, adverse effect, dosage etc. Subsequent extraction of various reports can provide useful information about trends in DRPs.
Purpose To analyse the DRPs identified by the pharmacist on the cardiology wards at Aarhus University Hospital, Skejby, over a two-year period. Secondly, the objective is to demonstrate that the Danish DRP database is a useful tool in analysing data.
Materials and Methods Over a two-year period, DRPs identified by the clinical pharmacist were recorded in the DRP database. Data have been analysed using the reports in the DRP database. 846 medicines reviews were included in the analysis.
Results 846 medicines reviews were conducted and a total of 563 DRPs were identified. The most frequent DRPs were associated with dosage (24%). DRPs classified in the categories time/schedule, interactions and supplement to treatment were also very common. Drugs from ATC code C (26%), A (17%) and N (19%) were most often involved in a DRP.
Conclusions The examination of data from medicines reviews of 846 patients has identified trends in DRPs on the cardiology wards. The Danish DRP database proved to be a useful tool in the analysis.

No conflict of interest.

CPC-043 EFFECTIVENESS AND CHANGE OF THE PROTOCOL FOR ANTIRETROVIRAL TREATMENT FOLLOWING EXPOSURE TO HIV

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Background The average risk of infection after occupational exposure to HIV is 0.3% (0.2–0.5% percutaneous exposure, 0.01–0.5% contact with mucous or non-intact skin) and after sexual exposure 0.01–3%, depending on sexual practise.

An action protocol has been in place at our centre since 2010, based on international recommendations for exposure to HIV that include:

1. Start treatment within 72 hours post-exposure.
2. 1st choice guideline: Tenofovir/Emtricitabine+Lopinavir/Ritonavir regimen or the source treatment if viral load is controlled; 2nd choice Tenofovir/Emtricitabine or Lamivudine/Zidovudine+protease inhibitor(PI), boosted with Ritonavir.
3. Length of treatment: 30 days.
4. Serological analysis at different points until the 6th month.

Before 2010, the hospital followed the international recommendations, with 1st choice Tenofovir/Emtricitabine or Lamivudine/Zidovudine+PI boosted with Ritonavir.

Purpose To evaluate the effectiveness and change to the protocol currently in force since 2010 and that of the previous international recommendations, following exposure to HIV.

Materials and Methods A retrospective observational study. Sample: 100% of patients with antiretroviral treatment following exposure. Period: January 2000-June 2012. Data Sources: Pharmacotherapy records (Silicon computer programme) and electronic medical records (IANUS application). Variable effectiveness: absence of seroconversion in exposed patient following post-exposure prophylactic treatment (PEPT). Analysis on: day-0, month-1, month-3 and month-6.

Results 33 patients. Average age 37.3(23–65), 13 males (39.4%). Patients treated with first choice: 94%, other therapeutic options: 6.0%. 90.9% of patients received treatment for 30 days. 38.2% of patients underwent correct serological monitoring until 6 months, 52.9% until 3 months. 96.9% started treatment within 72 hours of exposure. All baseline serologies were negative and there were no cases of seroconversion. Average cost/patient €747.

Conclusions PEPT was able to achieve the therapeutic goal in all study patients. The treatment chosen and the time of beginning after exposure were correct. The follow-up until 6 months was not carried out correctly in a significant percentage of patients. These facts and the high costs, require close pharmacotherapy monitoring of these patients.

No conflict of interest.

CPC-044 EFFECTIVINESS AND SAFETY OF BEVACIZUMAB IN METASTATIC BREAST CANCER IN CLINICAL PRACTISE

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Background New data released by clinical trials AVADO and RIBBON have questioned the use of Avastin in metastatic breast cancer (MBC). EMA keeps the indication of first line in combination with paclitaxel or capecitabine when taxanes or anthracyclines are not indicated.

Purpose This study explores our single-centre experience to cheque the effectiveness and safety of bevacizumab in MBC in clinical practise.

Materials and Methods Retrospective study of 41 MBC patients treated with bevacizumab and chemotherapy in a Spanish teaching hospital from 07/2008 to 06/2012. Toxic effects were graded according to the National Cancer Institute Common Toxicity Criteria (NCI-CTC). Disease status was assessed according to the Response Evaluation Criteria in Solid Tumors (RECIST). Clinical evaluation included clinical response, time to progression (TTP), and toxicity. Median survival times were estimated from Kaplan–Meier curves. Data analysis was performed using SPSS-17.0.

Results Median age was 59 yrs (34–75). 87.8% of patients had ECOG PS 0–1. Bevacizumab was administered with docetaxel (46.3%), paclitaxel (29.3%), taxane-carboplatin (17.1%) or capecitabine (7.3%). It was used as first line in 19 cases (46.3%), second line in 5 and following lines in 17 cases (41.5%). Sites of metastases were: 26 visceral and 4 skeletal. Overall Response was 46.4% (4.9% Complete and 41.5% Partial). 17.1% had progressive disease. Median TTP: 7.8 months (6.5–9.2;95%CI). Median TTP of first-line paclitaxel-bevacizumab was 11 vs. 7.7 months for the rest of the combinations (P = 0.501). Safety outcomes were similar among treatments. G1–2 toxicities: bleeding (32%), anaemia (21.8%), mucositis (21.9%), diarrhoea (9.7%), hypertension (20%). 1 patient suffered grade 4 hypertension resulting in discontinuation and 2 patients suffered deep vein thromboembolisms. Other non-specific toxicities: neutropenia (31.2% – G3–4 = 7.3%), neuropathy (19.5%), alopecia (24.4%), nausea/vomiting (9.8%).

Conclusions TTP was longer with paclitaxel than with other antineoplastic agents but the difference was not statistically significant. Most of patients in the paclitaxel group were censored as they hadn't reached progression yet. Toxicity profile was as expected.

No conflict of interest.

CPC-045 EFFICACY AND SAFETY OF BOCEPREVIR AND TELAPREVIR AT WEEK 12 OF TREATMENT

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Background Boceprevir and telaprevir are two new drugs approved by the European Medicines Agency for the treatment of hepatitis C genotype 1. They are used in combination with ribavirin and peginterferon to increase the response to treatment.

Purpose To analyse the evolution of the viral load and the adverse effects of boceprevir and telaprevir, at week 12 of treatment.

Materials and Methods We undertook a prospective observational study from November 2011 to October 2012 of patients who started treatment with boceprevir and telaprevir. Patients were monitored for 12 weeks after initiation of triple therapy. We also analysed the incidence of adverse effects during treatment. The data collected were: age, sex, grade of fibrosis, type of patient, baseline viral load, and viral load at weeks 4, 8 and 12. The data were consulted in the medical records of patients through the IMDHv.50 programme.

Results A total of 31 patients were followed up, eight treated with boceprevir and 23 with telaprevir. The median of age was 60 years. Regarding the type of patient, 10 were treatment naïve, 5 were relapsers, 7 non-responders, 4 presented side effects in previous treatment and 5 were partial non-responders. The median viral load was 2,682,000 IU/ml. At week 12, undetectable viral load was found in 26 (83.8%) patients (6 in the boceprevir group and 20 in the telaprevir group). Five patients (16.1%) had to discontinue treatment, four (12.9%) had >1000 IU/ml at week 12 and one (3%) due to pancreatitis. Adverse events observed during treatment are shown in the table.

Conclusions The data show an early decrease in the viral load of patients treated with triple therapy, becoming undetectable by week 12 in most cases. The side effects differed from those described in clinical trials, so more studies and post-marketing pharmacovigilance are needed.

Abstract CPC-045 Table 1

	Boceprevir	Telaprevir
Thrombocytopenia	3	10
Asthenia	2	14
Anaemia	2	10
Skin Lesions		9
Pruritus	1	7
Vitreous Detachment		1
Pancytopenia	1	
Pancreatitis		1

No conflict of interest.

CPC-046 EPIDEMIOLOGY, SYMPTOMS AND CHEMOTHERAPY OF IMPORTED MALARIA AT MOHAMMED V MILITARY TEACHING HOSPITAL IN RABAT, MOROCCO

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Background In Morocco, since the neutralisation of the last outbreak of Plasmodium vivax in 2004, only imported malaria cases have been recorded, the majority from sub-Saharan Africa. At Mohammed V Military Teaching Hospital in Rabat, patients are mostly military, often called to perform missions in malaria endemic areas.
Purpose To report the incidence, origins, symptoms and treatment of malaria at Mohammed V Military Teaching Hospital.
Materials and Methods A prospective study performed from 1 January 2000 to 15 November 2009. All patients who had travelled to a country where malaria is endemic and diagnosed positive for Plasmodium spp in our hospital were included. The data collected concerned the epidemiology, symptoms, diagnosis and treatment of malaria.
Results 145 patients had a thick blood smear positive for malaria parasites. 84% were Moroccan, the sex ratio Male/Female was 19.71 and the age varied from 6 to 60 years with a median of 34 years. Countries at the origin of the infection were classified in zone 3 in 92% of cases. All malaria patients were symptomatic at admission, with often one or more of the following symptoms: fever (99%), chills (57%), sweats (41%), headaches and various pains (80%), vomiting (67%), nausea (44%), anaemia (44%) and thrombopenia (73%). We distinguished 19 cases of severe malaria and 3 cases of probable evolutive visceral malaria unconfirmed by serology.

Plasmodium falciparum was responsible for most cases, alone in 68% of cases and in combination with other Plasmodium species in 10% of cases. A diagnosis was made within three months of returning from the endemic malaria area for 97% of cases. The drugs most commonly used for treatment were mefloquine (25%), quinine (17%) and the combination of the two (50%).
Conclusions This study allowed us to better understand the profile of our malaria patients in order to improve their management in our hospital.

No conflict of interest.

CPC-047 EPILEPSY MANAGEMENT FROM THE CLINICAL PHARMACIST'S POINT OF VIEW AMONG EPILEPSY OUTPATIENTS IN THE EASTERN HUNGARIAN DATABASE

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Background Epilepsy may need chronic medical treatment throughout life. This is why, besides epileptologists, clinical pharmacists also have an important role in the evaluation of effectiveness, tolerability, side effect, drug interaction, teratogenicity of antiepileptic drugs (AEs).
Purpose To investigate how the cooperation of epileptologists and clinical pharmacists influence compliance and the effect of AEs on the quality of life.
Materials and Methods We analysed 60 parameters of 1845 adult outpatients with epilepsy in the Eastern-Hungarian Database at the Department of Neurology, between 1992–2011. The clinical pharmacist collected and analysed data from 1015 men and 830 women that were related to epilepsy treatment. For statistical analysis the 'STATISTICS for Windows' programme was used.
Results The mean age was 49.3 years. Seventy-seven patients had idiopathic and 1768 symptomatic or cryptogenic epilepsy. During the examination period 1517 patients took antiepileptic treatment: 71% monotherapy, 21% dual therapy and only 8% polytherapy. Thirty-eight percent of the patients were on carbamazepine and 14% valproate monotherapy. Seventeen percent of the patients were seizure-free on levetiracetam, lamotrigine or oxcarbazepine monotherapy at least for one year. The ratio of side effect was 7.6%. Eighty-eight patients gave birth, 70 of whom took AEs during the organogenesis. No minor or major developmental disorders were observed, although there was one spontaneous miscarriage. At the start of the study a surprisingly high proportion of the patients (36.2%) received concomitant treatment affecting the CNS that could also influence the AEs metabolism. After carefully analysing the patient's history and symptoms, we could decrease the use of the co-medication (diazepam, antidepressants, minor and major tranquillisers, alprazolam) to 14.6% of the patients. The compliance was good in 78.7% of the patients.
Conclusions The data of Epilepsy Database analysis may give useful information in clinical practise, not only for epileptologists but clinical pharmacists too. Individuall-planned monotherapy decreases the side effects and improves the quality of life in patients with epilepsy.

No conflict of interest.

CPC-048 ESTABLISHING THE ROLE OF THE PHARMACIST IN AN INPATIENT ANTICOAGULATION MANAGEMENT SERVICE IN BELGIUM

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Background The complexity of the management of vitamin K antagonist (VKA) treatment has led to the development in many countries of anticoagulant management services (AMS) which provide patient education and good family physician communication in a systematic and coordinated fashion. In Belgium, there is only limited experience in AMS.
Purpose To determine the impact of a pharmacist-provided anticoagulation management programme (AMP) aiming at improving patient education and communication with the family physician.
Materials and Methods This was a prospective cohort study including consecutive inpatients newly initiated on VKA in an urban teaching tertiary care hospital. Patients and general practitioners were interviewed by phone shortly after discharge by using a standardised questionnaire to evaluate the quality of patient education and the quality of discharge reports before (usual care) and after implementation of a pharmacist-provided AMP. The AMP provided structured patient education and a standardised discharge report for family physicians.

Results With usual care, 58% of 26 patients received some form of unstructured education. Analysis of 42 discharge reports showed that duration of treatment, target INR (International Normalized Ratio), in-hospital INR results, scheduling of the next INR measurement and VKA maintenance dose were specified in 7%, 14%, 28%, 52% and 62% of them, respectively. Seventy-nine percent of 33 family physicians received the discharge report and 35% of them judged that it was complete.

With the pharmacist-provided AMP, all patients received structured education. Eighty-nine percent of 75 family physicians received the standardised discharge report and 99% of them judged that it was complete.

Conclusions The implementation of the structured pharmacist-provided AMP improved patient education and family physician communication.

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No conflict of interest.

CPC-049 EVALUATION OF A STANDARDISED THERAPEUTIC EDUCATION TRAINING SESSION FOR HYPERTENSIVE STROKE PATIENTS

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Background A standardised therapeutic education (TE) intervention was developed in 2009 in the department of Neurology, for hypertensive stroke patients. This training session has been officially authorised (Agence Régionale de Santé) since 2011.

Purpose To assess the effectiveness of the TE training.

Materials and Methods The TE training is for hypertensive patients hospitalised in a stroke unit for a cerebrovascular accident (CVA), and treated with antihypertensive drugs, when they are able to participate. We performed:

a. an evaluation of the patients' knowledge of hypertension (HT), self-measurement, and adherence to antihypertensive medicines, using a questionnaire (6 short questions) filled in before and after the TE session, during a consultation;
b. an evaluation of patient satisfaction, with an opinion questionnaire (after the TE session).

Results 67 patients participated in at least one session. a) 18 patients took part in a second session during a consultation, on average 4 months after the first session. The pre- and post-TE questionnaires were compared, and a score calculated, for 11 patients (7 patients excluded). The total post-TE score was significantly improved (34 ± 7 vs. 43 ± 2; $p = 0.005$). All items' scores had increased significantly: link between HT and CVA ($P = 0.05$), possibility of treating HT ($P = 0.03$), adaptation to antihypertensive drugs ($P = 0.006$), regular blood pressure measurement ($P = 0.05$). The score about the continuation of antihypertensive treatment was the only one that did not improve significantly. Results for medicines adherence could not be analysed (many patients had no treatment before hospitalisation). Post-TE, more patients carried out regular self-measurement. b) We analysed 40 opinion questionnaires: 94% of patients were completely satisfied with the session (reception, timing, educator open to listening, clarity), 80% felt completely capable of applying what they learned, 83% said they were ready to take part in other sessions.

Conclusions These results are really encouraging, about increased knowledge and patient satisfaction. Space should be made for a second TE session in post-CVA consultations.

No conflict of interest.

CPC-050 EVALUATION OF A UNIFIED INHALATION INSTRUCTIONAL SYSTEM IN COOPERATION WITH PHYSICIANS, HOSPITAL PHARMACISTS AND COMMUNITY PHARMACISTS

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Background The prevalence of asthma and chronic obstructive pulmonary disease (COPD) in Japan is estimated to be approximately three million and five million, respectively, and inhalation has gained widespread use as a long-term treatment modality. Thus, patient education on the purpose of medication and correct inhalation technique is essential for obtaining sufficient therapeutic benefit. In our region, to offer each patient correct inhalation treatment and improve treatment efficacy and quality of life, we prepared unified inhalation guidance documents and developed a system of cooperation between physicians, hospital pharmacists and community pharmacies.

Purpose To assess the benefits and problems of our guidance documents and cooperation system.

Materials and Methods A total of 162 Japanese patients were enrolled for instruction on inhalation treatment from August 2011 to August 2012. We investigated inhalation techniques and learning behaviour based on our unified inhalation guidance documents after patients had received instruction.

Results While 129 (79.6%) patients were instructed on inhaled medication only once, 59 of them (45.7%) were considered to need continuing instruction. Of these 59 patients, 50 (84.7%) used the inhaler device incorrectly and 31 (52.5%) had a lack of understanding of inhalation technique. The other 33 (20.4%) patients were allowed to receive continuing instruction to acquire the correct inhalation technique.

Conclusions In this study, 43.2% were able to acquire the correct inhalation technique with only one teaching session on inhaled medicines, and 20.4% of patients were allowed to receive continuing instruction to acquire the correct inhalation technique. On the other hand, 36.4% did not receive subsequent guidance despite the need for continuous instruction. Therefore, a system that enables us to determine the patients who need continuous instruction is required. Furthermore, correct instruction on inhalation treatment might promise to potentiate clinical efficacy. We plan to establish a more appropriate system and improve information sharing among system users.

No conflict of interest.

CPC-051 EVALUATION OF IMPLEMENTATION OF CLINICAL PHARMACY SERVICES IN CENTRAL NORWAY

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Background Central Norway Pharmaceutical Trust consists of six hospital pharmacies covering eight hospitals. In partnership with a research group at the University of Lund and the Lund Hospital Pharmacy, Sweden, we implemented a model for clinical pharmacy services named Integrated Medicines Management (IMM) based on the Lund IMM model (LIMM) and the IMM model from Northern Ireland. Two years on we have evaluated the service.

Purpose To evaluate the implementation of clinical pharmacy services with regard to reduction in medicines errors (MEs), with the main focus on discrepancies in medicines reconciliation (MedRec)

and drug related problems (DRPs) from medicines reviews (MRs); and benefits for patients and healthcare professionals (HCPs).

Materials and Methods The report builds mainly on studies, mini-audits and questionnaires. Four master thesis/projects completed in 2012 in our region studied the IMM model in hospital and primary care. Two mini-audits were completed during 2012 as benchmarking of daily activities and recording of MEs. Three questionnaire surveys were conducted; one investigating clinical pharmacists' experiences with the model, the second exploring the attitudes of and usefulness for HCPs and the third was a patient satisfaction survey.

Results Up to 70% of patients had one or more discrepancies between the drug lists in hospital and at home. Most discrepancies were due to drug(s) missing in the drug history. On average 2.1 DRPs per patient were identified and acted upon. Most DRPs were classified as: need for additional treatment and choice of drug/dose not appropriate. HCPs and pharmacists rated the service highly (5.1–5.5 on a 6-point scale) with regard to patient benefits and usefulness for HCPs.

Conclusions The model has been successfully implemented in hospitals in Central Norway. Further research will be needed to investigate end points such as reduced length of hospital stay and time to readmission. We plan to provide a more extensive service to all patients in our region, also in the community.

No conflict of interest.

CPC-052 EVALUATION OF THE INTEGRATION OF A CLINICAL PHARMACIST WITHIN A MOBILE MULTIDISCIPLINARY GERIATRIC TEAM

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Background In any general hospital, the number of elderly patients admitted in wards other than geriatric wards is steadily rising. The 'Centre Hospitalier du Bois de l'Abbaye et de Hesbaye' gets the benefit from a mobile second-line multidisciplinary team whose mission is to contribute to provide medical specialists and their staff with general geriatric principles and multidisciplinary expertise. The inclusion of a clinical pharmacist in this multidisciplinary team is an effective way to optimise the quality and the efficacy of elderly patient health care.

Purpose To evaluate the impact of including a clinical pharmacist within the mobile multidisciplinary geriatric team on the efficacy of pharmaceutical care.

Materials and Methods Two different working methods of the clinical pharmacist were compared in order to evaluate her inclusion in the geriatric team.

The first method, used from 1 July to 31 December 2011, evaluated the treatments and the interventions provided by the clinical pharmacist.

The second method, used from 1 January to 30 June 2012, was identical to the first one except that the interventions provided by the clinical pharmacist were taking into account the observations made by the multidisciplinary team.

Results From 1 July to 31 December 2011, 187 interventions were made for a total of 78 elderly patients. From 1 January to 31 May 2012, 202 interventions were made for a total of 75 elderly patients.

Following the inclusion of the clinical pharmacist within the multidisciplinary team we observed an improvement in the efficacy of pharmaceutical care with an increase of 12% in the number of interventions.

Conclusions The inclusion of a pharmacist within the mobile multidisciplinary geriatric team enables him/her to make better use of his/her expertise and to improve his/her analysis, improving patient health care.

No conflict of interest.

CPC-053 EVALUATION OF THE MANAGEMENT OF DIABETIC FOOT IN RABTA NATIONAL TEACHING HOSPITAL

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Background Feet lesions are the greatest cause of diabetic consultations in the endocrinology service.

Purpose To evaluate the diabetic foot management in a Tunisian hospital in order to improve patients' quality of life.

Materials and Methods This was a prospective, descriptive study based on documentation regarding 43 cases from the endocrinology service at Rabta hospital over five months. Data collected included: the age of the patient, sex ratio, type of diabetes, duration and type of lesion. The diagnostic examinations selected were: Doppler exploration, standard radiography of the foot, bacteriological sample of pus (applied to 2 patients).The prescribed treatment and the evolutionary aspects were also documented.

Results In our study we present 43 diabetics with foot lesions. Sex ratio (men/women = 3.3), median age 60 years and median length of diabetes 15 years. Traumatic lesions represented 46.68%. The most frequent lesions were gangrene (32.55%), ulcer and painful perforating plantar ulcers (67.45%). The main aetiological factors were peripheral neuropathy (72.09%) and arthritis of the lower limb (30.23%). Osteitis and diffuse atheromatous infiltration were observed in 46.66% of the patients. Samples were taken from two patients. 90.70% of the patients benefited from antibiotic treatment, the most prescribed drugs were amoxicillin + ac. clav (30%), fusidic acid (22%), pristinamycin (22%) and ciprofloxacin (15%). An amputation was performed on 37.20% of the patients

Conclusions Sepsis of the diabetic foot remains one of the most severe complications in Tunisia; it represents a frequent reason for prescribing antibiotics. This encourages strict microbiological investigation to identify the causative germs and the need for perfect observance of the rules of antibiotic prescription.

No conflict of interest.

CPC-054 EVALUATION OF THE USE OF CAPSAICIN PATCHES IN GARCIA DE ORTA HOSPITAL

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Background Capsaicin is commonly used in creams in low concentrations with limited success. More recently it has been formulated in a high concentration patch (8%), indicated for the treatment of peripheral neuropathic pain in non-diabetic adults.

Purpose To evaluate the effectiveness of treatment with capsaicin patches in a group of patients in Garcia de Orta Hospital Pain Unit.

Materials and Methods This retrospective study, which included 30 patients with neuropathic pain, examined data from the last two years. This treatment was done more than once, with a minimum interval of 12 weeks.

The number of treatments and the number of patches, the area affected, the perception of pain, functional capacity and adverse events were evaluated.

Results The mean age was 58.1 ± 16.5, the number of treatments was 2.8 ± 0.7, the number of patches per treatment was 2.4 ± 1.0 with an average cost per treatment of €630.2±€262.6.

An average reduction of 50.5% was observed in the affected area, a reduction of 24.1% in the baseline pain score, using a Visual Analogue Scale (VAS), and a reduction of 12% in the peak pain score.

Functional capacity had limited improvement.

The most common side effects were application site reactions including intense burning, pain, swelling and erythema. Blood pressure alterations were not noticed.

Conclusions Taking into account the 'IMMPACT' recommendations [2], the observed reduction in the VAS score was lower than 30% both in peak and baseline score. This did not translate into a clinically significant improvement.

Given the size of the study sample, the conclusions although interesting, must be confirmed with additional data.

In times of severe budget restraints, heath care providers must take into account both the benefits that new treatments bring to patients and the limited resources available in public services.

No conflict of interest.

CPC-055 EVALUATION OF TREATMENT COMPLIANCE IN MULTIPLE SCLEROSIS PATIENTS AND ITS IMPACT ON THE CLINICAL STABILISATION OF THE DISEASE

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Background Multiple sclerosis is a degenerative disease in which compliance with therapeutic regimens is extremely important in the clinical stabilisation of disease.

Purpose To evaluate the compliance of patients with treatment and the impact it has on the clinical stabilisation of the disease.

Materials and Methods Data were collected using a patient survey and consulting the hospital computer system. Statistical analysis was done with SPSS. The following data were collected: number of patients, average age, number of outbreaks and management failures in the last six months, reason for failure and flaws in the administration of medicines reported in the survey.

Results The sample (97 patients, mean age 41.73 ± 9.37 years old) was not only representative of the total MS patients followed in Centro Hospitalar Leiria-Pombal (CHLP) but also of the epidemiological data on the disease.

Over the past six months, 18.6% of patients had at least one outbreak. Regarding administration failures, 24.7% of patients admitted to failing to administer their medicines at least once, 45.8% of these failed more than three times.

The main reason for failing to administer the treatment was patient oversight and that represented 48% of total failures.

The largest number of administration failures was observed in patients treated with Interferon B 1b 8 MIU (66.7%).

86.6% of patients had administered their medicine correctly.

In this group of patients, there is no statistically meaningful correlation between the failures of management and inventory, with the number of outbreaks that occurred.

Conclusions Generally, multiple sclerosis patients followed in CHLP are a group with a great commitment to following their treatment.

There was a significant percentage of people who failed to administer all doses correctly, although there is no statistically meaningful correlation with the number of outbreaks that occurred, and there was a significant incidence of outbreaks in the last 6 months, suggesting that the disease has a multifactorial nature.

As I see it, the pharmaceutical staff plays an essential role in promoting compliance, which is crucial for stabilising the patients' clinical condition.

No conflict of interest.

CPC-056 EVOLUTION IN DRUG RELATED PROBLEMS IDENTIFIED IN PHARMACIST NOTES AT THE EMERGENCY DEPARTMENT, HILLER¯D HOSPITAL DENMARK

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Background 'Pharmacists in the Emergency Department' is a two-year implementation project carried out in collaboration between the pharmacy of Capital Region and the Emergency Department (ED) at Hillerød hospital. The task of the pharmacist is to draw up a current and valid medicines history and to make a medicines review before the physician sees the patient at the ED. During the first year of the project the interventions developed gradually while the professional skills and clinical experience of the pharmacists built up.

Purpose To describe the evolution of the interventions recommended when Drug Related Problems (DRPs) are identified, as described in the pharmacist's notes.

Materials and Methods 5 samples of pharmacist's notes were recorded. The samples represent the interventions made in the 2 first weeks of each quarter of 2011 and the first quarter of 2012. This showed the development in interventions made by pharmacists. The interventions were coded based on 8 categories of DRP introduced by Hepler and Strand. In total 383 pharmacist's notes were analysed.

Results In all 549 DRPs were identified. 70–80% of the pharmacist's notes contained one or more DRP. On average 1.4 DRPs were identified per note. During the first 15 months of the project the DRPs recorded evolved as follows: The number of comments tended to increase in the categories "inappropriate choice of drug", "overdose", "adverse drug events" and "medicine without reasonable indication". The number of comments identified in the category "interactions" decreased. The categories "untreated indication", "subtherapeutic dosing" and "inappropriate use by the patient" were stable throughout the study period.

Conclusions When introducing a new pharmaceutical service one must expect a gradual evolution of the interventions as the pharmacist gradually develops hands-on-competencies and clinical experience on the particular ward. After 12 months, the findings in the pharmacist notes were stable. This must be taken into account when introducing new pharmaceutical services in the clinic.

No conflict of interest.

CPC-057 EVOLUTION OF CLINICAL TRIAL PRESCRIBING INCIDENTS

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Background It is essential to record incidents in clinical trials (CT) to monitor them appropriately. It is a basic tool to analyse and detect problems.

Purpose To analyse the development in prescription incidents recorded from 2009 to 2011, to identify and resolve quality problems, with the aim of establishing corrective actions to reduce CT problems in a process of continual improvement.

Materials and Methods The most frequent incidents were found in the prescription phase. Data were recorded using the following items: date, person reporting, CT identification, department, professional involved, description of the problem and corrective measures. The evolution of incidents was analysed by chi square.

Results 186 events were recorded in a total of 331 CTs. The most frequent events occurred mainly in the prescription phase (49.0%)

followed by dispensing (22.1%), recording (9.6%) and reception (8.6%). The causes of prescribing incidents during 2009, 2010 and 2011 were respectively: no specification that the patient was included in CT (74.2%, 27.1% and 5.3%); incomplete prescription (2.6%, 24.2% and 31.6%), non-adherence to the study protocol (2.6%, 12.2% and 15.8%), incorrect dose (18%, 18.2% and 36.8%) and other causes (2.6%, 18.2% and 10.5%). The percentage of prescription incidents was: 2.01% (n = 1932) in 2009, 1.64% (n = 2012) in 2010 and 0.92% (n = 2050) in 2011. Prescribing incidents decreased significantly in 2011 compared to previous years. In these cases, there was an immediate intervention with a communication to the investigator.

Conclusions To manage the process as the Ethics Committee requires it is essential to have excellent communication and coordination between the pharmacy department and the other professionals involved. Measures taken were: increased electronic prescribing, using a specific application for CT prescribing and communication to researchers. The measures were effective in achieving a reduction in incidents in CT prescribing.

No conflict of interest.

CPC-058 FACTORS ASSOCIATED WITH ANTIRETROVIRAL MEDICINES ADHERENCE AMONG HIV-INFECTED CHILDREN

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Background The aims of highly active antiretroviral therapy (HAART) in HIV-infected children are to achieve and sustain full HIV-RNA viral load (VL) suppression and CD4-reconstitution, in order to prevent the progression of the HIV infection and allow normal growth and development.

Adherence to HAART is a strong predictor of therapeutic efficacy. Previous studies have shown that therapeutic success requires adherence > 95%. Among paediatric HIV patients, adherence to HAART is reportedly suboptimal.

There are a number of factors that can compromise treatment compliance. These can be classified as those related to the medicine, the patient, the family/caregiver and the healthcare system.

Purpose To estimate the correlation between adherence to HAART and treatment efficacy.

To assess factors related to non-adherence among HIV-infected children.

Materials and Methods Retrospective cohort study from January 2008 to July 2012 including all HIV-infected patients on HAART followed by the Paediatrics Department.

Age, sex, lipoatrophy, number of pills/day (P/d) and frequency of daily dosing: once a day (QD) or twice a day (BID), were analysed.

Adherence was assessed by using the pharmacy refill records and pill count, according to the following formula:

Adherence (%) = (N° dispensed doses- N° returned doses)/N° prescribed doses × 100

Undetectable VL was defined as VL < 20 copies/ml.

Data were analysed by multiple logistic regression methods using SPSS software (version 19.0).

Results 24 HIV-infected patients were included (mean age = 15.3 ± 5.5 years; 29.2% male, 70.8% female).

37.5% of patients presented lipoatrophy.

54.2% and 45.8% of the children were treated with a QD and BID regimen, respectively.

Only 50% of patients were considered adherent to treatment (adherence >95%).

The relationship between risk factors and adherence was: see Table

Patients with poor adherence had a higher risk of virological failure (OR = 11.67; CI95 = 1.14–119.54;p = 0.039)

Conclusions Adherence to HAART represents a significant challenge in the paediatric HIV population.

The P/d was significantly associated with adherence. Every pill/day increased up to 2.3-fold the risk of non-adherence to HAART.

Simplifying HAART by reducing the pill burden may contribute to improving compliance in the paediatric HIV population.

Abstract CPC-058 Table 1

Factors	OR	CI 95%	p
P/d	2.323	1.276–5.529	0.048
Sex	0.238	0.018–3.084	0.272
Age	0.858	0.622–1.182	0.348
BID	0.347	0.014–8.716	0.52
QD	0.494	0.030–8.204	0.623
Lipoatrophy	0.591	0.58–6.072	0.658

No conflict of interest.

CPC-059 FIRST GLOBAL ANTIMICROBIAL STEWARDSHIP SURVEY – INTERIM ANALYSIS OF NON-UK EUROPEAN DATA

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Background Antimicrobial stewardship (AMS) has been surveyed at national and continental level, but never at a global level. The European Society of Clinical Microbiology & Infectious Diseases, Guidelines & Policies Working Group (ESGAP) supported a worldwide survey of AMS. This aimed to quantify the delivery & impact of AMS across the world.

Purpose A literature review identified published surveys and standards for AMS. The survey aimed to quantify those aspects of AMS that were being delivered; the barriers to delivery; funding & staffing of AMS; and its impact on financial, safety and resistance outcomes.

Materials and Methods This was an open web-based survey of hospitals via SurveyMonkey software using good practise methodology. It was piloted in 11 countries in 6 continents, refined, then disseminated through microbiology, infectious diseases and pharmacy networks & websites.

Results By the initial deadline, 513 hospitals worldwide & 298 from Europe (including 122 from the United Kingdom (UK)) had entered data.

26 non-UK European countries entered data (range: 1 (many) to 24 (France); average 7; mean 3). 65% of hospitals had AMS standards & 19% were planning them. 74% had an AMS Committee, 58% had an AMS Programme in place & 25% had one planned. Lack of information technology was the main barrier. Antimicrobial or infectious diseases pharmacists were present on 86% of AMS committees. On average, there was 8 hours per week of pharmacist time for AMS from the 75 responses. 80% had an antimicrobial formulary, 69% guidelines, 58% restriction, 40% day 3 review, 50% IV-to-oral switch guidance & 57% had dose optimisation on request. 61% had AMS ward rounds mainly on intensive care & medicine. 34 centres had formally assessed their AMS programmes and had demonstrated reductions in expenditure, broad spectrum & inappropriate prescribing, but no decrease in length of stay or reduction in antimicrobial resistance.

Conclusions AMS appears to be well developed in many parts of Europe, and pharmacists are actively involved in its delivery.

No conflict of interest.

CPC-060 FOLLOW-UP OF PATIENTS TREATED BY PROLONGED-RELEASE OLANZAPINE IN A PSYCHIATRIC HOSPITAL

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Background Olanzapine is an atypical antipsychotic. Available in France since 2010, olanzapine pamoate (OP) is a prolonged-release suspension for intramuscular (IM) injection. OP is effective in the treatment of schizophrenic patients previously stabilised by oral olanzapine, and has been developed to improve compliance in these patients. In France, the injection must be performed in a psychiatric hospital department with 3-hour monitoring due to the potential 'post-injection syndrome' associated with OP.
Purpose To review the use and safety of OP since it became available in our hospital in May 2011.
Materials and Methods Retrospective study conducted from June 2011 to October 2012 in our 750-bed psychiatric hospital. Analysis of dispensing of long-acting IM antipsychotics: number of patients treated by olanzapine, risperidone and haloperidol. Analysis of OP prescriptions: number of patients, dosage and dose adjustment, treatment duration. Analysis of clinical data: diagnosis, treatment initiation and disruption, post-injection monitoring (blood pressure, heart rate, conscious state) and safety (other adverse events).
Results During the study period, 511 patients were treated by long-acting IM antipsychotics: 43% by haloperidol, 53% by risperidone and 4% by OP. OP was administered to 19 schizophrenic patients, mainly not compliant. In accordance with recommendations, a monthly dose of 405 mg was prescribed initially for 4 patients, 300 mg per 2 weeks for 1 patient, maintenance dosage after 2 months for 7 patients. 4 patients had only 1 injection. 3 patients required doses adjustments. 9 treatment disruptions were recorded during the study period for several reasons: care disruption, lost to follow-up, fear of injections. For the 10 patients currently treated, average treatment duration is 8 months. Post-injection monitoring data are collected on a special report form. Monitoring is performed for all injections in clinical departments. Altered consciousness has been reported in 1 patient during the 3 hours post-injection period without blood pressure or heart rate abnormalities and with normal vigilance 3 hours later. This suspected post-injection syndrome was notified to the pharmacovigilance services. Apart from this event, OP has been well tolerated.
Conclusions OP prescription is less frequent relative to other long-acting IM antipsychotics, probably because of its recent availability, physicians' reluctance due to the risk of post-injection syndrome and requirement for hospitalisation and monitoring in the psychiatric department. This monitoring is strictly observed and reported in our hospital using our special form. Only one mild adverse effect was reported but confirms the importance of post-injection monitoring and continuing follow-up. OP is an additional therapeutic option for schizophrenic patients with poor compliance.

No conflict of interest.

CPC-061 GLOBAL ANTIMICROBIAL STEWARDSHIP SURVEY – ANALYSIS OF UK RESULTS

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Background Antimicrobial Stewardship (AMS) has been in existence since the early 1990s.
Purpose To measure the extent and components of global efforts in AMS.
Materials and Methods A 43-question survey was developed and tested using robust survey methodology, then refined – piloting in 11 countries across 6 continents – and disseminated worldwide.
Results Responses from the UK: 109 England, 10 Scotland, 9 Wales & 3 Northern Ireland. Within the UK, 101 (79%) have an Antimicrobial Stewardship Programme (ASP). The main barriers are lack of information technology and lack of personnel. In the 22 (17%) that plan to develop an ASP the main barrier is lack of funding. Main ASP objectives were to reduce healthcare-acquired infection (91%), improve outcomes (57%), resistance (47%) and reduce prescribing (46%). 70% have an AMS policy, 92% a formulary, 88% specific treatment and 83% prophylaxis guidance for all areas. AMS rounds exist in 86%, resulting in reductions of antimicrobial (ATM) use in 36%, increases in 14% and no change in 50%.

Restriction of some ATMs occurs in 92% of hospitals: 84% restrict carbapenems, 88% quinolones, 91% cephalosporins. In 64% the pharmacy follows up. 12% practise diversity of ATMs and 5% cycle ATMs. 92% of ASPs report antimicrobial usage; 31% link these data to resistance rates and 33% to infection rates. Only 6% have electronic prescribing for all patients.

The intranet is the most common communication method, followed by credit card, booklet, poster then smartphone app. All educate staff, mainly by with face to face induction followed by written information.

Of the 33% who have formally reviewed their ASP, 100% (15) showed reduction in inappropriate prescribing, 76% (19) in broad spectrum antibiotics use, 71% (15) in expenditure, 91% (21) in healthcare-associated infections, 50% (3) in length of stay & 54% (7) in resistance.
Conclusions Despite inherent limitations (e.g. response bias, unselected institutions, etc.), this survey suggests AMS can reduce antimicrobial resistance and expenditure, and should encourage a strategy to promote worldwide ASPs.

No conflict of interest.

CPC-062 HEPATITIS C AND ADHERENCE

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Background Good adherence to hepatitis C treatment seems necessary to obtain a successful treatment, increasing sustained virological response (SVR) rates.
Purpose To assess the adherence to chronic hepatitis C treatment.
Materials and Methods The study was descriptive, retrospective and observational. Patients with chronic hepatitis C, who were being treated with peginterferon and ribavirin or monotherapy with peginterferon in 2011, were selected. Data collected were: age, drug dispensed, duration of treatment, pretreatment, co-infected status (HIV, HBV), haemophilia status, genotype and viral load at the beginning and the end of treatment. Adherence was calculated taking into account the number of medicines dispensed and the dates.
Results Of the 113 patients included (102 adults, 11 children) 110 patients were treated with ribavirin and peginterferon. The other three patients were treated with only peginterferon. There were 32 patients with HIV co-infection and three haemophiliacs. The average adherence of 112 of patients was 103%; one patient had less than 85% adherence. The genotype 1 patients (n = 54) had a mean duration treatment time of 35.5 weeks and a mean adherence of 103%. The genotype non-1 patients (n = 59) had a mean duration of treatment of 28.3 weeks and 104% adherence. The SVR of patients with genotype 1 and non-1 were 50% and 60% respectively.
Conclusions There was a high rate of adherence to treatment because it has a definite time course. Adherence was greater than

100% owing to some patients coming to pick up the medicines before the set date. The method used in this study could be improved with validated adherence questionnaires. Good adherence is necessary to achieve SVR and it is especially important with the new protease inhibitors drugs (boceprevir and telaprevir), due to the complexity of triple therapy, adverse reactions and the high cost. Therefore, hospital pharmacists should collaborate on it with pharmaceutical care clinics specialising in hepatitis C.

No conflict of interest.

CPC-063 HOW DO PHARMACISTS DOCUMENT AND TRANSMIT THEIR INTERVENTIONS? A SURVEY IN SEVERAL FRENCH-SPEAKING COUNTRIES

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Background The role of a clinical pharmacist in providing and transmitting drug information to other health professionals varies greatly between countries. There is no consensus on the most efficient way to document and transmit interventions and its effect on the implementation of recommendations in practise.
Purpose To describe and then compare the methodology of pharmacist's interventions (PIs) in each of the following French-speaking countries: France, Switzerland, Belgium and Quebec.
Materials and Methods 527 on-line questionnaires were distributed (276 in France, 47 in Switzerland, 92 in Belgium, and 112 in Quebec). They contained 36 questions about clinical pharmacy work, the ways of transmitting information and its documentation in the patient record.
Results 160 hospitals answered (total 30.3%; France 33.7%, Switzerland 44.7%, Belgium 23.9%, Quebec 21.4%). In the Swiss hospitals, only 47.4% of pharmacists analysed pharmaceutical prescriptions while 97.4% did in France, 76.5% in Belgium and 100% in Quebec. The same trend could be seen while examining the pharmacist's presence on the wards: 42.1% in Switzerland, 58.4% in France, 85.7% in Belgium and 88.2% in Quebec.

Communications channels for PIs also differed depending on countries: Swiss pharmacists mainly used the phone (56.7% of the cases), followed by personal visits (30.7%). In France and Quebec the preferred methods were writing notes in the patient's record in respectively 39.1% and 36.4% of the cases, followed by phone calls in 25.4% and 32.4%. In Belgium, the communication of PIs was most frequently done through personal visits (40%).
Conclusions Pharmacist's interventions in terms of ways of transmitting drug information and its documentation differ among the 4 countries. Differences in the pharmacist's integration into the ward teams, access to the patient record file and to the medical prescription probably explain the heterogeneity of our results.

No conflict of interest.

CPC-064 HOW IS IT BEST TO REPORT PHARMACEUTICAL INTERVENTIONS TO A MEDICAL TEAM? A CLINICAL RELEVANCE ASSESSMENT

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Background The clinical pharmacy department has recently started working with the medical team of the infectious and tropical diseases department. A pharmacy student, supervised by a clinical pharmacist, cheques 28 patient prescriptions daily.
Purpose To evaluate the impact and quality of pharmaceutical interventions (PIs) issued over a period of 8 months.
Materials and Methods All interventions are recorded and coded according to the criteria defined by the working group of the French Society of Clinical Pharmacy [1]. A note of the relevance is attributed by the pharmacist to each PI, according to Bayliff and Einarson's scale [2].
Results In total, 1947 paper prescriptions were analysed. During this period, 980 patients were hospitalised, 133 (13.6%) were identified as having 209 PIs. Physicians accepted 168 interventions (80%), of which the pharmacist quantified the clinical relevance. A very significant clinical impact (level 2) was attributed to 36 PIs (21.5%), a significant clinical impact (level 1) to 77 (46%) and 54 PIs (32.5%) had an informative objective (level 0). No interventions had a vital clinical impact (level 3).

For each level of relevance, the distribution of PIs was described according to the type of drug-related problems on the one hand and the type of pharmacists' recommendations on the other hand. Highlighting the clinical impact of PIs increased the interest of physicians in pharmaceutical work. Consequently, they asked for pharmaceutical reports more frequently (twice a month instead of once a year).
Conclusions The results reinforce the idea that a regular presence in care encourages collaboration between pharmacists and health care teams.
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No conflict of interest.

CPC-065 HOW TO ASSESS MEDICATION ADHERENCE AMONG PATIENTS WITH RESISTANT HYPERTENSION TREATED WITH TWO DIFFERENT PHARMACOLOGICAL INTENSIFICATION STRATEGIES

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Background Non-adherence to medicines and lifestyle are the main contributors to resistance to antihypertensive treatment (AHT). Various measures to assess medicines adherence (MA) among patients with resistant hypertension (RH) have been proposed but none is fully effective.
Purpose To assess MA with a new scoring system in RH patients included in a randomised controlled trial and the characteristics associated with low MA.
Materials and Methods Patients with RH on 4 week-treatment with irbesartan 300 mg + hydrochlorothiazide 12.5 mg + amlodipine 5 mg, were randomised to either reinforcement of sodium depletion by sequential administration of spironolactone and other diuretics (AB group, n = 82) or reinforcement of renin angiotensin system blockade by sequential administration of ramipril 5–10 mg and bisoprolol 5–10 mg (RB group, n = 82) for 12 weeks. In accordance with the literature, 4 methods were used to evaluate MA: 1/ measurement of plasma irbesartan concentration (HPLC); 2/measurement of urinary AcSDKP/creatinine ratio (UR) to evaluate ACE inhibitor exposure; 3/last dose of medicine taken before visit; 4/pill

counting (MA ratio = real/theoretical doses taken). One point (+1 point score) was attributed for MA if: Irb >20 ng/ml or UR >4 nmol/mmol or last dose had been taken <24 h before visit or MA ratio >80%. Three MA levels were assigned: low MA (score <2), intermediate MA (score +3), and sufficient MA (score + 4).
Results Only 82 patients were sufficiently adherent: 46 and 36 patients among the AB and RB groups, respectively. 52 had intermediate MA (23 and 29, respectively); 30 had low MA (13 and 17, respectively) (inter-groups difference NS). Patients with low MA were younger than sufficient MA patients (50 ± 11 vs. 56 ± 10 yrs, $p < 0.011$); no difference was ascribed to gender or dASBP (152 ± 14 vs. 148 ± 12 mmHg, $p = 0.16$). Other clinical characteristics did not differ except the glomerular filtration rate: lower among adherent patients than low MA patients (95 ± 25 vs. 107 ± 28 ml/min, $p < 0.02$).
Conclusions We propose a score of 3 MA levels (low, intermediate, sufficient) based on 4 complementary quantitative and qualitative methods. A combination approach is essential to balance imprecision of observed data. There were no differences in major clinical characteristics between groups. Further comparisons into each group of treatment and longer duration of treatment might be necessary to observe a significant differential effect among MA groups. Therapeutic education sessions could be useful for RH patients who undertake complex treatment.

No conflict of interest.

CPC-066 IDENTIFICATION OF PATIENT GROUPS WITH INSUFFICIENT KNOWLEDGE ABOUT THEIR MEDICINES AT HOSPITAL DISCHARGE

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Background Hospital patients in Serbia receive information about their medicines from physicians and nurses. Pharmacists are not involved in medicines counselling. In countries with developed health care, pharmacists provide counselling to patients at discharge.
Purpose To establish which groups of hospital patients got the least information about their medicines, since these patients could profit from additional counselling at discharge, provided by pharmacists.
Materials and Methods The study was carried out in five hospitals in Serbia, over a period of 8 weeks. Pharmacists collected clinical data from the patient's medical notes. Patients' knowledge of medicines was assessed through an interview using a structured questionnaire, on the morning of discharge. We evaluated 3 groups of patients according to age, length of hospital stay and number of newly-introduced medicines. They were asked seven questions: if they were informed about all medicines, reasons for treatment, the effects of the drug, duration of treatment, posology and method of administration, undesirable effects and interactions. 'Yes' was awarded two points, 'partially' one and 'no' no points. A total ≤10 of all answers per patient was defined as insufficient knowledge.
Results 148 patients (mean age 60 years) were interviewed. 74% of patients younger than 65 years and 89% of elder patients showed insufficient knowledge. Length of hospital stay had impact on patient knowledge. 70% who stayed more than 20 days had insufficient knowledge vs. 85% who were hospitalised less than 10 days. Insufficient knowledge increased with number of newly-introduced medicines (80% who had 1 vs. 96% who had ≥5 new drugs on discharge).
Conclusions The findings of this study indicate that older patients, those who stay less time in hospital and those who receive more new drugs on discharge need to get more counselling about their treatment. Serbian pharmacists can take a proactive role for these patients.

No conflict of interest.

CPC-067 IMPACT OF A MULTIDISCIPLINARY TEAM ON THE PROPER USE OF CARBAPENEMS: BEFORE/AFTER SURVEY AT TENON HOSPITAL

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Background The optimization of antibiotic therapy has become a major issue. Indeed, the evolution of bacterial resistance requires prescribers to reserve use of antibiotics and especially carbapenems. Various bodies have made recommendations to improve antibiotic regimens and thus preserve the effectiveness of these major antibiotics. At Tenon Hospital, a multidisciplinary unit was created in May 2011. It includes clinicians, bacteriologists, hygienists and pharmacists. Meropenem and ertapenem were already controlled whereas imipenem and doripenem were given without restrictions before May 2011.
Purpose To assess the impact of this new organisation, a study compared the requirements for carbapenems before and after the antibiotic management team was created.
Materials and Methods All patients who received at least one dose of carbapenem were included. Bacteriological and biological characteristics of each patient were found. The compliance of each prescription with the available guidelines was assessed studying the duration of treatment, dose and indications. Two periods were defined: the first between January 2009 and September 2010 and the second between June 2011 and May 2012.
Results Duration of the treatment was the single criteria that had changed for ertapenem and meropenem. The impact of this team is greater for the prescriptions of doripenem and imipenem. Establishment of that team shortened the duration of treatment: 2 days for doripenem and 4 days for imipenem. The number of unjustified prescriptions of imipenem decreased from 45% to 5% for empirical treatments and from 51% to 20% for documented treatments.
Conclusions Reduced length of treatment is important and reduces the selection pressure. This explains why carbapenem-resistant bacteria have been isolated only four times in the past year. Results obtained are similar to those obtained in two Parisian hospitals.

No conflict of interest.

CPC-068 IMPACT OF OPTIMISING PRESCRIPTIONS TO REDUCE THE RISK OF FALLS IN ELDERLY PEOPLE

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Background The increase in life expectancy increases the risk of falls, leading to dependence and death. Some studies have shown a link between inappropriate prescriptions and falls.
Purpose The main objective of this study was to evaluate if we could reduce falls and potentially readmissions by optimising the prescription of drugs in elderly people.
Materials and Methods From May to December 2011, we enrolled patients admitted for falls in a geriatric post-acute care

unit. For each patient, we detected potentially inappropriate medication (overuse, misuse and underuse) depending on the chronic conditions and suggested drug modifications to the general practitioner (GP). Three months after discharge, we phoned the GPs to find out if the pharmaceutical interventions had been accepted or not, and if patients had fallen again.

Results 96 patients (65% of women; median age 85 years) were admitted for falls due to medicines. 86% of the patients were living at home. Medicines involved with the risk of falling were essentially diuretics, benzodiazepines, calcium inhibitors, antiarrhythmics, sartans, anticholinesterases. The modifications usually suggested related to diuretics, benzodiazepines, anticholinergics, vitamin-calcium supplements, osteoporosis treatment and the use of stockings. Among patients called three months later, 75% of the suggestions were still respected, but 29% of the patients had fallen again. There was no difference in the number of falls for patients for whom the modifications had been respected and those for whom they had not been.

Conclusions This study suggested that falls were more frequent among patients living at home; work needs to be done to secure elderly people's houses. The importance of inappropriate prescriptions on fall events was also underlined. Falls occurred because of multifactorial mechanisms: inappropriate home fittings, sarcopenia, neurodegenerative diseases and inappropriate medicines. One way of reducing the risk of falling in elderly people is to improve the medication.

No conflict of interest.

CPC-069 IMPLEMENTATION OF A CLINICAL PHARMACY AND MEDICINES DISPENSING SERVICE IN A CHEMOTHERAPY DAY TREATMENT UNIT

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Background Cancer patients at the Oxford University Hospitals NHS Trust receive the majority of their chemotherapy treatments as daycase patients. The clinical pharmacy service provision to patients receiving chemotherapy did not move with the patients from the inpatient to the daycase setting. The lack of clinical pharmacy provision to the day treatment unit (DTU) resulted in medicines wastage and an increase in nursing time to educate patients on their medication.

Purpose The pharmacy service to the DTU was reconfigured to provide a clinical pharmacy and medicines management service, and to dispense medicines as pre-packs at the patients' bedside.

Materials and Methods One pharmacist and half of a technician were funded from cost savings to implement the new service. Medication record cards were developed for each supportive regimen as a counselling aid to patients. A patient satisfaction survey was undertaken prior to initiating the new service, and two months after initiation. Drug expenditure and medicine wastage savings were recorded prior to and two months after implementation of the service. A satellite pharmacy was set up to dispense medicines next to the DTU. A trolley was used to dispense pre-packs at the bedside. Data was collected prior to and two months after initiation of the new service to assess patient satisfaction, impact on nursing time, medicines wastage and savings.

Results It was anticipated that approximately £25,000 [€31,000] per month would be saved on medicines wastage. Patients were very satisfied with the new service. The service resulted in a reduction in nursing time of 37.5 hours/week. The results of the service impact after two months will be presented.

Conclusions The DTU pharmacy service ensures medicines optimisation, reduces medicines expenditure, and improves the quality of patient care. Patients receiving chemotherapy as inpatients always benefited from a clinical pharmacy service, so it is appropriate to provide this service in the day case setting.

No conflict of interest.

CPC-070 IMPORTANCE OF RESIDUAL INVESTIGATIONAL MEDICINAL PRODUCT COUNT

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Background Good Clinical Practice specifies the role of the pharmacist in clinical trials. For each prescription dispensed for a named patient, the pharmacist is responsible for educating the patient on the treatment, counting any residual Investigational Medicinal Product (IMP), and thus for evaluating the compliance.

Purpose To assess the importance of pharmaceutical vigilance about IMPs.

Materials and Methods This prospective study took three months. For each named-patient prescription dispensed, a count of returned treatment (RT) by the patient from the previously dispensed medicines was performed to assess compliance.

Results 117 RTs were analysed. 43 additional RTs from 1 clinical trial were not included in this study due to the impossibility of evaluating compliance (posology changes not notified to the pharmacy and unsuitable secondary packaging). The non-conformity rate was 20% (23 RT). 39% (n = 9) of the non conformities (NC) were due to allowing empty boxes not to be returned. In 61% (n = 14) of NC there was a discrepancy between the expected count of returned IMPs and the one actually made, showing poor compliance.

Average counting time was 12 minutes (5–30 min).

An exact count of returned IMP was operated during dispensing for 34% of returns and after dispensing for 66%. In all cases, a global analysis was performed before the prescription was dispensed.

Conclusions This study points out the major role of the pharmacist in the education of the patient enrolled in clinical trials, about the return of all experimental medicines and the therapeutic schedule. It appeared very important to evaluate compliance while the pharmacist was dispensing the next prescription, independently of the time consumed, in order to correct possible errors in taking the medicines at that time.

No conflict of interest.

CPC-071 INCIDENCE AND CAUSES OF CAPECITABINE DOSE ADJUSTMENT IN COLON CANCER PATIENTS

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Background Capecitabine is indicated in colon cancer alone or in combination. Recommended posology is calculated with reference to the body surface area (BSA) and pharmacotherapeutic regimen, although adjustments can be made if drug-related toxicity occurs.

Purpose To describe the incidence of capecitabine dose adjustment in colon cancer patients (CCPs). To analyse the reasons for this adjustment.

Materials and Methods Retrospective observational study of 49 CCPs treated with capecitabine with at least 3 cycles of 14 days from June 2011 to February 2012. Data were collected from the dispensary and medical history. The severity of the toxicity was classified according to the CTCAEv.4.

Results Fourty-nine patients were enrolled: 25 male, average age of 61 (34–82), average BSA of 1.75 m^2. Most of them presented ECOG0 (26 patients) at the beginning of the treatment, followed by ECOG1

(18 patients). The average follow up was 4 months. Most of the patients were treated with capecitabine-oxaliplatin, followed by those treated with capecitabine monotherapy and other minority schemes (cyclophosphamide or bevacizumab). The median starting dose of capecitabine was 3300 mg.

32% of patients required a dose adjustment (delay and/or dose reduction) during the follow-up period. The treatment of 26% of patients was delayed by an average of 16 days (2 of the patients had to delay 2 cycles). The initial dose was reduced in 24% of patients (twice in three of the patients).

Toxicity in any grade was reported by 30% of the patients. Severe toxicities (grade 3 of CTCAE) were sickness and neutropenia. Most frequent toxicities were gastrointestinal side effects (6 patients) and grade 2 hand-foot syndrome (4 patients), followed by mucositis, skin side effects, hyperbilirubinaemia and thrombopenia.

Toxicity and dose adjustment were not statistically related to the treatment regimen, ECOG, gender or age.

Conclusions The toxicity profile was consistent with the trials. 81% of patients who had a dose adjustment didn't need a further dose reduction.

No conflict of interest.

CPC-072 INCLUSION OF PHARMACOGENETICS STUDIES, PATIENT-REPORTED OUTCOMES AND COST MEASURES IN CLINICAL TRIALS; VARIABLES ADDED IN RECENT YEARS

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Background Pharmacogenetic studies analyse the variability of drug response; patient-reported outcome (PRO) measures complement traditional measures. Pharmacoeconomic studies tell us the efficiency of different therapeutic alternatives.

Purpose To evaluate the use of PRO measures, including health-related quality of life questionnaires (HRQoLQ), and the frequency of inclusion of pharmacogenetics studies and economic variables in the design of clinical trials (CT) and observational studies (ST). For CT, the quality of the study design was also measured.

Materials and Methods Observational study of CT and ST approved by a Clinical Research Ethics Committee (active between Jan/2008–May/2012). Information recorded: medical specialty, pathology, methodological quality (Jadad scale: 0–5), inclusion of PRO, HRQoLQ, pharmacogenetics studies (collection or not of human biological samples) and economic variables (use of health-care resources and/or indirect costs defined as the number of days lost due to sick leave of patients and caregivers). The information was systematically collected by 2 reviewers and checked by a third if discrepancies arose.

Results Ninety-four protocols (79CTs, 15ST) were analysed; 51 included PRO measures (54.3%), 44 CT (38 had HRQoLQ) and 7 ST (6 had HRQoLQ). Analysis by area showed PRO measures were most commonly studied in: endocrinology, neurology, digestive diseases and cardiology. The average quality score was 3.04. 31 studies incorporated pharmacogenetics studies, which were less frequent before 2010 than after (45.3% versus 65.4%). In 50% of the pharmacogenetics studies the storage of collected human biological material in biobanks was planned with the objective of conducting studies about drugs responses according to the genetic endowment. Twenty (25%) CTs and two (18.2%) STs included economic variables.

Conclusions The evaluation of economic variables in CTs and STs was low. More than half of the protocols included PRO measures, reflecting the importance of these parameters. Increasing knowledge of pharmacogenetics has resulted in a higher inclusion of these studies in more recent CTs. The average quality for the CT exceeded the value 3, indicating that studies analysed were of reasonable quality.

No conflict of interest.

CPC-073 INFLUENCE OF FIRST-LINE EGFR THERAPY ON SURVIVAL AND MORTALITY RATES IN NON-SMALL CELL LUNG CANCER

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Background The efficacy of chemotherapy has reached a plateau for advanced non-small cell lung cancer (NSCLC). Increasing evidence has demonstrated that patients with sensitising mutations in the epidermal growth factor receptor (EGFR) are associated with sensitivity to reversible EGFR tyrosine kinase inhibitors (TKIs). Numerous studies have demonstrated improvement of progression-free survival compared to conventional chemotherapy as first-line treatment for advanced NSCLC with EGFR mutations.

Purpose To evaluate mortality and overall survival (OS) in NSCLC patients treated with EGFR-TKIs or chemotherapy according to their EGFR status.

Materials and Methods Retrospective study. Sixty-one patients diagnosed with NSCLC and available EGFR status during 2008–2012 were included. Socio-demographic, clinical and pharmacological characteristics of patients were collected. Comparison of medians by Mann-Whitney-Wilcoxon Test for numerical variables and Chi-Square Test for categorical variables was performed.

Results Mean age was 62 ± 12years; 52.5% (32/61) male; 70.5% (43/61) smokers/ex-smokers; 60.7% (37/61) stage IV; 42.6% (23/54) mutant EGFR. Minimum follow-up of 6 months was accomplished in 54 patients.

An EGFR-TKI was prescribed as first-line treatment in 65.2% (15/23) EGFR-positive patients, 80.0% (12/15) stage IV, with an OS of 12.40[11.30–23.33] months and 53.3% (8/15) deaths. Two patients required second-line chemotherapy (2/15; 13.3%).

Chemotherapy as first-line treatment was prescribed in 75% patients (46/61), 17% EGFR-positive (8/46), 50.0% (4/8) stage IV, with 29% (2/7) deaths. EGFR-TKIs were used as second-line treatment in 87.5% (7/8) patients and third-line in 12.5% (1/8). OS was 17.97[8.83–60.84] months.

EGFR was native in 67.4% (31/46) patients, 58.1% (18/31) stage IV, and 61.3% (19/31) deaths. EGFR-TKIs as second-line treatment were prescribed in 61.3%. (19/31) patients, third-line in 35.5% (11/31) and fourth-line in 3.2% (1/31).

Seven patients had unknown EGFR status (7/61; 11.5%), 57.1% (4/7) stage IV, and 42.8% (3/7) deaths. EGFR-TKI as second-line treatment was prescribed in 85.7% (6/7) patients and fourth-line treatment in 14.3% (1/7).

OS and mortality were not statistically different between EGFR-positive patients treated with EGFR-TKIs/chemotherapy as first-line treatment ($P = 0.836$; $p = 0.105$). Mortality was not associated with stage or EGFR status ($P = 0.086$; $p = 1.000$).

Conclusions Mortality and OS are not associated with EGFR status or stage in this NSCLC population. EGFR-positive patients present similar OS and mortality rates regardless of first-line treatment.

No conflict of interest.

CPC-074 INTENSIVE MONITORING OF ADVERSE REACTIONS IN ONCOHEMATOLOGY: PROJECT FARMAREL

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Background The Pharmacy Department is involved in providing information and recording adverse drug reactions (ADRs) in the national system. The Oncology/Day Hospital provides clinical data. This study increases the culture of safety and security of processing through the collection of data, helping to give statistical and epidemiological value to otherwise casual observations.
Purpose To detect adverse drugs events in oncohaematology in a systematic and timely manner: the FARMAREL project.
Materials and Methods Following the training sessions at the regional level, meetings were held every three months, to monitor progress and analyse any problems found. All haematological patients treated from April 2009 to July 2012 were monitored and if ADRs occurred, a team of physicians and pharmacists analysed the event according to the World Health Organization definition.

The ADRs observed were posted to the network using special software, set up specifically to allow computerization and real-time monitoring progress of the project, as well as statistical analysis of epidemiological data.
Results We reported a total of 74 cases, categorised by the severity of adverse events (38 not severe, 3 deaths, 3 life-threatening, 30 hospitalizations or extended hospitalisation). Among the ADRs reported the most significant clinical cases in terms of severity were: Gram-negative septic shock (suspect drug: thalidomide), intestinal infarction (bortezomib), acute renal failure (amphotericin B); hypokinetic cardiomyopathy (doxorubicin); atrioventricular conduction block (lenalidomide). The most significant case studies were presented and discussed with other participating hospitals during a meeting of Lombardy Region, and in a national conference.
Conclusions The study has increased the culture of pharmacovigilance and awareness of the clinical data constituting ADRs. The present evaluation has revealed opportunities for intervention especially for the preventable ADRs which will help in promoting safer drug use.

No conflict of interest.

CPC-075 INTERDISCIPLINARY TASKFORCE BRINGS DOWN PRICE OF HIV DRUGS!

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Background The board in the Danish Regions decided on a new specialist consultancy structure called 'The Council for Use of Expensive Hospital Medicine' (RADS). The aim of RADS is to help standardise the rational use of medicine throughout Denmark, to be achieved primarily by setting guidelines for the use of expensive hospital medicine at the clinical level. The intention is to obtain the best healthcare in relation to expenditure whilst ensuring a high quality of treatment.
Purpose The purpose of this study was to identify an effective way of implementing the RADS guidelines in a multi-centred clinical practise and optimise the pressure on the pricing of the drugs concerned. This was exemplified using data on HIV treatment.
Materials and Methods The task was to change the HIV-treatment from a triple compound to three single compounds. To implement the RADS guidelines, the Capital Regional Pharmacy formed a taskforce consisting of the pharmacy director, top leaders from logistics and clinical pharmaceutical services, IT-department and a data-expert on medication use analysis. The implementation of the HIV-guideline was followed in each clinic during which time the leadership was in close dialogue with the clinicians. Feedback on actual prescribing behaviour was supplied every month to the responsible clinician.
Results The national goal for guidelines implementation was 95%. At 98% the Capital Region has the highest rate for guidelines implementation in Denmark. Following the next tender and one year after guidelines implementation, the price of the triple compound had dropped by 16%. Result – the price of the clinicians' first choice medicine was acceptable to the Region.
Conclusions The interdisciplinary taskforce achieved its goals. Intensive monitoring and feedback to the clinician in charge, followed by direct management involvement and support at all centres, is an effective implementation strategy.

No conflict of interest.

CPC-076 INTERNAL AUDIT ON THE LABELLING OF INVESTIGATIONAL MEDICINAL PRODUCTS

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Background The purpose of labelling is to protect persons who take part to biomedical research. It must enable the product and study to be identified and the drugs to be used safely. The decree of 24 May 2006 [1] sets out the information to be included on the labelling of investigational medical product (IMPs).
Purpose To evaluate the regulatory conformity of the labelling of IMPs.
Materials and Methods An assessment grid was established from the decree of 24 May 2006. This audit investigated the labelling of the primary or secondary packaging, according to the presentation, of 135 IMPs corresponding to 75 clinical trials.
Results Of 135 labels analysed, only 11 (8.1%) bore all the information required by the legislation. On 3 labels, information didn't appear in French. In more than 5% of the cases, information allowing identification of the product and the study and the good use of the drugs was absent from label. In other cases the following was missing: pharmaceutical form (15.4%), route of administration (15.3%), content of the active substance (11.6%), product identification (6.88%), clinical trial reference (6.88%), patient visit number (71.9%) and storage conditions (14.4%). 57.8% of the labels came in layers. Basic information was not present on the first layer in 26.1% of the cases for the pharmaceutical form, route of administration (55.9%), dosage (13.8%), product identification (11.7%) or storage conditions (45.8%).
Conclusions In spite of important and rigorous regulation, we noted non-conformities in labelling with sometimes important omissions. The significant number of statements required to appear on the label leads sponsors to reduce font size and to present the labels in layers. This audit highlights that the significant amount of information on the label makes it difficult to read and can lead to medicines errors, especially in elderly patients.
Reference

1. Order of 24 May 2006 establishing the content for the labelling of investigational medicinal products published in France's official journal on 30 May 2006.

No conflict of interest.

CPC-077 INVOLVING PHARMACY TECHNICIANS IN MEDICINES RECONCILIATION IN THE EMERGENCY DEPARTMENT: WHAT CAN WE EXPECT?

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Background In 2011, the Centre Hospitalier de Valenciennes Emergency Department (ED) treated an average of 140 patients per day, and 38.8% of these patients were hospitalised. Thus, 54 patients a day were eligible for medicines reconciliation at admission.

A previous study showed that the medicines reconciliation of 46.4% of the patients admitted at the Centre Hospitalier de

Valenciennes ED was incorrect, and that pharmacists' involvement could improve information gathering about home medicines.

During the study, pharmacists did not find any discrepancies with home meds or any drug-related problems (DRPs) in 38.2% of the patients. Pharmacists did not add value for these patients.

Separately, the Centre Hospitalier de Valenciennes pharmacy has automated the drug dispensing process. As a result, pharmacy technicians have expressed their reluctance to only work with a machine, fearing they might lose part of their skills in medicines management.

Before this problem arose, it has been proposed that technicians take part in medicines reconciliation in the ED.

Purpose To assess which tasks could be conducted by a pharmacy technician in medicines reconciliation.

Materials and Methods Technicians were present at the ED with a pharmacist. Technicians conducted standardised procedures, such as contacting the community pharmacy or assessing patients' compliance according to scores, and reported the conclusions to the pharmacist.

Results Pharmacy technicians had a strong incentive to get involved, as it refreshed their knowledge of medicines management. Moreover, it helped pharmacist to reconcile more patients in the ED, and to focus on patients with DRPs.

However, pharmacy technicians need to be trained on how to detect DRPs, such as therapeutic escalation, and on how to conduct a patient interview.

Conclusions Involving pharmacy technicians in medicines reconciliation may help the pharmacist in the ED, and allow the technicians to keep up their medicines management skills.

No conflict of interest.

CPC-078 IPILIMUMAB FOR ADVANCED MELANOMA: DRUG USE REVIEW

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Background Ipilimumab is a recombinant, fully human monoclonal antibody (IgG1) which blocks the inhibitory effects of cytotoxic T-lymphocyte antigen 4 (CTLA4), a negative regulator of T-cell activation. It has been approved for the treatment of unresectable or metastatic melanoma in patients who have failed or do not tolerate other systemic treatment for advanced disease.

Purpose To review the effectiveness and safety profile of ipilimumab in the treatment of adult patients with advanced melanoma.

Materials and Methods Medical record review and retrospective analysis (January 2011 to September 2012) of prescriptions recorded in the Integral Oncology Patient Information System (ONCOBASS) in a teaching general hospital. Previous drug use, dose, line of chemotherapy, number of cycles administered, objective response rate and toxicity were analysed.

Results A total of 5 patients with metastatic melanoma were prescribed ipilimumab (2 male, 3 female), median age 45 (36–60). The 4 cycles of treatment planned were completed by 3 patients, 1 continues in active treatment at the moment of finishing this study and the other one has been lost to follow-up due to change of hospital.

In the group of four patients who received treatment, 2 were prescribed ipilimumab as a second line after failure of a temozolomide-based regimen, and 2 were prescribed ipilimumab as third line after two regimens based on immunotherapy, temozolomide or vemurafenib.

After completing the 4 cycles planned, 1 patient maintained complete response (16 months) and 1 patient showed stable disease (maintained for 5 months), and the other one is in evaluation.

No patients suffered grade 3–4 toxicity and the treatment was well tolerated.

Conclusions Ipilimumab has shown effectiveness and safety in the treatment of unresectable or metastatic melanoma in patients who have failed or do not tolerate other systemic treatment for advanced disease in our patients, although data from more patients and longer-term studies are required.

No conflict of interest.

CPC-079 MANAGEMENT OF MYELODISPLASTIC SYNDROMES AND LYMPHOMAS: THE EXAMPLE OF LENALIDOMIDE

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Background At our centre, haematologists and department pharmacists constantly monitor outcomes and safety of treatment with lenalidomide.

Purpose To describe clinical outcomes and safety of lenalidomide in our lymphoma and myelodysplastic syndrome patients.

Materials and Methods Onco-AIFA Registry and medical records were checked as of 30/06/2012 for diagnosis, duration of treatment, incidence of adverse drug events (ADRs).

Results Data of 34 patients were reviewed, with the following diagnoses: Diffuse large B-cell lymphoma (DLBCL), 24 patients; 5q-myelodysplastic syndrome (MDS5q-), 11 patients and mantle cell lymphoma (MCL), one patient.

Of patients with DLBCL, one discontinued treatment because of serious ADRs, two because of death and 4 for disease progression after an average of 4.4 treatment cycles, corresponding to 7 months (range: 2–18).

Of patients with MDS5q-, 8 stopped treatment, two of whom because of disease progression or death and two for toxicity. The median duration of treatment was 11.8 cycles (range 1–29).

Seventeen DLBCL patients and 3 MDS5q- patients are still on therapy.

34 non-serious ADRs relating to 14 patients and 5 serious ADRs relating to 4 patients were reported, two of which were cases of development of solid neoplasia. Non-serious ADRs were mostly cases of haematological toxicity, alterations of the skin and of nervous system and infections.

Conclusions Lenalidomide seems to control the disease in patients with MDS5q- for long periods, while the Time to Progression in patients with DLBCL appears shorter.

The treatment-related toxicity appears in most cases acceptable.

Despite the limited number of data, our analysis highlights the need for close monitoring of the patients both during treatment and on follow-up, as evidenced by the two cases of onset of neoplasia.

The progressive collection of data is providing the haematologists and pharmacists the information to design a model for optimised appropriate treatment with lenalidomide.

No conflict of interest.

CPC-080 MANAGEMENT OF POSTOPERATIVE PAIN AT MOHAMMED V MILITARY TEACHING HOSPITAL, RABAT, MOROCCO

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Background Management of postoperative pain is a subject of interest as we believe that pain is still inadequately relieved in this population.
Purpose To describe methods of postoperative pain management in anaesthesia-resuscitation and surgery services of Mohammed V Military Teaching Hospital in Rabat.
Materials and Methods A questionnaire was distributed to our hospital anaesthesia-resuscitation doctors and surgeons. The questionnaire was designed to explore the evaluation, treatment and provision of postoperative pain prevention.
Results 27 answers (78%) were obtained. 9 services stated that this was making them aware of the problem of postoperative pain management. 81.5% of the professionals didn't have a written protocol. Postoperative pain was only evaluated in 32% of the patients. Among the methods used for postoperative pain measurement in post-surgical care units, simple verbal scales were the most used by professionals (29.6%), followed by an analogue visual scale (25.9%). Paracetamol was the drug most used in pain treatment.
Conclusions Although our investigation generated fairly satisfactory results, our hospital professionals must give greater importance to postoperative pain management in order to improve their patients' pain relief.

No conflict of interest.

CPC-081 MANAGEMENT OF SEVERE ANAEMIA WITH RECOMBINANT HUMAN ERYTHROPOIETIN IN A JEHOVAH'S WITNESS PATIENT: CASE REPORT AND REVIEW OF LITERATURE

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Background The medical care of Jehovah's Witness patients, because they refuse blood transfusion, becomes problematic in cases of severe life-threatening anaemia.
Purpose To describe the case of a patient with severe anaemia who received erythropoietin (EPO) treatment as the result of a literature review.
Materials and Methods A 77-year old woman was sent to the emergency department with thoracoepigastric pain, blood clots and vomiting for a week. Cardiac examination revealed a coronary syndrome caused by gastrointestinally-induced anaemia at 5.6 g/dl (haematocrit = 18.9%). On day 3 the haemoglobin fell to 4 g/dl (haematocrit = 14.4%) upon which a treatment with EPO beta at 30,000 IU per week (380 IU/kg/week) associated with high intravenous iron supplementation (300 mg/48 hours) was instituted. After 16 days of treatment haemoglobin (8.9 g/dl) and haematocrit (31.6%) had doubled and clinical improvement was observed. The patient was discharged on day 22 of treatment with a total of 4 EPO injections (haemoglobin = 9.6 g/dl).
Results Currently in emergency there is no alternative to transfusion and a higher mortality is linked to a low haemoglobin level. In a multicentre study with 148 patients, Georgopoulos *et al*, showed the efficacy of EPO, used off-label, administered once weekly, to reduce transfusions.

Thirteen recent publications reported experiences with the intravenous or subcutaneous administration of EPO in anaemia treatment. The optimal dose of EPO remains unclear: dosage ranges from 200 μg/week darbepoetin alfa (Gutierrez *et al*), to 130 IU/kg of EPO three times weekly (Walton *et al*), to 600 Iu/kg/day for 2 days to 300 IU/kg/day (Cothren *et al*). After starting treatment the haemoglobin level doubled in 19 days (in an average of 4 days–30 days).

Conclusions Our weekly EPO protocol is in the lower targets found in the literature but it appears as effective as other protocols. Significant variability without a major difference in efficacy appears when EPO is used for Jehovah's Witness patients, but EPO may provide an alternative treatment in life-threatening anaemia, when blood transfusions are not accepted.

No conflict of interest.

CPC-082 MEASURING EFFECTIVITY: PHARMACEUTICAL INTERVENTIONS THROUGH COMPUTERISED PHYSICIAN ORDER ENTRY VERSUS DIRECT PHONE CALLS

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Background Computerized physician order entry (CPOE) implementation in hospitals has become an important tool for interactive validation of medical orders as well as a facilitator for pharmacist interventions. However several studies have investigated the 'alert fatigue' phenomenon caused by an elevated number or recommendations which can lead to relevant clinical interventions being bypassed.
Purpose To compare the degree of acceptance of pharmacist's interventions after medical order validation using CPOE versus direct phone conversation with the physician.
Materials and Methods Observational, descriptive and prospective study from May to August 2012.

The intervention chosen for comparing the systems was FDA recommendation for simvastatin use regarding contraindications and maximum recommended doses. Interventions were generated using a quasi-random allocation method and physicians could refuse recommendations.

When an intervention assigned to the telephone call group was not possible, CPOE was used as a second option. Acceptance of recommendations and time to modifications of the prescriptions were recorded.
Results Phone call: only 34 of 42 attempted interventions were possible due to the prescriber's unavailability.

CPOE: 46 interventions and 54 interventions in total after the first attempt by phone call.

Rate of recommendations accepted was 82% for phone calls while only 52% of CPOE interventions.

Time to medical order modification since intervention was 0.26 days for the phone call group versus 2.18 days for CPOE group.
Conclusions CPOE is a useful tool for pharmacists to communicate with the multidisciplinary patient care team but when a relevant clinical intervention is necessary direct phone calls to prescribers are more effective and quicker.

Abstract CPC-082 Table 1

Concomitant drug	Number of patients	Number of alerts made by CPOE	Recommendations accepted	Number of alerts made by phone	Recommendations accepted
Amiodarone	25	16	6(37%)	9	9(100%)
Amlodipine	26	15	9(60%)	11	7(64%)
Ciclosporin	1	1	1(100%)	–	–
Diltiazem	26	15	9(60%)	11	10(91%)
Gemfibrozil	2	1	1(100%)	1	1(100%)
Ketoconazole	1	1	1(100%)	–	–
Verapamil	7	5	1(20%)	2	1(50%)
Total	**87**	**54**	**28**	**34**	**28**
Ratio		**62%**	**52%**	**39%**	**82%**

No conflict of interest.

CPC-083 MEDICATION RECONCILIATION EXPERIENCE IN PSYCHIATRIC HOSPITALS, SAUDI ARABIA

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Background In 2006, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) started the new year with a mandate for accredited organisations to implement an innovative initiative: Medicines Reconciliation. The mandate attempted to address the 1.3 million iatrogenic adverse events that occur annually, many of which are related to medicines.

Medicines reconciliation is an effective process of reducing errors and harm associated with loss of medicines information, as patients transfer between wards (handovers). It may prevent up to 70% of all potential errors and 15% of all adverse drug events.

Literature investigation of medicines reconciliation is minimal in psychiatric hospitals.

Limited information is available about medicines reconciliation in psychiatric hospitals in Saudi Arabia.

Purpose To gain an insight into pharmacists' practise, knowledge and attitudes toward medicines reconciliation in psychiatric hospitals and the most common challenges and barriers.

Materials and Methods We developed and administered a survey to the Director of Pharmacy at all psychiatric hospitals in Saudi Arabia (20 hospitals), The questionnaire was modified after piloting on 10 randomly-selected pharmacists working in psychiatric hospitals. The survey included scales measuring (1) pharmacists' attitudes towards medicines reconciliation, (2) pharmacists awareness of medicines reconciliation and (3) local practise in Saudi psychiatric hospitals.

Results Response rate: 90% of pharmacy directors in psychiatric hospitals in Saudi Arabia returned the survey, 70% indicated that they were familiar with the concept of medicines reconciliation and believed that medicines reconciliation represented an important safety intervention. Only 25% of pharmacy director had initiated medicines reconciliation in practise, and 40% did not believe that they had the necessary resources to manage discrepancies.

Conclusions Pharmacists had mixed attitudes toward implementation of medicines reconciliation services due to the limited patient transfer between wards or between care (acute and ambulatory) in psychiatric hospitals; on the other hand they believed that medicines reconciliation would improve patient safety and result in a better therapeutic outcome. Pharmacists were willing to practise medicines reconciliation if they could be trained.

No conflict of interest.

CPC-084 MEDICATION REVIEWS BY CLINICAL PHARMACISTS AT HOSPITALS LEAD TO IMPROVED PATIENT OUTCOMES: A SYSTEMATIC REVIEW

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Background Suboptimal use of medicines may lead to morbidity, mortality and increased costs. In order to reduce unnecessary patient harm, an increasing number of hospitals have implemented pharmaceutical care interventions such as medicines reviews. Some recent studies indicate a positive effect of pharmacist-led medicines reviews in hospitals, but the quality and outcome measures vary among studies. Hence there is a need to compile evidence within this area.

Purpose To identify, assess and summarise the literature investigating the effect of pharmacist-led medicines reviews in hospitalised patients.

Materials and Methods Five databases were searched from their inception to 2011: MEDLINE, EMBASE, CINAHL, Web of Science (including a citation search of relevant papers) and the Cochrane Library. Relevant systematic reviews and personal archives were also hand-searched for studies for inclusion. Only original research papers published in English describing pharmacist-led medicines reviews in a hospital setting including a minimum of 100 patients were included in the final assessment.

Results A total of 836 research papers were identified and 30 publications were included in the study. Twenty studies were descriptive studies while ten studies were controlled to some extent. Only six studies were randomised controlled trials. Generally, the interventions were well implemented with acceptance rates between 39–100%. The key findings indicated positive effects on quality of prescribing, quality of life, readmission rates and emergency department visits, time to readmission and costs. However, no effect on survival rates was found in addition to several other statistically insignificant results.

Conclusions Only a few papers describing pharmacist-led medicines reviews in the hospital setting were designed as randomised controlled trials and were evaluated using hard endpoints. Future research within this area should be designed using rigorous methodology and include outcome measures for patient health outcomes.

No conflict of interest.

CPC-085 MEDICINES AND THEIR COSTS IN THE LAST SIX DAYS OF LIFE

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Background Palliative care provides many advantages to patients who face life-threatening illness. The five most common symptoms that usually occur in the last days of life are pain, nausea and vomiting, restlessness, dyspnoea and respiratory tract secretions. Supportive treatment for pain and symptom relief should be incorporated into treatment to address these issues.

Purpose The aim of this retrospective study was to compare the use of medicines in the last six days of life in patients treated according to a palliative or standard treatment pathway.

Materials and Methods Inclusion criteria were treatment at the Institute of Oncology, Ljubljana, Slovenia, within the last 6 days of life and the diagnosis of advanced or metastatic cancer. 25 patients were included in the palliative treatment pathway, whereas 25 were treated according to standard treatment pathway and served as a control group. Both groups were comparable in terms of the primary tumour site and median age of the patients.

Results The majority of patients in both groups received strong opioid analgesics. Other medicines to relieve symptoms, such as haloperidol, midazolam, dexamethasone, butylscopolamine and metoclopramide, were more likely to be administered in the palliative group. Polypharmacy was a common problem observed in both groups. However, patients treated according to the palliative treatment pathway received on average 10 medicines, whilst those in control group 14. The cost of medicines was 2.7-fold lower in the palliative group, 15€ compared to 42€ per patient per day. The difference was mainly attributed to unnecessary prescribing of low-molecular weight heparins, systemic antimicrobial medicines and parenteral nutrition.

Conclusions Palliative care is given to improve the quality of life of patients with serious or life-threatening disease, such as cancer. The goal is to prevent the symptoms and side effects of advanced disease, and not to cure. In our opinion, the essential medicines in palliative setting are analgesics, antiemetics, sedatives, anxiolytics and anticholinergics. Other, unnecessary, medicines should be omitted from the treatment.

No conflict of interest.

CPC-086 MIGLUSTAT OFF-LABEL IN A PAEDIATRIC FORMULATION FOR A RARE METABOLIC DISEASE: EARLY INFANTILE GM1 GANGLIOSIDOSIS

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Background GM1 gangliosidosis, a rare metabolic disease, is an autosomal recessive lysosomal storage disorder caused by a deficiency of beta-galactosidase, and characterised by the generalised accumulation of GM1 ganglioside. The most severe form, called type I or early infantile, progressively destroys the neurons and the cells of the spinal cord.

No pharmacological treatment is available at present and children affected by GM1 type I usually do not survive past the age of three.

Miglustat (N-butyldeoxynojirimycin) is an iminosugar and functions as a competitive and reversible inhibitor of glucosylceramide synthase, the initial enzyme in reactions resulting in the synthesis of most glycosphingolipids. It is indicated in lysosomal storage diseases and it had positive results in GM2 gangliosidosis.

Purpose To describe our experience in the 12-month treatment with an individual formulation of miglustat, for a patient affected by GM1 gangliosidosis.

Materials and Methods In July 2011 Regione-Marche Centre for Rare Diseases involved our Hospital Pharmacy (authorization, galenic compounding) in supplying miglustat for an 18-month-old child with type I GM1 gangliosidosis, who was clearly showing severe signs of the pathology, lacking any other therapy.

Miglustat is off-label for this indication, so the approval of the Ethics Committee was necessary with the duty to report results every three months.

Personalized capsules were prepared for the hospital and home administration, with different doses (from 30 mg/d to 210 mg/d in 3 doses). The capsules were prepared from Zavesca, exclusively using mannitol as excipient: lactose is to be avoided in GM1 gangliosidosis

Results Miglustat provided surprising results, but only in the first four weeks of treatment. Frequent infections and seizures, typical of the disease, occurred later.

Conclusions The treatment is still being used, but after 12 months, we are considering stopping it. It would be important to compare other experiences in order to better evaluate the effectiveness of the treatment.

No conflict of interest.

CPC-087 MONITORING ANTIEMETIC REGIMENS WITH APREPITANT IN CANCER PATIENTS

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Background After including aprepitant in the hospital's pharmacotherapy guide 5 years ago, we decided to cheque if it is being used as defined by the Drug and Therapeutics Committee, which approved its use after the failure of other antiemetic treatments.

Purpose To evaluate the use of aprepitant in the Oncology Department of our hospital.

Materials and Methods We used the cytostatic prescription programme (Oncofarm Farmis-version 9.0.0.27) and dispensing programme (AS-400) to obtain the patients treated with aprepitant. The study period was from May 2010 to December 2011.

Results A total of 52 patients (84% women) were prescribed aprepitant during the study period. The average age was 49 years (age range: 19–69 years). The following data were collected: diagnosis and stage of disease, chemotherapy scheme, anti-emesis change cycle number, combination with radiotherapy and alcohol intake. 65% of patients had breast cancer followed by non-small lung cancer (5%). 27% and 25% of cancers were in stages IA and IIA respectively. The most common chemotherapy scheme (55%) for which the change of antiemetic therapy was seen, was FEC 500–100–500. 26% of patients started ondansetron 4 or 8 mg before aprepitant was prescribed. The rest (74%) received aprepitant directly after failing the first line antiemetic therapy. In 40% of patients the antiemetic regimen was changed to the study drug in cycle 2 and in 25% in cycle 3, demonstrating that aprepitant is not used as first-line antiemetic. Only 5 patients received radiotherapy combined with chemotherapy and only in 4 was alcohol intake recorded.

Conclusions In our hospital aprepitant is mainly used in chemotherapy regimens that include anthracyclines in combination with cyclophosphamide. It is prescribed after first line antiemetic regimen failure; meeting the indications established by Drug and Therapeutics Committee.

However, it would be advisable to cheque the antiemetic guidelines periodically for compliance with reference guides such as NCCN, ASCO, MASCC etc.

No conflict of interest.

CPC-088 MONITORING OF THE CORRECT USE AND PRESCRIPTION METHODS OF PACLITAXEL ALBUMIN AND ERIBULIN AT THE EUROPEAN INSTITUTE OF ONCOLOGY

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Background The use of innovative anticancer drugs in patients with various advanced tumours allows disease control with improved quality of life. This perspective must identify mechanisms to make additional costs arising from the most recent therapeutic advances affordable.

Purpose To evaluate the correct use and prescription methods of two new drugs in metastatic breast cancer in patients for whom the standard treatment for advanced disease has failed.

Materials and Methods Patients treated from April 2011 to May 2012 with Abraxane and from March 2012 to June 2012 with Halaven were extrapolated (start dates corresponded to the inclusion of drugs in the Hospital Therapeutic Handbook). For each patient individual doses were extrapolated and integrated with clinical data reported in the medical records.

Results 25 patients were treated with Abraxane, 10 with Halaven, while 3 received both treatments. Of the 25 patients treated with Abraxane, 9 (36%) received the drug after at least 10 lines of treatment, 11 (44%) after 6–9 lines, 5 (20%) after 1–5 lines. 16 patients were treated according to SPC: 260 mg/m^2/day 1 q 21 (64%), 9 with an off-label schedule: 100 mg/m^2/day 1.8 q 21 (36%). Furthermore it was found that a dose reduction not corresponding to what was reported in the SmPC was often used. Among patients treated with Halaven, 8 (80%) had received 8–15 prior lines of treatment, only 2 (20%) began treatment in 3rd–4th line. Among patients who went into progression (17 patients, 68%), only 18% reached 10 doses, 6% achieved 7–9 doses, 23% 4–6 doses and the majority (53%) did not exceed 1–3 doses of the medicine.

Conclusions The evaluation of these data suggests the need for a more accurate selection of patients based on predictive baseline characteristics or early indicators of activities and the implementation of post-registration studies to confirm the efficacy and safety of these drugs.

No conflict of interest.

CPC-089 MULTIDISCIPLINARY COLLABORATION IN THE TREATMENT OF PAEDIATRIC HEMATOPOIETIC TRANSPLANT REJECTION WITH ALLOGENEIC MESENCHYMAL CELLS. A CASE REPORT

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Background Advanced treatments represent a source of hope for rare diseases. However, they are complex as they require the participation of several professionals and experience is necessary for optimal use.
Purpose To describe the outcome and collaborative multidisciplinary process undertaken for the appropriate use of allogeneic mesenchymal cells (AMC) in the treatment of graft versus host disease (GVHD) developed by a paediatric patient after hematopoietic stem cell transplantation.
Materials and Methods Retrospective study of clinical outcomes, steps taken and requirements for the preparation of AMC (Prochymal). The case involved a 2-year-old paediatric patient with steroid-refractory severe GVHD with severe gastrointestinal manifestations. The treatment involved the administration of two doses per week for a total period of 4 weeks. If the patient responds completely or not at all, the treatment is completed, if there is a partial response the treatment can be completed plus an additional weekly dose for 4 extra weeks.
Results There was cooperation between the Paediatrics, Haematology and Pharmacy Services. A protocol was developed for use based on the instructions provided by the supplier. Pharmacy processed the application as a compassionate use (expanded access clinical trial) with the agreement of the supplier and hospital management. Haematology built on its expertise in handling blood cells to ensure storage (–135°C) and initially collaborated with Pharmacy in the preparation of the doses: controlled defrosting, bottling and packaging in aseptic conditions. The treatment resulted in a partial response at completion so an additional cycle was administered. No adverse reactions to AMC were observed.
Conclusions Interdisciplinary collaboration through the optimization of hospital resources and the rapid training of participating staff allowed the administration of a new and urgent treatment of advanced treatment, allogeneic mesenchymal cells. Tolerance was good and the response to treatment was initially favourable.

No conflict of interest.

CPC-090 MUPIROCIN RESISTANT METICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) – DO PATIENTS GET THE CORRECT DECOLONISATION AFTER SCREENING?

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Background MRSA screening has been mandatory in England for two years. Mupirocin is used routinely for MRSA-positive patients but there is some resistance.
Purpose A prospective audit was undertaken of all mupirocin-resistant MRSA screens to see if patients were put on the correct treatment.
Materials and Methods From October 2011, all in-patients with high level mupirocin or neomycin MRSA resistance were followed up by a pharmacist. Patients on ineffective decolonisation regimes were changed to the correct regime, and ward staff educated. Results to March 2012 were shared, and then monthly thereafter. Education was delivered at speciality and ward level. Any subsequent failures were reported as clinical incidents.
Results The percentage of patients that were MRSA positive on screening on admission into hospital or at pre-elective screening remained stable at 2.3% during both periods. Worryingly high-level mupirocin resistance had increased from 12.2% to 19.7%. It had doubled to 24% by June! Despite audit, education and feedback, the proportion of patients with known MRSA on admission and those still in hospital when the result from the admission screen was released, on the correct decolonisation regime, got worse. There has been no improvement using senior staff or ward infection control link nurses to rebrief their staff on the documented procedure.
Conclusions MRSA carriage on screening is low. Current systems appear too complex despite multiple interventions. As a failsafe, these patients should be followed up. Posters and screensavers have since been introduced. The prospective audit continues. All centres should review their current practise to ensure patients get prescribed effective MRSA decolonisation.

Asbtract CPC-090 Table 1

	Oct 2011–Mar 2012	Apr–Jun 2012
Screens	49177	17926
MRSA positive	2.3%	2.3%
High level mupirocin resistance	12.2%	19.7%
And also neomycin resistant	8.6%	4.6%
Correct on admission (from previous screen results)	23%	12%
Correct after current admission screen result released	40%	27%

No conflict of interest.

CPC-091 NATALIZUMAB IN CYPRIOT PATIENTS WITH RELAPSING REMITTING MULTIPLE SCLEROSIS: THREE YEAR DATA ON SAFETY, EFFICACY AND FREQUENCY OF ANTI-JC VIRUS ANTIBODIES

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Background Natalizumab (NAT) is a recombinant humanised anti-α4-integrin antibody used in treating Relapsing Remitting (RR) Multiple Sclerosis (MS).
Purpose To evaluate the long-term safety and efficacy of NAT in Cypriot patients, to assess the frequency of anti-JC Virus (JCV) antibodies and implement a strategy for the prevention of PML.
Materials and Methods Twenty-two patients were studied prospectively for 3 years.

The patients received 300 mg of NAT intravenously every 4 weeks. MRI examinations were performed at study entry and 12–24 months after the start of treatment. JCV antibody testing was performed after two years of treatment.
Results Six patients (27.3%) discontinued the study due to: Severe allergic reaction (9%), generalised atony, fatigue and weakness (4%), recurring herpes infection (4%), family planning (4%) and presence of anti-JCV antibodies (anti-JCV positive) due to previous immunosuppressive therapy (4%).

Most frequently reported side effects were: cardiovascular (41%), general (41%), laboratory abnormalities (41%), gastrointestinal (23%), neurological (18%), allergic reactions (18%) and depression (14%).

After three years of NAT treatment, a 55.2% decrease from the baseline mean annual relapse rate was observed, as well as improvement of 0.3 points on the mean Expanded Disability Status Scale (EDSS) Score.

87.5% of the patients completing the study had repeat MRI scans. Of those, 85.7% were found to have no new or gadolinium-enhancing lesions.

JC Virus antibody testing was performed after two years of NAT. Of the thirteen samples, eight (61.5%) tested positive. Two of those (25%) discontinued NAT due to previous IV mitoxantrone treatment. The remaining patients continued treatment under close supervision by the attending neurologist.

No cases of Progressive Multifocal Leukoencephalopathy were reported.

Conclusions Long-term therapy with natalizumab proved to be safe and effective in our population. Strict follow-up criteria were implemented for JCV antibody-positive patients remaining on treatment with natalizumab for more than two years.

No conflict of interest.

CPC-092 NEUROPSYCHOLOGY OF SAUDI COLON CANCER PATIENTS

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Background Colorectal cancer is a common disease and its prevalence is second to that of breast cancer worldwide. In Saudi Arabia the disease is ranked second after breast cancer and accounts for 8.5% of all tumours. Evaluation of Quality of life (QOL), anxiety and depression of such patients, as well as neurocognitive properties, is important to assess the impact of both malignancy and/or exposure to treatments including chemotherapy and surgery.

Purpose To assess the neuropsychology of a group of Saudi colon cancer patients 6 months after treatment was completed.

Materials and Methods Patients (18- 60 years) were recruited from the oncology clinic at King Khaled University Hospital (KKUH) at Riyadh, the capital city of Saudi Arabia. Exclusion criteria included smoking, psychiatric or cerebrovascular disease, sensory impairment, abnormal electrolytes, anaemia or uncontrolled blood pressure. Healthy volunteers were randomly recruited from the same hospital, however the availability of matched age controls was difficult. Cognition was assessed using the Rey Auditory-Verbal Test RAVLT (learning & memory); the Rey-Osterrieth complex figure (RCF, visuo-spatial organisation and visuo-spatial memory); semantic verbal fluency (executive function); letter cancellation (attention); digit-symbol (sustained attention, visual searching, visual sequencing). The Arabic version of 36-item Short-Form Health Survey SF-36 and the Hospital Anxiety and Depression Scale (HADS) were also used to assess QOL, anxiety, and depression, respectively.

Results A total of 32 colon cancer patients in remission were recruited, their mean age was 44.8 years. 23 of them were males (71.9%), while their mean years of education was 13.1 ± 4.06 years. Healthy controls (n = 36), were significantly younger than the patients (34 Years) ($t(66) = -4.2$, $P < 0.05$). There were no differences between the groups in terms of QOL, anxiety, depression, attention, executive function, oral and visuospatial memory. Healthy controls had significantly better RCF recall task ($t(67) = 2.61$, $p < 0.01$) and delayed recall task ($t(67) = 3.16$, $p = 0.002$) than colon cancer patients.

Conclusions This study indicates that neither colon cancer, nor its treatment, has any significant impact on the psychological well-being of the patients in comparison to healthy controls. The significant differences in recall may reflect the differences in age between the groups.

No conflict of interest.

CPC-093 NOSOCOMIAL INFECTIONS IN A COHORT OF EXTRA-CORPOREAL LIFE SUPPORT PATIENTS

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Background Extra-Corporeal Life Support (ECLS) is a method of life support used to treat patients with severe respiratory and/or cardiac failure refractory to conventional modes of treatment. Nosocomial infections in these patients are associated with increased morbidity and mortality along with increased lengths of intensive care unit (ICU) and hospital stay. No international best-practise consensus guidelines exist for treatment and/or prophylaxis of infections in this patient group.

Purpose To examine the rate of nosocomial infection in MMUH ECLS patients as well as the consumption of antimicrobials in the treatment and prevention of these infections.

Materials and Methods In a retrospective cohort study, the pharmacy records from a daily multi-disciplinary microbiology round reviewed all patients who are on ECLS. The use of prophylactic and therapeutic antimicrobials in these patients was assessed as well as the background ICU bloodstream infection rate.

Results Data analysis yielded a total of 17 patients over a two-year period, with a total of 444 ECLS days. In total, there were 17 infections in this cohort including 4 (24%) blood-stream infections (yielding a rate of 9.0 per 1000 ECLS days). The first four ECLS patients received antibacterial (vancomycin) and antifungal (caspofungin) prophylaxis for the duration of ECLS, whereas the later cohort of 13 did not. In the cohort of patients who received prophylactic antimicrobials, defined daily doses (DDDs) per 100 ECLS days for vancomycin and meropenem were 49.54 and 49.63 respectively. For the non-prophylaxis cohort this was 25.31 and 37.73 respectively.

Conclusions The infection rate in this cohort was low. In particular, the bloodstream infection rate compared favourably with previously published rates, and was comparable with the 'background' bloodstream infection rate of the ICU population as a whole. Antimicrobial use in ECLS patients was high relative to overall ICU antimicrobial use.

No conflict of interest.

CPC-094 NUTRITIONAL STATUS OF HOSPITALISED PATIENTS WITH HEAD AND NECK CANCER

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Background Malnutrition is common in hospitalised patients with head and neck carcinoma.

Purpose The aim of this study was to analyse the causes of hospitalisation of patients with head and neck cancer and to evaluate the nutritional status; type and route of nutrition therapy during hospitalisation and at discharge.

Materials and Methods Retrospective study of patients with head and neck cancer, between October 2011 and March 2012 at 420-beds hospital.

We examined demographic data, cause of admission to hospital, type and location of tumour, nutritional status before admission and at discharge by CONUT® (system for early detection and monitoring of clinical undernutrition based on biochemical parametres and immune indicator) and type of nutritional therapy. We used the data source as medical record (IANUS®).

Results Were included 13 patients, with a mean age of 67 ± 13.5 (39–86). The location of tumour was 6 in oral cavity and 7 in oropharynx. The causes of admission was surgery (69.3%) and complications of neoplastic pathology base (39.7%); bleeding: 40%, dysphagia: 20% bronchoaspiration: 20%, oral mycosis: 20%.

According to the nutritional status before admission, were found 4 patients (30.7%) with mild malnutrition, 2 (15.3%) with moderately malnutrition, 1 (7.7%) with severe malnutrition and 6 patients with not available data. At discharge: 5 patients (38.5%) with mild malnutrition, 7 patients with not available data and one patient died during the period.

During the admission period, all the patients received oral feeding, 6 patients received enteral nutrition (EN) by gastrostomy tube. At discharge, 61.5% of patients received oral diet and the 7.7% of them needed energy supplementation. The remaining 30.8% needed to continue with EN.

Conclusions The risk of malnutrition in patients with head and neck cancer is high.

Individualized nutritional support in these patients is necessary to prevent weight loss.

In the absence of parameters to perform an adequate nutritional assessment, we need greater involvement by hospital physicians with the clinical nutrition unit.

No conflict of interest.

CPC-095 OFF-LABEL USE OF ANAKINRA IN A PATIENT WITH FAMILIAL MEDITERRANEAN FEVER: A CASE REPORT

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Background Familial Mediterranean Fever (FMF) is an autosomal recessive autoinflammatory disease characterised by periodic episodes of fever, peritonitis, arthritis and may be complicated by secondary amyloidosis. FMF affects groups of people from around the Mediterranean Sea. Colchicine is the standard treatment in the prevention of both acute attacks and secondary amyloidosis but there are some resistant patients. Anakinra, an interleukin-1 (IL-1) receptor antagonist indicated for the treatment of the signs and symptoms of rheumatoid arthritis in combination with methotrexate, is also known to affect the severity and the frequency of FMF attacks.

Purpose To describe the progress of a patient with FMF treated with anakinra as IL-1 blocker, and evaluate the efficacy and safety of this treatment

Materials and Methods We describe the case of a 53-year-old colchicine-resistant woman suffering from FMF, who was treated with anakinra between April and September 2012 as second-line treatment, after several episodes of recurrent fever and abdominal pain. In order to evaluate the treatment the patient's clinical history and analytical data (C-reactive protein) were reviewed.

Results Anakinra was started with a daily subcutaneous dose (100 mg) associated with oral corticosteroids (methylprednisolone 8 mg). After the first cycle of treatment, the patient was fine, with no recurrent episodes of fever or abdominal pain. C-reactive protein (CRP) fell from 0.8 to <0.1 mg/dl. There were no injection site reactions. The only noteworthy adverse effect was neutropenia (1.4 × 109/L).Corticosteroids and anakinra doses were reduced to zero and 100 mg every other day respectively.

Conclusions In this case of FMF, anakinra successfully suppressed the number of attacks and the symptoms, without significant adverse reactions and with improvement in quality of life. Controlled trials are necessary to confirm the safety and efficacy of interleukin-1 antagonists in FMF patients.

No conflict of interest.

CPC-096 OPTIMIZATION OF THE TREATMENT OF RHEUMATOID ARTHRITIS WITH BIOLOGICAL TREATMENT

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Background The introduction of biological treatment (BT) in the treatment of rheumatoid arthritis (RA) has led to better control of this disease, but on the other hand to a great increase in pharmacy costs.

Purpose To review BT regimens in patients with RA in order to optimise treatment; to try to increase the dosing interval in patients who are responding well and evaluate the savings made.

Materials and Methods Interventional prospective study aiming at optimising the treatment of RA with BT by expanding interval in patients with a good response: adalimumab 40 mg/every 14–21 days and etanercept 50 mg/every 10–14 days. The review of treatments was made jointly between the pharmacy and rheumatology, adjusting the dose and calculating the cost avoided.

Results Patients chosen to extend the dosing interval had a mean DAS28 value of 2.183 (DAS28 < 2.4 is considered to mean disease remission). By extending the dosing interval €108,049.47 was saved in a year.

Conclusions The review and optimization of BT dosage regimens in RA patients in remission allowed us to control the disease and save money.

Abstract CPC-096 Table 1

Rheumatoid arthritis

Patients with BT	Extended interval
Adalimumab: 62 patients	10 patients (16.1%)
Etanercept: 53 patients	5 patients (9.5%)

Etanercept (cost per unit: 236,805€)

Posology	Cost/patient/year	Incremental cost	Number of patients with extended interval	Annual savings
Etanercept 50 mg/7 days (standard)	€12,313.86			
Etanercept 50 mg/10 days	€8,524.98	– €3,788.88	2	€7,577.76
Etanercept 50 mg/14 days	€6,156.93	– €6,140.35	3	€18,470.79

Adalimumab (cost per unit: 514,145€)

Posology	Cost/patient/year	Incremental cost	Number of patients with extended interval	Annual savings
Adalimumab 40 mg/14 days (standard)	€13,567.77			
Adalimumab 40 mg/21 days	€8,946.13	– €4,621.64	6	€27,729.84
STOP upon prolonged remission of the disease	€13,567.77	– €13,567.77	4	€54,271.08

No conflict of interest.

CPC-097 OPTIMIZING CLINICAL PHARMACY: DETERMINING CRITERIA TO TARGET "HIGH RISK" PRESCRIPTIONS

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Background Because pharmacists do not yet systematically analyse prescriptions closely due to lack of time and resources, tools to optimise pharmaceutical validation must be developed.

Purpose To identify pertinent criteria to target high-risk patients or drugs.
Materials and Methods A prospective 3-month study was performed. Daily prescriptions were filtered using an automated computerised system based on selection criteria identified from an analysis of the literature. Pharmaceutical interventions (PIs) that were necessary as a result of the selection criteria and the rest of the prescription were analysed.
Results We analysed 1122 prescriptions, corresponding to 456 patients (mean age 79 years). Prescriptions were grouped together according to several selection criteria: creatininemia ≥125 µmol/l (62.1%), dyskalaemia (23.2% including 55% hyperkalaemia and 45% hypokalaemia), INR ≥ 4 (7.2%) and drug dosages (7.5% including 37% vancomycin, 22% digoxin and 15% gentamicin). Among the prescriptions selected for creatininemia ≥125 µmol/l, 45.7% were associated with severe kidney failure and 26.4% with moderate kidney failure.

The rate of PIs was 16% (n = 179) and varied according to the criteria: 22% and 19.6% respectively for severe and moderate kidney failure, 33.3% for hyperkalaemia, 10.3% for hypokalaemia, 13.8%, for INR, 4.4% for drug dosages.

The PI was related to the selection criteria in 77% of the cases. The rate of acceptance by prescribers was 80.6%.
Conclusions Carefully choosing pertinent criteria to philtre prescriptions seems to be an interesting option to optimise our approach to clinical pharmacy.

Our study shows that criteria associated with kidney failure and hyperkalaemia seem to be pertinent as they are related to numerous PIs. Following up INR > 4 should also be added as a pertinent criterion, as anticoagulants are often the cause of iatrogenic events.

This type of selection could be used to perform a transversal analysis of prescriptions, without discrimination by hospital unit.

No conflict of interest.

CPC-098 OSTEOPOROSIS AFTER LUNG TRANSPLANT

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Background Osteoporosis after a lung transplant is common, with reported vertebral fracture rates of up to 30% [1]. Bisphosphonates, and calcium and vitamin D supplements may be less effective in patients who remain on steroid treatment [2]. Corticosteroids are more detrimental to spinal bone mineral density than to the hip [2]; however risk prediction systems use hip T-scores to predict risk and make treatment recommendations [3, 4].

We reviewed the prophylaxis of osteoporosis in a cohort of patients at the time of listing and up to 6 years post-transplant.
Purpose We wished to identify:

1. any potential for improvement in prescribing
2. risk factors for clinically significant lumbar fractures
3. the utility of currently available osteoporosis risk algorithms in this cohort.

Materials and Methods We conducted a retrospective chart review (n = 27).

Patients' risk of fracture at the time of listing for transplant was calculated using three different methods including WHO charts and American College of Rheumatology algorithm for steroid-treated patients.

We attempted to create a model to predict fracture in transplant recipients using known risk factors.
Results At time of listing, all patients were taking at least 5 mg of prednisolone daily plus a bisphosphonate and appropriate calcium and vitamin D supplementation. Many already had osteoporotic T scores at this point. Fracture rates in our cohort are in line with published data, but substantially higher than those predicted from algorithms. Improvised algorithms using lumbar T scores were better at predicting risk than published methods. The only risk factor in our cohort that predicted subsequent fracture was lumbar spine T-score (Mean −1.2 versus −2.65 in the fracture group (P = 0.009)).
Conclusions Current algorithms underestimate risk, new charts should be created using lumbar T-scores. Our results emphasise that current prophylaxis strategies are not successful in preventing fractures in those who have osteoporosis and remain on prednisolone. Early osteoporosis prophylaxis and alternative treatments are essential to prevent fractures.
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No conflict of interest.

CPC-099 PATIENTS ON VITAMIN K ANTAGONISTS (THE BENEFIT OF PHARMACY STUDENTS EDUCATING VKA PATIENTS IN AN UNIVERSITY HOSPITAL)

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Background Vitamin K Antagonists are the most used anticoagulants in the treatment of thrombotic diseases and their misuse is an important source of medicines-related illness.
Purpose To study the effect of targeted information on patients' knowledge of their VKA treatment.
Materials and Methods The study took place between 05/07/2012 and 09/07/2012 as described below: An assessment grid including 18 questions grouped in 4 items was made by pharmacists and checked by the 'haemostasis-coagulation' group. It included a) general knowledge, b) meaning of the INR test, c) drug and food interactions and d) signs of bleeding. The students were trained (by pharmacists) and empowered (by specialist members of the 'haemostasis-coagulation' group) The pharmacy students evaluated patient knowledge with the grid (T0) The answers were analysed in order to highlight points where knowledge was lacking Targeted therapeutic information was supplied on the deficient points Patients were re-evaluated with the same grid before discharge (T1).
Results 73 patients (27 males/46 females) were evaluated and received therapeutic information. The mean age was 66 years. 57% of responses were adequate with 69%, 55%, 37% and 47% of correct answers for items a, b, c and d respectively. 41 (56%) of the 73 patients were re-evaluated before discharge. In this group of patients, 50% answers were correct initially and 78% after education. An improvement of the knowledge was observed for all items with 73% vs. 32%, 66% vs. 30%, 83% vs. 18% and 72% vs. 27% of correct answers at T1 vs. T0 for items a, b, c and d, respectively.
Conclusions The improvement in patients' knowledge of their VKA treatment shows the benefit of this approach based on the patients being educated by empowered pharmacy students. That's why this process should be extended to other units with VKA patients.
Reference

1. VKA, therapeutic information, patients' knowledge.

No conflict of interest.

CPC-100 PHARMACEUTICAL CARE IN PATIENTS DIAGNOSED WITH MULTIPLE MYELOMA TREATED WITH LENALIDOMIDE

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Background Multiple myeloma (MM) is a malignant monoclonal gammapathy that occurs mainly in patients over 65 years. Lenalidomide is indicated in combination with dexamethasone for the treatment of MM in patients who have received at least one prior treatment regimen.

All this makes it likely the patient will require Pharmaceutical Care (PC). PC consists of collaboration with other health professionals and with the patient to design a safe and effective treatment plan, as well as to identify Drug Related Problems (DRPs) and to resolve and prevent negative outcomes associated with medication (RNMs).
Purpose To evaluate the impact of pharmaceutical intervention in patients diagnosed with MM treated with lenalidomide in a pharmacists-led haematological consultation within the Pharmacy Service.
Materials and Methods Quasi-experimental study of 4 months duration on patients diagnosed with MM treated with lenalidomide. Clinical practise follow-up procedures used the Dader method adapted to the study situation. Data were obtained from interviews with patients, electronic medical records and Outpatient Service Pharmacy records.
Results During this period, 29 patients were diagnosed with MM and treated with lenalidomide, 21 joined the study (4 didn't gave consent and 2 weren't able to visit the pharmacy), 11 women and 10 men. Average age: 70.3 years (52–89). During study a total of 17 DRPs were detected: 4 related to the indication, 1 to the effectiveness and 8 to the safety, and a total of 35 RNMs: 4 related to the need, 5 to the effectiveness and 26 to the safety. Of these 35, 45.7% could have been avoided. A total of 25 pharmaceutical interventions were made: 10 related to the amount of drug, 9 to the pharmacological strategy and 6 to patient education.
Conclusions A variety of goals were achieved through pharmaceutical interventions: medicines reconciliation, resolution of health problems by detecting RNMs and avoidance of RNMs by detecting DRPs.

No conflict of interest.

CPC-101 PHARMACEUTICAL INTERVENTION IN THE PATIENT RECORD: TOWARDS HARMONISATION OF OUR PRACTISE

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Background In our hospital, patient records and all medical prescriptions are computerised in 11 departments. These prescriptions are analysed daily by a pharmacist. Each pharmaceutical intervention (PI) is recorded in the patient record and can be accepted or rejected by physicians. PIs are marked critical, medium or low by the pharmacist. We set up a weekly PI meeting with all pharmacists in June 2012.
Purpose To standardise, analyse and promote our interventions.
Materials and Methods For each PI, the pharmacy student fills in an Excel table with medical ward, drug, problem identified, type of intervention, pharmacist rating and clinical impact of the intervention. During the meeting, all PIs marked critical or that had a physician comment, discrepancy on out of formulary discharge proposal, or any IPs considered relevant by the pharmacist were considered and discussed.
Results Analysis of medical prescriptions generated 1,483 PIs over 3.5 months. The most frequent rating was 'low' (70%). There were 18% 'medium' and 3% 'critical' interventions. The main pharmaceutical problem was out of the formulary discharge proposal which represented 54% of PIs (796/1483). Dosage adaptation was recommended in 12% of cases; 9% of PIs were for stopping the treatment and other interventions were about the choice of route of administration, adding a treatment, therapeutic monitoring and optimization of administration. In total, 58% of PIs were accepted, the physician was not informed of 23% and 19% were not accepted; but 11% of the PIs accepted were not implemented.

135 PIs were discussed in pharmaceutical meetings. Among the subjects that arose, 3 were particularly highlighted: re-evaluation of renal failure and metformin, interaction between beta blockers and flecainide and recommendations on allergies. We have studied out of the formulary discharge proposal discrepancies about cardiology medicines (angiotensin converting enzyme inhibitors and angiotensin receptor antagonists).
Conclusions Feedback on PIs is a key element to improve their relevance. Finally, a weekly pharmaceutical meeting can highlight recurrent prescription problems in order to propose and implement corrective measures. It is moreover a working base for our hospital to improve the quality of medical care.

No conflict of interest.

CPC-102 PHARMACIST-DRIVEN INTERVENTIONS IMPROVE THROMBOPROPHYLAXIS IN ACUTELY ILL MEDICAL PATIENTS OVER TIME – RESULTS AFTER SIX MONTHS

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Background Forty to 50% of hospitalised patients with an acute medical illness have risk factors for venous thromboembolism (VTE) and it has been shown that thromboprophylaxis reduces the incidence of VTE events in these patients [1]. However, a large multinational survey, the ENDORSE study, showed that only 37% of medical patients with VTE risk factors currently received thromboprophylaxis [2].
Purpose To evaluate the impact over time of pharmacist-driven interventions aiming at increasing the appropriate use of thromboprophylaxis in acutely ill medical patients hospitalised in an urban academic tertiary care hospital.
Materials and Methods First, medical and nurse reports of hospitalised medical patients were reviewed to evaluate the proportion of patients who were on prophylaxis according to clinical practise guidelines. Second, interventions were conducted and included unit-specific physician and nurse education, dissemination of educational tools summarising VTE prophylaxis guidelines, and reminders. Third, the effect of the interventions on the proportion of patients receiving appropriate thromboprophylaxis was evaluated after three and six months.
Results The baseline evaluation showed that 36% (26/72) of the patients at risk of VTE received appropriate thromboprophylaxis. Three and six months after the interventions, 68% (55/81), and 72% (58/81) of the patients at risk of VTE received appropriate thromboprophylaxis.

Of the patients not at risk of VTE, 15% (21/141), 8% (24/290), and 8% (27/330) respectively at baseline evaluation, three and six months after the interventions, received thromboprophylaxis.
Conclusions Pharmacist-driven interventions improved the proportion of acutely ill medical patients receiving appropriate thromboprophylaxis and the benefit of the interventions was maintained after six months.
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No conflict of interest.

CPC-103 PHARMACIST-MANAGED INSULIN TITRATION VERSUS STANDARD CARE IN A VASCULAR SURGERY UNIT

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Background Hyperglycemia is a prevalent situation in hospitalised patients and it has been associated with higher morbidity and mortality. Poor glycemic control is related to higher costs due to longer hospital stays and higher rates of complications. A large percentage of vascular surgery patients in our hospital have diabetes mellitus with a poor glycemic control.
Purpose To assess the impact of a collaborative, pharmacist-managed insulin titration programme compared to standard medical care on glycemic control in patients with neuropathic diabetic foot ulcers in vascular surgery unit.
Materials and Methods It was established a new protocol to control glycemic levels in hyperglycemic patients in our hospital. To assess its effectiveness a prospective cohort study to compare pharmaceutical intervention of insulin titration to standard medical care was implanted. 30 patients were recorded and evaluated, 15 subjects were included as control (standard medical care before implantation of insulin protocol) and 15 in the pharmacist-managed group (insulin titration programme). Patients were selected consecutively on admission to the vascular surgery unit, the control group, one month prior to the implementation of the protocol and the rest one month later. In both groups it was registered: age, diabetes mellitus type, blood glucose levels, diet and drug treatment. Student t test was used to evaluate the glycemic values between groups.
Results Both groups were analysed and compared: 67% of subjects from control group were men vs 92% from the intervention group. No significant differences were found in the composition between both groups ($p > 0.05$) respect of age, diabetes mellitus type and diet. The pharmacist-managed group showed a lower glycemic level compared to standard medical care group (123 mg/dl vs 170 mg/dl respectively; $p < 0.044$). The hyperglycemic levels were more frequent in control group than intervention group (78% vs 35%). No statistics differences were found with hypoglycemic situations (2% vs 4.5% $p = 0.1$).
Conclusions At the end of the study period, the intervention group patients had better glycemic control. Pharmacist-provider collaboration can result in significant clinical improvements when compared to standard care glycemic control in diabetic patient in a surgical unit.

No conflict of interest.

CPC-104 PHARMACISTS AND CLINICAL TRIALS: PERSPECTIVES AND RESULTS AT THE MEDICAL ONCOLOGY OPERATIONS UNIT OF THE G. RUMMO HOSPITAL, BENEVENTO

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Background The rules on Controlled Clinical Trials require the expertise of a pharmacist specialising in internal monitoring of ongoing trials in the Operations Unit.
Purpose To highlight the role of the pharmacist dedicated to research projects, who sees that trials are conducted in accordance with GCP and in compliance with applicable regulations.
Materials and Methods From January 2010 the pharmacy has created a database to monitor all studies approved by the Ethics Committee, both observational and experimental. Having a dedicated pharmacist has led to: proper storage of drugs, completing the application form accompanying the samples, storage of electronic and paper documentation of the experimental samples, fitting directly in Pharmacy, randomization of patients enrolled and completing the Drug Accountability.
Results 40 clinical trials have been conducted, 26 of which were conducted in the Oncology OU, 3 in Pulmonary and 8 in Cardiology, 1 in Rheumatology, 2 in Dermatology. As regards the preparation of the antiblastic treatments, the treatment setting provided by the experimental protocols accounted for 5% of all cancer preparations performed in the pharmacy. 83% of the studies (33 studies) were for profit, non-profit research accounted for only 17% of the studies. In 2012 the number of for-profit studies increased compared to 2010; we hope these will be particularly useful to point out any problems of current clinical practise.
Conclusions The dedicated pharmacist can ensure that research is conducted properly, both the management of experimental drugs and collaboration with the clinical evaluations related to routes of administration, any incompatibilities, monitoring of side effects and/or adverse events, interactions with associated therapies. In conclusion it is evident that the multidisciplinary approach and sharing of expertise with the medical and nursing staff encourages adherence to protocols.

No conflict of interest.

CPC-105 PHARMACOECONOMIC ASPECTS OF THE TREATMENT OF RHEUMATOID ARTHRITIS WITH TUMOUR NECROSIS FACTOR ALPHA ANTAGONISTS: A SOCIETAL PERSPECTIVE

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Background Rheumatoid arthritis (RA) is an autoimmune disorder, affecting 1% of the population, characterised by pain, joint swelling and progressive destruction of joint tissue. EULAR (European League Against Rheumatism) recommends the use of Tumour Necrosis Factor alpha antagonists (anti-TNFα) if methotrexate or Disease Modifying Antirheumatic Drugs fail. Anti-TNFα treatment imposes a significant financial burden on hospital budgets.
Purpose To perform a pharmacoeconomic investigation in the Piedmont region (Italy) to identify the cost of the illness RA. To analyse the payer's and societal perspectives, investigating direct costs associated with health care use and indirect costs related to productivity loss.
Materials and Methods A multidisciplinary group, rheumatologists, hospital pharmacists and pharmacoeconomists, was established to perform a pharmacoeconomic evaluation of the direct and indirect costs of RA, by a systematic literature review. Afterward, we plan a perspective, observational, multicentre, cost-effectiveness analysis of RA biological drugs, involving 100 patients. Each patient will be recorded, every three months for one year, through personal data, disease duration and characterization, systemic manifestations and comorbidities, prescribed biological medicines. A questionnaire will be submitted, in order to assess direct and indirect costs.
Results 40 existing pharmacoeconomic evaluations were critically appraised: the overall mean costs of RA amounted to about €15,000 per year, while the direct annual costs of RA were on average about €4,000. The greatest burden of RA costs was the indirect costs. From a societal perspective the superior clinical outcomes achieved

with anti-TNFα are worth their higher costs. The most favourable incremental cost-effectiveness ratio was for etanercept compared to methotrexate.

Conclusions The cost-effectiveness of an intervention depends on the maximum the decision makers are willing to pay for an extra unit of health effect. It should be considered that treatments with anti-TNFα, in a societal perspective, decrease the use of health resources and increase productivity.

No conflict of interest.

CPC-106 PHARMACOKINETIC DRUG-DRUG INTERACTIONS DUE TO TREATMENT WITH AMIODARONE – A PRACTICAL APPROACH

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Background The drug amiodarone has a complex pharmacokinetic profile and can be a challenge to use due to the high potential for drug-drug interactions.

Purpose To identify and submit proposals for handling drug-drug interactions for patients treated with amiodarone. In addition we would like to highlight the fact that drug interactions can occur even if amiodarone is administered as only a single IV dose, and the effect on further treatment. The purpose was also to prepare proposals for management and follow ups of interactions in the clinic.

Materials and Methods Before the ward round the pharmacist carried out medicines reviews for the 25 patients who were included. They were all treated with amiodarone at admission or during hospitalisation. Input was given on the clinically significant interactions identified. For patients treated with warfarin in addition to IV amiodarone the INR values were observed through the entire hospital stay for any signs of a drug-drug interaction.

Results The pharmacist had 54 inputs referring to interactions with amiodarone, of which 41 were taken into account. The inputs led to dose reductions, changes of drugs and monitoring of blood values. Case reports showed that interactions do occur after IV amiodarone treatment and these lead to uncertain and variable drug efficacy over time.

Conclusions Based on results from the study and a literature search, general advice for handling interactions due to amiodarone and further treatment were prepared. The recommendations were endorsed by the consultant Cardiologist.

Abstract CPC-106 Table 1

Advice for avoiding Drug-Related Problems DRPs due to treatment with amiodarone
Warfarin Reduce/give half-dose warfarin at start-up. Monitor the INR values (1)
Digitoxin Give half dose digitoxin/digoxin and monitor digitoxin/digoxin determined by procedure (2)
Simvastatin No doses above 20 mg or switch to another statin. (3)
Atorvastatin Note the dose! No clear recommendations, but maximum 40 mg
Metoprolol Bradycardia? The dose may be adjusted (4)
General advice
When admitted from other hospitals
Note in the drug curve if recently treated with amiodarone!
Discharge summaries
Explain why the GP should follow up the blood values; INR, digitoxin/digoxin and possibly CK.

1. Edvin SB *et al*, An evaluation of early pharmacodynamic response after simultaneous initiation of warfarin and amiodarone.
2. Laer S *et al*, Digitoxin intoxication during concomitant use of amiodarone.
3. Marot A *et al*, Concomitant use of simvastatin and amiodarone resulting in severe rhabdomyolysis: a case report and literature review
4. Fukumoto *et al*, Effect of amiodarone on the serum concentration/dose ratio of metoprolol in patients with cardiac arrhythmias

No conflict of interest.

CPC-107 PHARMACOTHERAPY FOLLOW-UP IN CHRONIC HEPATITIS C PATIENTS TREATED WITH BOCEPREVIR OR TELAPREVIR

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Background The approval for the clinical use of direct-acting antivirals in 2011 (boceprevir [BOC] and telaprevir [TLV], viral NS3 protease inhibitors) has increased recovery rates by up to 70%. However follow-up of these patients is necessary due to adverse effects (AEs) and the high cost of the treatment.

Purpose To follow up the pharmacotherapy in chronic hepatitis C virus genotype-1.

(VHC-1) patients treated with triple therapy (TT): BOC or TLV, ribavirin and peg-interferon.

To evaluate the efficacy of the treatment and describe the pharmacological handling of severe AEs.

Materials and Methods Prospective study (from 01/01 to 30/9/2012) was carried out in the Pharmacy Department. VHC-1 patients who started TT were included. All of them had at least one viral load (VL) determination (BOC at week 8 and TLV at week 4).

A hospital pharmacist interviewed the patient at the first day treatment and provided oral and written information about how to take the drugs and their potential AEs.

Later, we analysed the compliance of the treatment to the guidelines of Spanish Agency for Drugs. Patient data (age, sex, basal LV at week 4 and week 8, previous treatment response, fibrosis and haemoglobin levels) were collected from electronic clinical histories and outpatient software.

Results 35 patients were included (22 TLV and 13 BOC), 28 had initial VL > 800000 IU/mL. 34 patients had fibrosis grade ≥3.13 patients were treatment-naive, 22 had been treated previously (9 non-responders, 8 relapsers, 5 partial responders). 2 BOC patients obtained fast viral response vs. 4 TLV patients, and 7 BOC patients had undetectable VL at the week 8 cheque-up vs. 16 TLV patients at week 4 cheque-up.

5 patients (4 with BOC) discontinued treatment, one due to severe toxicity and 4 due to lack of efficacy. TT was effective and adhered to the guidelines in 84% patients.

The most frequent AEs were asthenia, anaemia and dermatological reactions (mainly with TLV). 9 patients presented grade 3 anaemia and were treated with erythropoiesis-stimulating agents (EEAs) (31% BOC vs. 23% TLV).

Conclusions The safety profiles of BOC and TLV found in our study were similar to those published in clinical trials. Despite not being a comparative study, we observed that more people in the TLV group reached undetectable VL after 4 or 8 weeks (91% TLV vs. 69% BOC). Patients treated with BOC had earlier suspended the TT because of lower effectiveness and higher occurrence of grade 3 anaemia that required EAAs.

No conflict of interest.

CPC-108 PHARMACY INTERVENTIONS UNDERTAKEN IN AN INTENSIVE CARE UNIT SPECIALISING IN WOMEN'S HEALTH

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Background Pharmaceutical interventions can prevent drug-related problems and possible prescription errors. They thus

contribute to the optimization of pharmacotherapy and to prioritising safety in an Intensive Care Unit (ICU).
Purpose To identify and quantify medicines errors observed and interventions made in the ICU in question, drawing a profile of the main actions of the pharmacist in critical care specialising in women's health.
Materials and Methods The study was conducted in a Brazilian ICU of a university hospital specialising in women's health, from February to May 2012. Interventions were performed after analysis of patient prescriptions (18 years old or over, hospitalised for more than 24 hours in the ICU) and discussions of clinical cases during multidisciplinary meetings. Interventions were classed on whether or not they were accepted by the medical staff. Drug-related errors observed were classed as preventable or not and ranked by an adaptation of the classification of the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP).
Results The study involved 82 patients, and 386 prescriptions were evaluated. The mean age was 41.1 ± 19.0 years old and the average hospital stay was 4.7 ± 3.3 days. We identified 45 medicines errors (mean 0.6 ± 3.5/patient), 86.7% of these were preventable and 13.3% were not. The most common error types were: unsafe medicine due to drug interaction (26.7%), higher dose than recommended (15.6%) and unsafe medicine during lactation (13.3%). Fifty-one interventions were made (mean 0.6 ± 4.2/patient), and 84.3% of these were accepted; 3.9% partially accepted; and 11.8% were not accepted. The most common interventions were to recommend an alternative dose (25.5%), identify drug interactions (23.5%), and risk during lactation (11.8%).
Conclusions Partial results obtained show the necessity for clinical pharmacy services in the ICU as an important contribution to reducing risks from drug treatment.

No conflict of interest.

CPC-109 PHARMACY INTRAVENOUS IRON PROTOCOL IN A CENTRAL HOSPITAL

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Background Iron deficiency anaemia (IDA) is a common condition. The pharmacy intravenous iron protocol (100 mg/5 ml iron sucrose vials) includes assessment of patient analytical data, dose calculation, schedule and information about iron administration intended to prevent adverse reactions.
Purpose To assess the use of intravenous iron in hospitalised patients being treated by the pharmacy protocol.
Materials and Methods An eight-month retrospective, observational study (January to August 2012). Hospitalized patients treated with pharmacist-managed intravenous iron were selected. Demography, main diagnosis, comorbidities, basic data, dosage suggestions and haemoglobin and haematocrit values were collected from electronic clinical files and pharmacotherapeutic profiles.
Results A total of 35 patients (19 male) were included. Mean age was 75.9 years (range 43–94).

9 (25.7%) patients were admitted for surgery and 26 (74.3%) for a variety of medical conditions.

20 patients (57.1%) were treated without complete investigation of the anaemia.

The most frequent intravenous iron dosage was 200 mg 3x week.

27 (77.1%) patients had increased haemoglobin and haematocrit values after an average of 10.3 days (range 3–20) of intravenous iron replacement treatment. The mean increase in haemoglobin concentration was 2.5 g/dl (range 0.2–6.6). Only 9 patients (25.7%) achieved the haemoglobin target during admission. The majority of patients were discharge before achieving the target haemoglobin. No adverse reactions were reported to the pharmacist.
Conclusions As stated in the literature, a large proportion of patients in our study were not confirmed to be iron deficient. Pharmacist should advise physicians about the importance of a complete IDA study before starting this therapy. The information about iron administration and a test dose in the pharmacy protocol seem to be useful in preventing adverse reactions.

No conflict of interest.

CPC-110 PHARMACY INVOLVEMENT IN THE MANAGEMENT OF ACADEMIC CLINICAL TRIALS

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Background The sponsor is the person or entity that initiates a clinical trial, manages it and provides funding. We define two types of promoters, commercial sponsors and academic sponsors (mainly hospitals). In order to minimise the cost of academic studies without limiting the quality, some work done by the hospital is not included, for example pharmaceutical management by pharmacies.
Purpose To measure the size of pharmacy involvement in the management of clinical studies and academic costs not taken into account.
Materials and Methods We accounted for all pharmaceutical work done for academic studies (dispensing, preparation, reception of goods or materials, destruction of goods or materials, monitoring, labelling, ordering, randomization) managed by our pharmacy during the year 2011. We estimated the average time for each of these duties and the resulting financial cost (national grid, LEEM).
Results 35 institutional studies were in progress during this period and represented approximately 20% of all studies managed by our service: 8 studies were promoted by Montpellier hospitals, 7 by associations and 20 by other hospitals. We noted 501 prescriptions dispensed, 180 assignments to treatment or randomization, 52 preparations, 138 receptions, 13 destruction, 55 orders, 416 labels prepared and 52 monitoring visits. All this took 736.5 hours (or 210 half days) and additional costs estimated at 45,752 euros. Only 8,865 euros were allocated to the pharmacy (19% of the costs).
Conclusions Academic research is essential and necessary for the improvement of scientific knowledge. However, in most cases, no expenditure is planned for the pharmacy unit. Currently, these activities are made within the hospital pharmacist's "free time". A national reflection is currently under way to establish a grid indicating how much academic studies should pay for the recruitment of dedicated medical staff. This study demonstrates that academic research requires a considerable time from the pharmacies, to justify the allocation of human resources in order to support good management.

No conflict of interest.

CPC-111 PHARMACISTS' OPTIMIZATION OF THE MEDICATION PROCESS DURING ADMISSION TO HOSPITAL: A MULTICENTRE, RANDOMIZED, CONTROLLED TRIAL

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Background During hospital admission, nearly 10% of all patients experience adverse events (AEs) and almost 1/3 of AEs are

drug related (ADEs). The effect of clinical pharmacy on ADEs and drug costs has not been substantiated in randomised controlled trials.

Purpose To study the clinical effect of pharmaceutical optimisation of the medication process at admission to hospital.

Materials and Methods Medical patients admitted to three Danish acute wards aged ≥18 years and taking ≥4 types of medicine per day were eligible for inclusion. The patients were randomised to either intervention or control group. A retrospective control group was also formed.

The intervention was comprised of: medicines history, medicines review, medicines reconciliation and entry of proposed prescriptions in the electronic medication system.

Primary endpoint was the proportion of patients with adverse drug events (ADEs), identified by screening the charts for 25 defined triggers from the Danish version of 'Global Trigger Tool'. ADEs were then validated and evaluated for severity scores by two independent panels of clinicians blinded for the intervention.

Secondary end points were length of hospital stay (LOS), in-hospital drug costs, readmissions and death within one year of discharge.

Results From March 2010 to July 2011 a total of 1775 patients were screened for inclusion. 573 patients were included, 74 were excluded due to discharge within 24 hours, leaving 499 patients in the study. Preliminary studies clearly showed that the intervention group had fewer ADEs and triggers, shorter LOS and lower in-hospital drug costs than the control groups, although no significant differences were recorded.

Conclusions Although the findings did not reach statistical significance, the clinical pharmacist's intervention tended to have a positive impact on the medication process in terms of higher patient safety and lower health care costs.

No conflict of interest.

CPC-112 PREDICTORS OF POTENTIALLY INAPPROPRIATE PRESCRIBING IN ELDERLY FALLERS

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Background A study to explore the rate of potentially inappropriate prescribing (PIP) in elderly fallers, and the impact of pharmacist-led medicines reviews was undertaken. Data relating to possible predictors of PIP, identified in the literature, were also collected.

Purpose To investigate the following factors as predictors of PIP in elderly fallers:

- Demographic data
- Drugs classes
- Polypharmacy

Materials and Methods The following data were collected as part of a larger study:

- Demographic data: age, gender and days since admission at time of fall
- Number of regular medicines
- Name and class of PIMs identified

Results

- Sixty patients were included in this study, 34 (56.7%) of whom were male.
- The median age was 79 years (range: 29). Patients were taking a median of 9 regular drugs (range: 17). Twenty-one (35%) patients were prescribed ≥1 PIM at the time of their fall.
- Gender was not a predictor of PIP, with 13 male and 8 female patients prescribed ≥1 PIM ($P = 0.548$).
- Excessive polypharmacy (≥10 medications) was identified as a positive predictor of PIP. Participants prescribed ≥1 PIM were taking a mean of 10.86 regular medicines; those not prescribed ≥1 PIM were taking a mean of 7.67 regular medicines ($p < 0.001$).
- A drug from each class in section H of the STOPP criteria was identified at least once. Benzodiazepines were the most frequently prescribed PIM drug class, accounting for 59% of PIMs overall. Six patients in the baseline group and 7 in the intervention study were prescribed a benzodiazepine. The most commonly prescribed PIM was temazepam.

Conclusions Polypharmacy is a predictor of PIP. Patients prescribed ≥1 PIM were taking on average 3 more regular medicines than those who were not prescribed ≥1 PIM ($p < 0.001$). Gender was not a predictor of PIP.

No conflict of interest.

CPC-113 PREOPERATIVE ORAL IRON PRESCRIPTION IN THE PREVENTION OF POSTOPERATIVE ACUTE ANAEMIA IN ORTHOPAEDIC SURGERY

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Background A previous study on postoperative acute anaemia in orthopaedic surgery was conducted in 2011 (S1), showing that anaemia is recurrent and not always treated. We have recommended prescribing oral iron in the month preceding surgery. A pre-dispensed oral iron prescription has been set up for use during preoperative anaesthesia consultations. We decided to evaluate the impact of this recommendation by a second study in 2012 (S2).

Purpose To assess the impact of preoperative oral iron prescription on the prevalence and treatment of postoperative acute anaemia in orthopaedic surgery.

Materials and Methods Both studies included patients who underwent total hip or knee arthroplasty (THA/TKA). S1 was conducted retrospectively on all patients operated on in 2011. S2 was conducted prospectively on patients who had been prescribed preoperative iron in September/October 2012. We collected data about operations, iron prescriptions, haemoglobin levels, transfusions and lengths of stay.

Results Operations: 327 (S1): 205THA/122TKA vs. 30 (S2): 13THA/17TKA. Postoperative iron prescription: 69% of patients (S1): oral iron 32%, intravenous iron 20%, both oral and intravenous iron 17% vs. 43% of patients (S2): oral iron 23%, intravenous iron 13%, both oral and intravenous iron 7%. Haemoglobin levels: between preoperative and immediate postoperative periods, mean decrease was from 12.9 ± 0.2 g/dl to 11.1 ± 0.1 g/dl (S1) vs. 13.3 ± 0.2 g/dl to 11.7 ± 0.2 g/dl (S2), between preoperative period and hospital discharge, mean loss was 2.2 ± 0.2 g/dl (S1) vs. 1.9 ± 0.17 g/dl (S2) ($p < 10–3$). Transfusions: 29% of patients (S1) vs. 20% (S2) ($p < 10–3$). Length of stay: mean was 10.6 ± 0.8 days (S1) vs. 8.3 ± 0.3 days (S2) ($p < 0.005$).

Conclusions The prospective study showed that oral iron preventive treatment significantly decreases haemoglobin level fall, transfusion rate and length of stay. Therefore it is necessary to sensitise prescribers concerning preventive iron coverage. A further study is needed to evaluate the impact of a longer iron preventive treatment on a larger number of patients.

No conflict of interest.

CPC-114 PREVALENCE AND MANAGEMENT OF DRUG-RELATED PROBLEMS IN AN INTENSIVE CARE UNIT

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Background Patients admitted to intensive care units (ICUs) are at higher risk than other patients of having problems, injuries and adverse drug reactions (ADRs) associated with their drug treatment.
Purpose To identify and categorise drug-related problems (DRPs) in an intensive care unit, using a standardised tool modified for use in critically ill patients.
Materials and Methods The Integrated Medicines Management model (IMM) was used as a standardised tool for both medicines reconciliation and medication reviews. All patients admitted to the Intensive Care Unit (ICU) at Levanger Hospital, Norway, during a 12-week period in 2011 were asked to participate in the study. DRPs identified by the pharmacist were discussed with the physicians in charge and changes in drug treatment were recorded.
Results A total of 23 patients were included in the study and 94 medication reviews were conducted (1–25 reviews per patient). One or more DRPs were identified for 16 of the patients. Overall 150 DRPs were identified by the pharmacist. Out of these 41% were related to discrepancies with the medicines list, 18% were non-optimal doses, 8% clinically relevant interactions and 8% non-optimal treatment. Input from the pharmacist was upheld by the physician and the medicine changed as suggested for 18% of the DRPs related to the medicines reconciliation and discrepancies with the medicines list and for 76% for DRPs identified in the medication review.
Conclusions DRPs were frequently identified in this cohort of ICU patients by the use of a standardised assessment tool. The majority of DRPs identified in the medication reviews were accepted by the physician. This indicates that the inclusion of a clinical pharmacist in the ICU multidisciplinary team may contribute to the quality of both acute and prophylactic drug treatment in critically ill patients.

No conflict of interest.

CPC-115 PREVENTION AND TREATMENT OF INTRALUMINAL CATHETER THROMBOSIS IN CHILDREN HOSPITALISED IN A PAEDIATRIC INTENSIVE CARE UNIT

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Background Placing central venous access devices (CVADs) is essential in the management of critically ill children. Used for the administration of fluids, medicines, total parenteral nutrition or blood products they may, however, also cause thrombotic complications.
Purpose To develop and implement a protocol for the prevention and treatment of catheter-related intraluminal thrombosis in a Paediatric Intensive Care Unit (PICU).
Materials and Methods A computerised search was carried out on MEDLINE using the medical subject heading 'central venous catheter' associated with 'occlusion',' 'thrombosis', 'critically ill patients' and 'fibrinolytic'. The protocol development process was guided by the goal of weighing evidence regarding effectiveness, safety and cost. Algorithms were developed in order to reduce the complexity of the protocol, aid comprehension, and facilitate successful implementation.
Results With the information gathered, a protocol was drawn up and those recommendations that best suit our environment were included. They were agreed upon by a broad panel of professionals working in the PICU and the Pharmacy Department. Facts to highlight:

Prevention of intraluminal catheter thrombosis:

Prevention of intraluminal CVAD thrombosis with continuous heparin infusion: To keep intravenous catheters patent for drug administration, haemodynamic monitoring and blood sampling.
Prevention of intraluminal CVAD thrombosis with heparin lock solutions: To maintain catheters not being used for the administration of continuous infusion fluids.
Prevention of intraluminal CVAD thrombosis with fibrinolytic lock solutions: If prior intraluminal thrombosis has occurred. The fibrinolytic agent used should be the same as that used for thrombosis resolution.

Treatment of intraluminal CVAD thrombosis

Normal saline: Flush with 5–10 mL. If after 3 attempts the problem is not solved, administration of fibrinolytic therapy is recommended.
Urokinase at a concentration of 5,000 U/mL (first line).
Alteplase at a concentration of 1 mg/mL (second line).

Conclusions Due to the variety of options available for the pharmacotherapeutic management of intraluminal catheter thrombosis, one measure to improve the quality of the treatment and reduce the variability in prescriptions could be to implement a protocol as described.

No conflict of interest.

CPC-116 PREVENTION OF OPIOID-INDUCED CONSTIPATION: RESULTS FROM A CAMPAIGN IN 4 HOSPITALS IN DENMARK

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Background The Clinical Pharmacy Service is part of the Capital Region Pharmacy. The Clinical Pharmacy Service handles acquisition of medicines for the hospital wards and is responsible for the safe and rational use of medicines. The department employs teams consisting of a pharmacist and a pharmaconomist [roughly translating as an expert in pharmaceuticals] with responsibility for each ward. The educational background of the pharmaconomist is 3 years' tertiary education which includes an internship in a community pharmacy or hospital pharmacy. The pharmaconomist handles the daily acquisition of medicines and contact with the wards and the pharmacist is responsible for quality assurance. A campaign was launched to improve the quality of the service on the wards and to educate the pharmaconomists.
Purpose To improve awareness of opioid-induced constipation and treatment with laxatives.
Materials and Methods The pharmaconomist attended teaching sessions arranged by the pharmacists. The pharmacists developed an intervention handout to the wards containing information about why and how they should prevent opioid-induced constipation. For 8 weeks the pharmaconomists screened the medicines prescribed on the wards for opioids and checked whether a laxative was prescribed. If no laxative was prescribed they filled in an intervention handout with patient information and proposed solutions and

gave it to a nurse or doctor on the ward. The nurse and doctor would consider the suggested solution and tick off either 'Yes I agree and have prescribed a laxative' or 'No I don't agree' and return the handout to the pharmaconomist.

Results A total of 2282 patient medicines were screened and 681 patients had been prescribed opioids. 236 of the patients receiving opioids did not have a prescription for a laxative and the pharmaconomist filled in an intervention handout for these patients. 25 interventions were accepted by the doctors on the wards and laxatives were prescribed. Unfortunately about 50% of the handouts were never returned to the pharmacy, making it difficult to determine the exact number of interventions accepted. Also a number of patients were discharged before action could be taken. If the intervention were to be repeated the following would be relevant to improve the outcome: better communication with the doctors, ensure that the patients on selected wards are hospitalised for a few days (to make time for intervention) and more time to prepare the ward personnel.

Conclusions The campaign was a success, but more could be done to improve the outcomes of such a campaign. It is important to consider the selection of wards to include in the campaign. On wards where the patients are discharged after a few days it can be difficult to implement the interventions under time pressure.

No conflict of interest.

CPC-117 PROSPECTIVE REGISTRY FOR EVALUATING THE EFFECTIVENESS OF BEVACIZUMAB ALONE OR WITH IRINOTECAN IN RECURRENT GLIOBLASTOMA

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Background Recurrent glioblastoma is nearly always fatal, with median survival rates of approximately 12–14 months. Previous phase II clinical trials showed promising results with bevacizumab, alone or in combination with irinotecan, in patients with recurrent glioblastoma.

Purpose To assess whether the survival of patients with recurrent glioblastoma receiving bevacizumab alone or with irinotecan in everyday practise is comparable to that reported in clinical trials.

Materials and Methods This was a retrospective observational study conducted at a single hospital in Italy. Patients with recurrent glioblastoma who had received bevacizumab alone or with irinotecan from January 2009 to September 2011 were included in our study.

The main outcome measures were progression-free survival (PFS), overall survival (OS), and rates of PFS and OS at 6 months.

Results Median PFS was 5.1 months in the bevacizumab group (n = 9) and 15.4 months in the bevacizumab + irinotecan group (n = 10), with 6-month PFS rates of 45% and 69%, respectively. Median OS was 6.8 months for bevacizumab alone and 11.1 months for bevacizumab + irinotecan, with 6-month OS rates of 100% and 90%, respectively.

Conclusions Although the number of patients included is not sufficient to allow a conclusive statement about the place of bevacizumab in the treatment of recurrent glioblastoma, the data appear promising, and are consistent with the results of clinical trials.

No conflict of interest.

CPC-118 QUICK WINS – INNOVATIVE AND ECONOMIC FOCUS ON USE OF MEDICINES

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Background Medicines account for a large part of the budget in Danish hospitals. National and regional actions are initiated to control drug expenses. Local initiatives aim at involving doctors, nurses and pharmacy staff in taking everyday responsibility for the rational use of drugs.

Purpose To establish systematic and documented cooperation between the Local Drug and Therapeutics Committee, the clinical staff and the pharmacy staff to systematically identify and intervene on avoidable medicines expenses.

Materials and Methods 10 focus areas were identified: Handling free-of-charge drugs, systematic feedback from top-up-service, the staff's (unofficial) use of medicines, reanalysis of statistical material on drug use, input from other pharmacy departments, analysing the use of the 120 most expensive drugs, analysis of disposed medicines, emptying vials (expensive drugs), shift from IV to oral antibiotics, and use of the patients' own medicine, when possible. Through a systematic approach and co-operation on all levels of the organisation, the 10 focus areas were implemented in everyday practise at the hospital.

Results The results were recorded in a report to the Local Drug and Therapeutics Committee in January 2012. A financial estimate was made for 4 out of 10 focus areas. The total result for the 4 intervention areas amounts to a saving of DKK 1,154,500 (€155,00)/year. The saving is based on a conservative estimate. For the remaining six focus areas interventions are still taking place. In 2012 the initiative is spreading to other hospitals in the Capital Region.

Conclusions Through systematic and well-documented cooperation between the Local Drug and Therapeutics Committee, the clinical staff and the pharmacy, it has proved possible to save a considerable amount on the total hospital budget.

No conflict of interest.

CPC-119 RANDOMIZED CONTROLLED TRIAL OF CLINICAL PHARMACY MANAGEMENT OF PATIENTS WITH TYPE 2 DIABETES IN AN OUTPATIENT DIABETES CLINIC IN JORDAN

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Background Glycaemic goals are often not achieved in patients with type 2 diabetes despite the availability of many effective treatments and the documented benefits of glycaemic control in the reduction of long-term microvascular and macrovascular complications.

Purpose To evaluate, in a randomised, controlled trial, the impact of a clinical pharmacy service on clinical outcomes in patients with type 2 diabetes.

Materials and Methods A total of 171 patients (85 interventions vs. 86 usual care) participated in the study. Intervention patients had individualised education and treatment recommendations from a clinical pharmacist while control patients received usual care provided by the clinic. The primary outcome measure was glycaemic control manifested by HbA1c reductions. All other data collected including systolic and diastolic blood pressure, total cholesterol, low density lipoprotein (LDL), high density lipoprotein (HDL), serum triglycerides, medication adherence, and necessary self-care activities formed secondary outcome measures. Between-group differences in the amounts of change from baseline to 6-month follow-up were tested and a p value of <0.05 was considered statistically significant.

Results Compared with baseline values, patients in the intervention group had a mean reduction of 0.8% in HbA1c versus a mean

increase of 0.1% from baseline in the usual care group (P = 0.019). The intervention group compared with the usual care group had small but statistically significant improvements in the secondary measures of fasting blood glucose, systolic and diastolic blood pressure, total cholesterol, LDL, serum triglycerides, self-reported medication adherence and self-care activities. Between-group differences in changes in the secondary measures of HDL and body mass index were not significant.

Conclusions The enhanced patient clinical outcomes as a result of pharmacist-led pharmaceutical care in an outpatient diabetes clinic in the present study demonstrate the value of an enhanced clinical pharmacy service in improving diabetes care and achieving the desired therapeutic outcomes for patients with type 2 diabetes.

No conflict of interest.

CPC-120 RANITIDINE-INDUCED SYSTEMIC HYPERSENSITIVITY REACTION: A CASE REPORT

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Background Ranitidine is a histamine-2-receptor antagonist (antiH2) widely used with an excellent safety record. It's a drug included in the premedication for several chemotherapy regimens.

Purpose To report a case of hypersensitivity to ranitidine.

Materials and Methods Case report, literature review.

Results A 68-year-old man was being followed at hospital for management of metastatic lung carcinoma. A third-line treatment with weekly paclitaxel had been decided. The usual premedication includes intravenous ondansetron, ranitidine, dexchlorpheniramine and methylprednisolone. The patient's anamnesis hadn't reported any allergic events.

During the first course, the patient presented pruritus 5 minutes after ondansetron and ranitidine injections. Hypotension and warmth occurred despite the administration of dexchlorpheniramine. 120 mg of methylprednisolone resolved the hypersensitivity completely before the patient received paclitaxel, without further event.

During the next course, ondansetron was replaced by metoclopramide. During the ranitidine infusion the patient presented sweats, hypotension and bronchospasm. Ranitidine infusion was stopped and methylprednisolone overcame the reaction. The patient's condition allowed paclitaxel administration although he refused dexchlorpheniramine.

The need for antiH2 and the most appropriate premedication for the next courses were discussed by the clinician and pharmacist. Hypersensitivity reactions are reported in ranitidine's SPC with an estimated rare frequency and also in the literature review. A case also reported a cross-reaction between antiH2 and other antihistamines [1], while another author excluded it [2].

As no allergic investigation has been performed, all antihistamines have been removed as a precaution. For subsequent courses the premedication included metoclopramide 10 mg and methylprednisolone 80 mg. No other incidents have been reported. This search didn't formally establish the need for antiH2 in paclitaxel premedication.

Conclusion: This case has been reported to the pharmacovigilance centre and reminds clinicians that even commonly used and generally well-tolerated substances can cause serious side effects.

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No conflict of interest.

CPC-121 REPORT AFTER ONE YEAR USING OF FINGOLIMOD, THE FIRST ORAL TREATMENT FOR MULTIPLE SCLEROSIS: ANALYSIS OF PATIENTS IN A NEUROLOGY UNIT

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Background Multiple sclerosis (MS) is in Europe the most common neurological disease starting between the ages of 20 and 40 years. It affects approximately 2.5 million people worldwide and is the first cause of non-traumatic disability for young people. Management of this disease has for a long time been limited to treatment of relapses. However, in recent years, significant progresses have been made in the treatment with the appearance of, among others, fingolimod for relapsing-remitting MS in March 2011 in the European Union.

Purpose To observe the impact of fingolimod in the care of patients, and make an assessment of practise in the neurology unit (Professor Pelletier, La Timone hospital, Marseille) one year after fingolimod was approved for use.

Materials and Methods We noted treatment interruptions and their causes, and analysed benefits and side effects reported by patients treated with fingolimod for more than three months. Data collection was based on meetings or telephone interviews with patients and on information taken from medical records.

Results 143 patients started treatment with fingolimod between March 2011 and October 2012, 51 in the last three months. Our analysis was performed on 92 patients, and included 19 meetings and 20 telephone interviews. Four definitive treatment interruptions were identified: three for disease progression (relapses) and one hepatic cytolysis. We also noted two temporary discontinuations for tuberculosis contagion and hives. Preliminary results show that the clinical and biological tolerance was satisfactory in most cases. Furthermore, absence of relapse or improvements in motor status and tiredness were noted by the majority.

Conclusions Fingolimod has changed the management of patients with MS, and many of them have reported an improvement in their quality of life and feel side effects to be acceptable. The imminent arrival of other oral agents should result in clarification of the role of each in the strategy, and might be the subject of comparative studies.

No conflict of interest.

CPC-122 RISK FACTORS IN THE INCIDENCE OF CHEMOTHERAPY-INDUCED EMESIS

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Background Chemotherapy-induced nausea and vomiting (CINV) are the most common side effects after the administration of anticancer drugs. CINV appears in a variable percentage of patients, depending on the cytostatic agent and patients' risk factors.

Purpose The aim of this study was to evaluate the effect of the risk factors on the incidence of emesis after the administration of the first cycle of chemotherapy.

Materials and Methods A literature search was conducted for articles addressing the risk factors in CINV. Younger age, female sex, history of motion sickness or pregnancy-induced vomiting, radiotherapy and anxiety/depression were included. A history of alcohol intake was considered a protective factor and it was graded as none, mild (1–5 drinks/month), moderate (6–14) or high (>14) consumption. The impact on complete response (CR) of those risk factors for

Abstract CPC-122 Table 1

Risk factors	Patients	CR (N, %)	Non-CR (N, %)	Risk reduction CR vs. Non-CR	Statistical difference (SD) or Non-significant difference (NSD)
Age (n = 30)	3	3 (100%)	0	100%	SD between all subgroups.
Age >75	21	16(76.2%)	5(23.8%)	52.4%	
Age 51–74	6	2 (33.3%)	4(66.7%)	33.3%	
Age 31–50					
Sex (n = 30)	14	8 (57.1%)	6(42.9%)	14.2%	NSD
Female	16	13(81.2%)	3(18.8%)	62.4%	
Male					
History of motion sickness	4	3 (75%)	1 (25%)	50%	
Pregnancy-induced vomiting	4	3 (75%)	1 (25%)	50%	
Radiotherapy	3	2 (66.7%)	1(33.3%)	33.3%	
Anxiety/depression	6	3 (50%)	3 (50%)	–	
Alcohol intake history (n = 30)					SD between zero and mild consumption vs.
None	19	12(63.2%)	7(36.8%)	26.4%	moderate and high.
Mild (1–5)	9	6 (66.7%)	3(33.3%)	33.4%	
Moderate (6–14)	1	1 (100%)	0	100%	
High (>14)	1	1 (100%)	0	100%	

CINV was investigated. CR was defined as no emetic episodes during the overall 5-day study period. Patients' risk factors were recorded before chemotherapy infusion. All patients received intravenous 5HT3-receptor antagonists before chemotherapy infusion and a two-drug combination (metoclopramide and dexamethasone) on the following four days. Patients kept a diary to report CINV during the 5-day period. Univariate analyses were performed to determine the risk factors significantly associated with emesis after the first cycle of chemotherapy. Risk reduction between CR and non-CR results were calculated. The statistical significance among risk-factor subgroups was also evaluated in order to assess the extent of influence of each one.

Results A total of 30 patients were evaluated. The incidence of emesis is summarised in the table.

Conclusions The younger the patient the less emetic control there was. Although the risk was higher in women, this difference was not significant. None or minor consumption of alcohol had significantly higher risk of emesis than moderate or high. A multivariable analysis may be performed to confirm the relationship between risk factors and CINV.

No conflict of interest.

CPC-123 RISPERIDONE AND SUSPECTED ANGIONEUROTIC OEDEMA: CONTRIBUTION OF MULTIDISCIPLINARY CARE

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Background Psychotropic drugs may cause cutaneous eruptions with various degrees of severity ranging from urticaria to 'angioedema' (AE). Respiratory tract obstruction needs emergency care.

Purpose To report on a patient who developed facial AE following treatment with risperidone.

Materials and Methods An 85-year-old woman was admitted to the emergency department (ED) for acute respiratory failure 24 hours after risperidone was introduced.

Results She presented macroglossia, dyspnoea and oedema of the soft palate, unresolved with antihistamines and steroids. In the ED, risperidone was reintroduced for agitation. It was immediately followed by severe dyspnoea, oedema of the tongue and uvula requiring admission to the intensive care unit. Risperidone imputability was suspected after a review of the literature. The Regional Reference Centre for Bradykinin AE (BAE) was consulted. Allergic oedema caused by risperidone but not BAE was concluded (delay of occurrence, absence of real BAE case with risperidone). Risperidone was stopped, the patient was monitored and treated with the optimal dose of steroids and antihistamines. Oedema resolved in 48 hours and patient went back home without sequelae. Naranjo evaluation scored 9, so it was highly probable that oedema was linked to the drug.

Conclusions AE can result in laryngeal oedema and fatal airway obstruction. When differential diagnoses are eliminated, AE is classified into allergic/pseudo-allergic or bradykinin-related (hereditary or acquired with angiotensin-converting enzyme inhibitors and sartans). The mechanism of drug-induced BAE seems to be mediated by increased plasma bradykinin levels, because these drugs reduce its breakdown.

AE has been reported to occur with antipsychotics like risperidone, but these drugs probably produce histaminergic AE, not BAE. In our case, this hypothesis must be ruled out with cutaneous allergology prick tests with risperidone.

Diagnosis of BAE can be difficult. Clinical signs and oedema resistant to conventional treatments have led to suspicion of BAE. French Reference Centres can improve and optimise detection and treatment of these orphan diseases and limit use of expensive drugs (*e.g.* icatibant: 6,300 US dollars per patient).

No conflict of interest.

CPC-124 RIVAROXABAN OR CONVENTIONAL THROMBOPROPHYLAXIS AFTER MAJOR ORTHOPAEDIC SURGERY IN ROUTINE PRACTISE: INFLUENCE OF CO-MEDICATIONS ON OUTCOMES IN THE XAMOS STUDY

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Background Rivaroxaban, a direct Factor Xa inhibitor, has been shown to be more effective in preventing venous thromboembolism than enoxaparin regimens, with a similar safety profile, in patients undergoing hip or knee arthroplasty (the phase III RECORD studies). Rivaroxaban is approved for this indication worldwide.

Purpose To examine the effectiveness and safety of rivaroxaban for thromboprophylaxis in routine clinical practise and the impact of selected co-medication use on outcomes.

Materials and Methods XAMOS was a phase IV, non-interventional, open-label cohort study in patients undergoing major orthopaedic surgery in daily clinical practise. The choice of rivaroxaban or standard of care (SOC) for VTE prophylaxis was at the discretion of the attending physicians. All adverse events, including symptomatic thromboembolic and bleeding events, and pre-trial and concomitant use of medicines were reported.
Results XAMOS enrolled 17,701 patients; the safety population included 17,413 patients, of whom 8778 received rivaroxaban and 8635 received SOC (81.7% low molecular weight heparin). Baseline patient demographics and use of cytochrome P450 (CYP) 3A4 inhibitors or inducers and platelet aggregation inhibitors (PAIs) before surgery were similar between groups; these drugs were used less frequently after surgery. There was a significant reduction in the incidence of symptomatic thromboembolic events in the rivaroxaban group compared with the SOC group, with numerically but not statistically higher incidence of major bleeding events. Concomitant use of PAIs was associated with higher incidences of symptomatic thromboembolic and any bleeding events compared with non-use in both the rivaroxaban and the SOC groups (Table).
Conclusions XAMOS confirmed the results of the RECORD studies. CYP3A4 inhibitors or inducers and PAIs were used less frequently after surgery compared with before surgery. The benefit–risk profile of rivaroxaban compared with SOC was maintained in routine clinical practise in patients undergoing major orthopaedic surgery, including patients with concomitant use of PAIs.

Abstract CPC-124 Table 1

Pre-trial and concomitant use of drugs and clinical outcomes in the XAMOS study*

	Rivaroxaban (%)	SOC (%)
Pretrial use (≤7 days before surgery)		
CYP3A4 inhibitors	2.3	3.0
CYP3A4 inducers	0.8	0.8
PAIs	6.8	8.2
Concomitant use during the study		
CYP3A4 inhibitors	0.5	1.0
CYP3A4 inducers	0.4	0.7
PAIs	2.8	3.7
Incidence of any symptomatic thromboembolic events		
Concomitant use of PAIs	2.4	4.0
No concomitant use of PAIs	0.6	0.9
Incidence of any treatment-emergent bleeding events		
Concomitant use of PAIs	8.4	8.1
No concomitant use of PAIs	4.6	3.0

*Unadjusted data as crude estimates for comparison between groups (covariate-adjusted and propensity score-adjusted results will be presented elsewhere upon completion of the final data analyses).

No conflict of interest.

CPC-125 SATISFACTION SURVEY WITH PHARMACEUTICAL CARE IN AMBULATORY CANCER PATIENTS ON TREATMENT WITH ORAL ANTINEOPLASTIC AGENTS

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Background In recent years, many oral antineoplastic agents (OAAs) have appeared providing patient convenience. According to law, in the Autonomous Community of Región de Murcia (Spain), these drugs are dispensed at hospital pharmacies in the outpatient setting.

Hospital pharmacists, because of their frequent contact with cancer patients on treatment with OAA, play a pivotal role in improving adherence and ensuring that medicines are taken correctly through oral and written information.
Purpose To know patient satisfaction with pharmaceutical care (PC) through a survey in ambulatory cancer patients who take OAA.
Materials and Methods A Likert-type scale on patient satisfaction with PC was designed and run on every other week for six weeks. The survey was completed by patients in an anonymous and voluntary manner. It included 17 questions in 5 groups: demographical data, PC request, opinion about the information provided to them, consultation with the pharmacist and global satisfaction degree with PC. Only these 2 latest question groups were considered for the analysis, including 5 items: pharmacist accessibility, courtesy, professional competence, patient opinion about pharmacist utility and global satisfaction degree with PC. Survey internal consistency was measured with Cronbach's alpha coefficient.
Results This survey was completed by 57 patients (71.25% of the total; 53% men; 47% women). Answers to questions were graded with 5 points. For the items pharmacist accessibility, courtesy, professional competence, patient opinion about pharmacist utility and global satisfaction degree with PC, the mean plus/minus standard deviation values achieved were 4.53 ± 0.49, 4.53 ± 0.49, 4.29 ± 0.53, 4.29 ± 0.53 and 4.46 ± 0.53, respectively. Overall satisfaction extent was 88.33%. In this survey, Cronbach's alpha coefficient was 0.85, so we can say that this scale is trustworthy.
Conclusions In this patient group, the degree of overall satisfaction with pharmaceutical care was satisfactory. Future surveys will be needed to cheque and improve our service.

No conflict of interest.

CPC-126 SECOND-LINE CHEMOTHERAPY WITH NAB-PACLITAXEL IN PATIENTS WITH PANCREAS CANCER

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Background Pancreatic cancer is one of the most deadly forms of cancer. Standard treatment in metastatic disease is the quemotherapy with gemcitabine, but there is not a standard therapy for gemcitabine-refractory patients.
Purpose Assess the off-label efficacy of nab-paclitaxel, in patients who progressed on gemcitabine-based therapy, in our hospital.
Materials and Methods Observational retrospective study of pancreatic cancer patients treated with nab-paclitaxel who progressed on gemcitabine-based therapy from June 2011 to April 2012. Data were collected from clinical history, Oncofarm® and Omega-3MIL® programmes. We determined: Progression free survival (PFS) and Overall Survival (OS). 12 patients (100% male) were treated with nab-paclitaxel. Eleven of them presented metastatic desease. The patients were treated with two therapies:

- nab-paclitaxel 100 mg/m^2 (1.8,15/28d). 5 patients received this treatment. Median age was 79.4 years (sd = 4.2 years)
- Gemcitabine 1000 mg/m^2 plus nab-paclitaxel 100 mg/m^2 (1.8,15/28d): 7 patients received this treatment; Median age was 65.5 years (sd = 6.9 years).

Results Median PFS was 2,8 months (95% CI, 1.5 to 4.1 months) with single agent, and 5.3 months (95% CI, 4.0 to 6.5 months) with gemcitabine plus nab-paclitaxel. The PFS in the study was 20% and 83% respectively. The OS couldn't be determine in the nab-paclitaxel group, because there wasn't any event during the study period. The OS with gemcitabine plus nab-paclitaxel was 66.7%.

Conclusions

- It showed better clinical outcomes in the gemcitabine plus nab-paclitaxel group in PFS.
- The nab-paclitaxel can be an effective second-line chemotherapy in gemcitabine resistant patients.

No conflict of interest.

CPC-127 SEVERAL TYPES OF PROTEINURIA AND ASSOCIATED FACTORS AMONG HIV-INFECTED ADULTS IN THE HAART ERA

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Background HIV-infected individuals have an increased risk of chronic kidney disease.
Purpose To evaluate the prevalence of different types of proteinuria and associated factors in a HIV-infected population with a high percentage (92%) of Caucasian origin.
Materials and Methods Cross-sectional study of all HIV-infected adults seen at the Montpellier University Hospital HIV outpatients unit over 6 months. Demographics, treatment history, comorbidities and laboratory data were collected from an electronic database and manual review chart. Spot urine protein to creatinine (uPCR) and albumin to creatinine (uACR) ratios, estimated glomerular filtration rate using the MDRD equation (eGFR) were assessed. Three types of proteinuria were defined: tubular proteinuria (uPCR > 200 mg/g and albuminuria/proteinuria <0.5), glomerular proteinuria (uPCR > 200 mg/g and albuminuria/proteinuria > 0.5), microalbuminuria (uPCR < 200 mg/g and uACR 30–300 mg/g). Multivariate logistic regression was used to identify independent factors of proteinuria for patients with eGFR> 60 mL/min/1.73 m^2.
Results Characteristics for 1210 patients were: median age 48 years, 26% women, 7.1% black, 93% on HAART, 54% on tenofovir, median CD4 cell count 488 cell/µl, 73% with HIV viral load <20 copies/ml, 7.8% hypertensive, 3.4% diabetic, 18.2% HCV positive, 2.1% with history of kidney disease.eGFR was >90 for 59.5%, 60 to 90 for 36% and <60 for 4.5%. Of 1156 patients with eGFR> 60 mL/min/1.73 m^2, proteinuria was observed in 159 patients (13.7%) [tubular: 124 (10.7%), glomerular: 35 (3%)] and microalbuminuria for 51 patients (4.4%)]. Factors associated with tubular proteinuria were: current regimen with tenofovir (OR 2.70), diabetes (OR 2.54), HCV+ (OR 1.62), AIDS stage (OR 1.54), older age (OR 1.46/10-year increment). Diabetes (OR 5.15) and hypertension (OR 3.74) were associated with glomerular proteinuria.
Conclusions The prevalence of proteinuria or microalbuminuria was 18.1% in this predominantly white, cART (current antiretroviral therapy)-experienced cohort. Measuring uPCR and albuminuria may assist in the diagnosis of early renal disease.

Abstract CPC-127 Table 1

1210 patients			
DFG < 60	DFG > 60		
54 patients	**1156** patients		
	No Proteinuria uPCR < 200 mg/g	Proteinuria = uPCR > 200 mg/g	
	86.3% (**997**/1156)	13.7% (**159**/1156)	
	Microalbuminuria uACR 30 to 300 mg/g	Tubular proteinuria alb/prot < 0.5	Glomerular proteinuria alb/prot > 0.5
	4.4% (**51**/1156)	10.7% (**124**/1156)	3% (**35**/1156)

No conflict of interest.

CPC-128 START SMART THEN FOCUS – A SURVEY OF ANTIMICROBIAL STEWARDSHIP GUIDELINES IMPLEMENTATION IN ENGLAND

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Background Start Smart then Focus Antimicrobial Stewardship (AMS) guidance for England was launched in November 2011 on European Antimicrobial Awareness Day.
Purpose To identify the extent of guideline implementation, whether the guidelines had improved AMS, and to collect examples of good practise.
Materials and Methods A web-based survey was developed using SurveyMonkey software, piloted, and then distributed through the microbiology, infectious diseases and pharmacy networks in July 2012.
Results There were 74 responses (44%) to the Start Smart then Focus (SSTF) guidance by September. SSTF was rated excellent or good by 65% for making AMS a Trust priority; by 57% for improving their AMS infrastructure; by 51% for improving prescribing practise; by 57% for improving audit and by 31% for improved usage reporting. Only 12% to 22% thought it was poor or less than satisfactory for the same criteria.

A formal review of SSTF has been done by 41%, with 17% planning to do so. 86% had done an informal review. 52% had developed an action plan.

The main barriers to implementation were a lack of microbiology/infectious diseases time, then pharmacist time. An established AMS group, an enthusiastic pharmacist or microbiologist, or adequate time, were the main facilitators.

Putting the indication and duration or a review date on inpatient antimicrobial prescriptions were in place prior to SSTF in 67% and 73% of centres respectively. Since SSTF a further 9% have started and another 13% and 10% plan to implement these suggestions by April 2013.

Additional antimicrobial ward rounds have started or are planned since SSTF in medical wards by 20%, surgical wards by 19% and paediatrics by 10% of centres.
Conclusions The Start Smart then Focus Antimicrobial Stewardship guidance has helped to further implement AMS in England.

No conflict of interest.

CPC-129 STUDY OF A PHARMACISTS CONTRIBUTION TO MEDICINES RECONCILIATION IN CRITICALLY ILL PATIENTS

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Background Medicines reconciliation in intensive care units (ICU) is essential in preventing medicines errors. Medicines reconciliation errors have been found to occur mainly in the transition of care.
Purpose To develop and evaluate a medicines reconciliation programme in critically ill patients.
Materials and Methods Prospective study. Discrepancies between chronic treatment and treatment prescribed by the hospital physician in patients admitted to the ICU were analysed. Medicines histories were obtained from the medical history and patient interview. If discrepancies were found, the ICU physician was contacted.

Results A total of 50 patients were studied (mean age 62.7 years, SD 13.2). 60% of patients showed at least one reconciliation error. The average number of drugs involved in reconciliation errors was 1.8 (SD 1.2) per patient. A total of 54 (17%) drugs discrepancies were found. The most common error was omission of a regularly used medicine (74%), followed by discrepancies in the frequency (9%), incorrect drug (9%) and incorrect dose (8%). Antihypertensive drugs represented 37% of all discrepancies. Pharmacists made interventions in 98% of discrepancies. Most pharmacist interventions consisted of the addition of an omitted drug (66%) and dosage adjustment (9.4%). 81% of recommended interventions were accepted by ICU physicians. Most rejected interventions were due to the patient's clinical status (70%).
Conclusions Critically ill patients showed a high incidence of medicines reconciliation errors. Most reconciliation errors consisted of omissions of chronic medicines and involved antihypertensive drugs. 81% of pharmacist interventions were accepted. Medicines reconciliation could reduce medicines errors in critically ill patients and should be incorporated into the daily routine of the pharmacist responsible for the unit.

No conflict of interest.

CPC-130 SWITCHING FROM ADEFOVIR TO TENOFOVIR IN HEPATITIS B-INFECTED PATIENTS

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Background Adefovir disoproxil (ADF) was the second nucleoside analogue to be approved for Hepatitis B Virus (HBV) treatment. Later studies showed that tenofovir had better and more cost effective clinical outcomes for HBV treatment.
Purpose To analyse the treatment changes in patients with chronic infection on ADF treatment. To define treatment changes and their clinical causes and effects in our population.
Materials and Methods A retrospective observational study was performed in a tertiary hospital including all patients treated with ADF between January 2005 and September 2012. Data collected: demographics (sex, age) previous treatment, ADF treatment duration, reasons for changing from ADF, new drug prescribed, HBV DNA viral load at the moment of change and 6 months later.
Results Fifty-nine patients started treatment with ADF during the study period; men (81.4%), mean age: 42 years. Previous treatment: 45 treatment-naïve, 2 Peginterferon-a2-a and 12 lamivudine. Fourteen patients were lost to follow-up. Of the 45 patients included mean duration of treatment with ADF was 44.96 months (range: 3–92). 40 patients changed treatment with ADF: 27 patients switched to TDF with undetectable HBV DNA viral load (two of them returned to ADF due to intolerance); 15 patients switched due to detectable HBV DNA-viral load: 10 patients to TDF and 5 to ETV. 5 patients remain on ADF.
Conclusions Nearly every patient treated with ADF has changed treatment at some point and are no longer treated with this drug.

Most patients switched from ADV to TDF without any clinical reason; this may be related to better clinical outcomes and cost effectiveness.

No conflict of interest.

CPC-131 SWITCHING STRATEGY. THE PHARMACIST'S POINT OF VIEW ON COST, ADHERENCE AND VIROLOGICAL OUTCOME

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Background HIV infection is a complex medical problem that requires careful monitoring of adherence to treatment, efficacy, development of resistances and toxicities. The estimated life expectancy of patients is increasing, this makes it necessary to find efficient ways to optimise switching therapy away from HAART in order to reduce costs and increase its efficacy. At Amedeo di Savoia Hospital of Turin, the regional centre in Piedmont for HIV infection diagnosis and treatment, hospital pharmacists work in a multidisciplinary team with infectiologists, nurses, psychologists and dieticians. The team follows every aspect of the clinical pathway, leading to an improvement in the clinical management of HIV patients.
Purpose

- To monitor HAART for all patients on therapy
- To identify patients with a switch of therapy
- To create a multidisciplinary database including adherence, economic and clinical data before and after the switch
- To monitor the distribution of available resources in relation with virological outcome and adherence response of patients
- To achieve a rational use of resources

Materials and Methods Collecting data from Oliamm Software and File F using a specific software application, we analysed cost and adherence by the pharmacy refill method (days supplies between refill dates/duration of dispensed therapy x 100) for each switch of treatment between March 2010 and March 2012. From clinical reports we also evaluated the reasons for switching (toxicity, simplification, treatment failure) and the success of variation in term of virological outcome.
Results Switching of antiretroviral treatments occured in 250 patients (male 177, female 73, median age 48 years), out of about 1,835 HIV-positive people in treatment, considering overall 310 switches (about 8% at the patient's request). In 151 cases the switch led to a financial saving and in 159 cases to an increase in cost, leading overall to an excess of cost of 4396,6€ each month (an additional €17,59 for each patient for each month). The reasons for the variation were: treatment failure in 30%, simplification of the treatment in 20%, toxicity in 44% and other causes in 6%. Focus on simplification evidenced: 13% decrease in pill burden, 17% on STR, 55% on LDR, 10% on QD therapy. We also analysed the causes of toxicities. From our study we observed an increased number of patients with suppressed viral load (from 60% to 77%) as evidence of efficacy. 67 out of 125 patients (54%) with pre-switch viral load non-suppressed, had a suppression after switch. 172 patients out of 185 patients (93%) with pre switch viral load suppressed, conserved suppression after switch, but 13 patients (7%) had viral rebound. The change of the treatment didn't impact on adherence in 50.32% cases and produced an improvement in adherence in 39.03% of switched patients. Only in 10.65% did a decrease of adherence improve. We have also analysed the cost distribution, observing a better use of resources to obtain a viral load under 20 cp/ml and a financial saving for treatment of patients already suppressed pre-switch.
Conclusions In our study an analysis of switching treatment has demonstrated a correct distribution of budget and an improvement in adherence. It has also demonstrated the importance of working in team for better management of the therapeutic path.

No conflict of interest.

CPC-132 SYNDROME OF INAPPROPRIATE ANTIDIURETIC HORMONE SECRETION AS ADVERSE DRUG REACTION IN HOSPITALISED PATIENTS TREATED WITH TOLVAPTAN

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Background Some drugs can cause Syndrome of Inappropriate Antidiuretic Hormone Secretion (SIADH). Tolvaptan is a new drug

to treat SIADH. There is a lack of studies about the prevalence of SIADH as an Adverse Drug Reaction (ADR).

Purpose To classify by the Naranjo Algorithm (NA) and to determinate the prevalence of SIADH in hospitalised patients caused by ADR and treated with tolvaptan.

Materials and Methods Two-year descriptive, retrospective, longitudinal, historical cohort study of 33 patients (15 men, 18 women). We sought patients and their clinical characteristics (age, sex, pretreatment in the week prior to tolvaptan with drugs that could cause SIADH as ADR) using pharmacotherapy management software SINFHOS, Silicon, IANUS and BOT Plus. To determine the probability of ADR, we used the NA. Probability levels based on total score are: definite (>9), probable (5–8), possible (1–4), doubtful (0).

Results 12 of the 33 (6 men, 6 women) patients were treated in the week prior to tolvaptan with drugs that could cause SIADH as ADR. 16 treatments with 10 drugs that could cause SIADH as ADR (1.3 drugs per patient) were found in the week prior to tolvaptan. The 16 treatments detected were classified as possible (12 times), probable (once) and doubtful (three times); average score was 2.6. SIADH could have been caused by a drug in 10 patients and was classified as possible (4 men, 5 women, 7 older than 65, 2 younger), and probable (1 man over 65). Prevalence was 30%, 40% in men and 34% in women, 28% in people older than 65 and 40% in younger people.

Conclusions Our results suggest that some drugs may contribute to the development of SIADH, and there seems to be a greater risk in male patients under 65. Further research is required to evaluate the prevalence and the relative risk of suffering from SIADH as ADR.

No conflict of interest.

CPC-133 TELAPREVIR: ADVERSE EVENTS IN CLINICAL PRACTISE

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Background The addition of telaprevir to peg-interferon and ribavirin represents a new treatment for hepatitis C (HCV) associated with an improvement in treatment response rates but an impairment of the safety profile.

Purpose To evaluate the safety of telaprevir-based treatment in patients with HCV infection in real clinical practise in a specialty hospital.

Materials and Methods Prospective and observational study of patients who started telaprevir between April and September 2012. Data were collected at each treatment visit at the hospital pharmacy through clinical interview and revision of analytical parameters.

Results We enrolled 14 patients treated with telaprevir, 9 mono-infected and 5 co-infected. All patients were between 18 and 70 years old, had HCV genotype-1 infection and had at least stage 3 liver fibrosis (Metavir score).Only two patients had received no previous treatment. In the pre-treated group, 42% of the patients had a previous relapse, 33% had a partial response, and 25% had no response.

43% of patients required ribavirin dose reduction due to anaemia (haemoglobin < 10 g/dl).

23% of patients needed erythropoietin-stimulating agents due to anaemia (haemoglobin < 8.5 g/dl even though the ribavirin dose had been reduced).

8% of patients required a blood transfusion

Telaprevir was stopped in one patient because of rash. No patients discontinued treatment because of anaemia.

Conclusions The safety profile of telaprevir was consistent with the findings in clinical trials. However, most of the adverse events were reported more frequently in patients in real clinical practise compared with previous results in clinical trials.

These serious and frequent adverse events may be an opportunity for pharmacists to get involved to improve the safety of this treatment.

Abstract CPC-133 Table 1

Anaemia	69%	Grade 2 (8.0 – <10.0 g/dL)	54%
		Grade 3/4 (<8.0 g/dL)	8%
Thrombocytopenia	69%		
Neutropenia	77%		
Hyperbilirubinaemia	46%		
Increased triglycerides	46%		
Increased ferritin	54%		
Increased GGT	46%		
Photosensitivity	23%		
Fatigue	100%		
Depression	69%		
Reduction appetite	77%		
Nausea	30%		
Diarrhoea	46%		
Vomiting	38%		
Haemorrhoids	77%		
Rash and pruritus	69%		

No conflict of interest.

CPC-134 THE EFFECT OF ABACAVIR ON CARDIOVASCULAR RISK OF A SPANISH HIV-INFECTED COHORT

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Background There is evidence that antiretroviral therapy (ART) increases cardiovascular risk (CVR). There is controversy over the effect of abacavir (ABC) on CVR. The use of abacavir has been associated with a higher incidence of myocardial infarction in several cohort studies, but data from clinical trials are not conclusive.

Purpose To determinate the effect of exposure to ABC and exposure time (ET) to ABC in CVR of a HIV-infected cohort on ART from the northwest of Spain.

Materials and Methods Cross-sectional study including HIV patients on ART who were treated at our hospital between March-May 2012. We recorded demographics, ART history and CVR risk factors. CVR was estimated using the Framingham function calibrated for Spanish population (REGICOR). CVR categories were: low (<5%); intermediate (5–9%); high (10–14%); very-high (>15%). Three ABC exposure groups were defined: a) no abacavir exposure (No ABC); b) exposure to abacavir but not to indinavir (ABC); c) exposure to abacavir and indinavir (ABC + IND).

Results 89 HIV patients were included in the study (83.1% males, mean age 47.4 ± 7.8 years). Smoking prevalence was 51.7%, hypertension 39.3%, dyslipidaemia 24.7%, low HDL cholesterol 67.4%, diabetes 4.5%. Mean global CVR was 4.01%±2.50. Proportion of patients with low CVR was 70.8%; intermediate 25.8%; high 2.2%; very high 1.1%. According to ABC exposure: mean CVR was 4.02 ± 2.62 (No ABC); 3.77 ± 2.28 (ABC); 4.30 ± 2.0 (ABC+IND). No significant differences were found when we compared mean risks of each group. We did not find differences in CVR according to ET to ABC.

Conclusions Apparently, ABC exposure does not increase CVR in our HIV-infected population. More prospective controlled studies are needed to evaluate any association between ABC and increased CVR.

No conflict of interest.

CPC-135 THE EFFECT OF GENDER ON THE USE OF MEDICINES IN MULTIPLE SCLEROSIS PATIENTS

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Background Multiple Sclerosis (MS) is a chronic inflammatory disease of the central nervous system that disables young adults. Epidemiological studies have shown that women are more likely to develop MS than men (ratio 2:1); however, the pathogenesis and treatment of MS in regards to gender has not been extensively studied.
Purpose To evaluate gender-related differences of relapsing-remitting MS patients in response to treatment with natalizumab.
Materials and Methods AIFA-NEURO records relative to patients treated with natalizumab in the Neurology Division of L'Aquila were examined from May 2007 to September 2012. A total of 39 patients were recruited, of which 82% were females. The average age of patients starting the treatment was 33 for females and 36 for males. An Expanded Disability Status Scale (EDSS) score was assigned for each patient before natalizumab treatment was started. The number of relapses in the 12 months before starting treatment with natalizumab were calculated and recorded.
Results EDSS scores were similar (average = 2.8) in females and males. In contrast, females were more likely to have relapses compared to men (1.8 vs. 1.4). Only 3 patients were treated with natalizumab as the first-line drug; all other patients were first treated with a combination of 2 or 3 drugs. Females were more likely than males to have previously been treated with (IFN)-β 1a compared to (IFN)-β 1b (62.5% vs. 37.5%), while men had previously been treated with both equally (57%). Additionally, females were more likely to have been treated previously with glatiramer acetate (44% vs. 14%). All patients received an average of 10.5 administrations of natalizumab per year. All patients are currently undergoing treatment except for 5 females who developed autoimmune reactions.
Conclusions The study describes gender-related differences in response to pharmacological treatments for MS. The results suggest that research should be conducted into the gender response to MS treatments.

No conflict of interest.

CPC-136 THE EFFECTS OF USING A TREATMENT PLAN FOR DISPENSING BIOLOGICAL DRUGS IN RHEUMATIC DISEASES IN ASP 8 OF SYRACUSE, ITALY

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Background Rheumatic diseases are chronic diseases with a high cost. New drugs are the anti-TNF inhibitors adalimumab (A) and etanercept (E). The Infectious Diseases Unit of Umberto I Hospital, Syracuse, Italy, was identified as a Regional Centre for the prescription of biologicals. Furthermore, D.A. 0264/16.02.2011 authorised a regional Treatment Plan (PT) by which these drugs are to be dispensed, health care costs and appropriateness of prescription monitored.
Purpose To evaluate the consequences of the PT and the effects of A and E on PCR values and number of joints involved (NJI).
Materials and Methods The PT is annual and consists of two sections containing: 1. Demographic features, diagnosis, prior therapy with any failures, clinical and laboratory data (NJI, PCR), date of first prescription and dose of biological agent. 2. Follow-up at 6 months, with the assessment of therapeutic efficacy (excellent, good, adequate, inadequate), side effects and updated clinical data.
Results Overall, 56 PTs were examined: 32.7% of patients (mean±SD age: 50.7 ± 12.1) taking A and 67.3% (mean±SD age: 54.1 ± 13.7) taking E. In subjects treated with A the PCR values were: 0.5 ± 1.0 g/dl (baseline) and 0.1 ± 0.2 g/dl (6 months); NJI were: 11.9 ± 7.2 (baseline) and 10.1 ± 9.2 (6 months). In subjects treated with E, the PCR values were: 2.5 ± 6.2 g/dl (baseline) and 1.2 ± 3.9 g/dl (6 months); NJI were: 15.4 ± 10.8 (baseline) and 8.2 ± 8.2 (6 months).
Conclusions The use of A and E has been shown to improve the clinical condition of the patients. Furthermore, the use of the PT has allowed all patients with rheumatic diseases in the province of Syracuse to access a dedicated health facility, reducing their physical/economic inconvenience. A significant economic benefit was recorded for the ASP 8, not having to refund the costs of flow-compensation activation (File F).

No conflict of interest.

CPC-137 THE PERCENTAGE OF MEDICINES ORDERS FOR INTERMITTENT TREATMENT THAT ARE "REVIEWED" BY A PHARMACIST FOR "SAFE PRESCRIBING"

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Background A multidisciplinary panel chose the percentage of medicines orders for intermittent therapy that have been reviewed by a pharmacist for safe prescribing as a valid and feasible performance indicator for the Mater Misericordiae University Hospital (MMUH) clinical pharmacy service. Fatalities have been reported due to errors in the prescribing and administration of intermittent medicines. Pharmacists have a recognised role in clearly communicating intermittent medicines orders.
Purpose

1. To develop a performance indicator descriptor and data collection tool for the chosen indicator.
2. To measure the percentage of medicines orders for intermittent medicines that had been reviewed by a pharmacist for safe prescribing.

Materials and Methods A performance indicator descriptor and data collection tools were developed and piloted. 100 in-patient beds were randomly selected. All patients supplied with methotrexate or an erythropoiesis stimulating agent 14 days prior to data collection were included. Pharmacists were not informed data collection was taking place. An independent pharmacist collected the data to reduce bias. Data collection was checked for inter-rater reliability.

Intermittent medicines were defined as 'safely prescribed' if the day(s) of the week that the medicine was to be taken were stated and the day(s) when the medicine was not to be taken were crossed out in the administration section of the drug chart.

Medicines orders were classified as fully 'reviewed' by a pharmacist when (in addition to checking the dose and frequency of the prescribed medicine) the above parameters, if not entered by the prescriber, were completed by the pharmacist as outlined by the Clinical Pharmacy Services Standard Operating Procedure (SOP).
Results 79% (48/61) of medicines orders for intermittent medicines were 'reviewed' by a pharmacist for 'safe prescribing'.

21% (13/61) had been signed as clinically reviewed but did not fully meet the criteria of a safely prescribed intermittent medicines.

11% (7/61) were prescribed as per MMUH prescribing policy and did not require further endorsements by a clinical pharmacist.

Conclusions A valid tool was developed that measured the baseline performance of the MMUH clinical pharmacy service for the safe prescribing of intermittent medicines. Clarification of the clinical pharmacy services SOP will lead to improved performance as pharmacists had varying interpretations of the SOP.

No conflict of interest.

CPC-138 THE PRESCRIPTION OF ANTHRACYCLINES DURING PREGNANCY IN HAEMATOLOGY: CASE REPORTS AND LITERATURE REVIEW

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Background Anthracyclines are one of the most important groups of drugs used nowadays in cancer chemotherapy. Chemotherapy is essential in the management of haematological malignancies (HM). When acute leukaemia (AL), aggressive non-Hodgkin's lymphoma (NHL) or Hodgkin's lymphoma (HL) occur during pregnancy, chemotherapy is an emergency but foetal risk must be considered.
Purpose To evaluate foetal and maternal outcomes associated with the prescription of anthracyclines in pregnant women with HM.
Materials and Methods Cases of pregnant women with AL, NHL or HL treated by anthracyclines were collected from the Teratogenic Agent Information Centre (TAIC), a French reference centre providing specialised information for clinicians about drug use in pregnancy. A literature review was performed in the PubMed and Embase databases until May 2012 (keywords: pregnancy, acute leukaemia, Hodgkin lymphoma, non-Hodgkin lymphoma, cancer chemotherapy, doxorubicin, daunorubicin and idarubicin). Selection criteria of articles: diagnosis of HM and anthracycline prescription during pregnancy, foetal outcome.
Results We report 5 cases of pregnant women with HM (4 AL, 1 HL) treated early in the 3rd trimester by chemotherapy with doxorubicin or daunorubicin at standard dosage. All 5 newborns were normal, but 2 were premature deliveries. 3 maternal outcomes were complete remission (2 unknown). 81 articles were selected, corresponding to 134 pregnant women with AL (95 cases), HL (16) or NHL (23) treated by chemotherapy with daunorubicin (65 cases), doxorubicin (59) or idarubicin (10). Normal neonatal outcomes (100/134) were 88%, 68% and 40% for doxorubicin, daunorubicin and idarubicin respectively, 79%, 77% and 45% for exposure from 3rd (26 cases), 2nd (69) and 1st trimester (11) respectively and 96%, 81% and 68% in NHL, LH and AL respectively. Foetal toxicities were death (20), growth retardation (8) and congenital abnormalities (6). Only idarubicin was associated with foetal cardiomyopathy. 97 maternal outcomes were known with remissions (71 cases) and progressions, relapses or deaths (26 cases).
Conclusions Embryo-foetal toxicity depends on gestational age, anthracycline and HM. 2nd or 3rd trimester exposures were mainly associated with favourable neonatal outcomes. Idarubicin was specifically associated with a risk of foetal cardiotoxicity, probably due to its lipophilic nature, facilitating placental transfer. Unfavourable foetal outcomes were more frequent in AL compared to lymphomas, probably reflecting that chemotherapy can never be delayed till post-partum in AL. It is possible to prescribe anthracyclines for HM in the 2nd and 3rd trimesters of pregnancy with minimal risk to the developing foetus but then the treatment must be conducted by a multidisciplinary team.

No conflict of interest.

CPC-139 THERAPEUTIC DRUG MONITORING FOR GLYCOPEPTIDES AND AMINOGLYCOSIDES: ACTUAL SITUATION AND PERSPECTIVES IN A FRENCH UNIVERSITY HOSPITAL

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Background Optimising glycopeptide and aminoglycoside treatment with Therapeutic Drug Monitoring is recommended. Underdosing can lead to resistance and ineffective treatment while over-dosing is associated with toxicity.
Purpose To evaluate current practise by monitoring aminoglycosides and glycopeptides in a French university hospital: levels (trough and peak concentrations) and percentage of optimal concentrations based on our internal antibiotics guide.
Materials and Methods Prescriptions for glycopeptides and/or aminoglycosides, of which at least one dose had been given, were reviewed over one month (February–March 2012). Our data pool contained: patient characteristics, infection and antibiotic treatment background, serum concentration.
Results A wide range of official optimal target serum concentrations has been recommended (Consensus Review of the American Society of Health-System Pharmacists, French Pharmacology and Therapeutic Society, internal guidelines, etc.)

91 prescriptions (31 aminoglycosides, 60 glycopeptides) were analysed: the largest percentage was represented by vancomycin (55%) 80% of which were for continuous infusion. Serum vancomycin concentrations are optimised by using continuous regimens (Table 1).

For the two regimens, (continuous and intermittent, 10% of trough vancomycin serum concentrations were below 10 mg/L, exposing the patient to to subtherapeutic doses and a higher risk of selecting resistant microorganisms.

10 prescriptions for teicoplanin were reviewed: 70% of serum concentrations were below 20 mg/L and 30% below 10 mg/L.

50% of aminoglycosides trough concentrations were below the internal guideline values and target peak concentrations were not reached (amikacin: 67% under 60 mg/L, gentamycin: 90% under 30 mg/L).
Conclusions Most aminoglycosides and glycopeptides concentrations didn't reach required therapeutic levels during this study. Consensus guidelines should be proposed to avoid bacterial resistance and guide clinical practise.

Abstract CPC-139 Table 1 Serum vancomycin concentrations vary with the infusion regimens

		Continuous infusion regimens	Intermittent infusion regimens
Optimal vancomycin concentrations	[20–30] mg/L	42%	27%
Subtherapeutic vancomycin concentrations	<20 mg/L	33%	54%
	<10 mg/L	8%	27%

No conflict of interest.

CPC-140 THERAPEUTIC OPTIONS IN ANTI-NMDA RECEPTOR ENCEPHALITIS

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Background Despite the expanding knowledge base, much remains to be understood about effective treatments to treat the many symptoms of anti-NMDA receptor encephalitis (anti-NMDA RE).
Purpose To describe the treatment options for a case of refractory status epilepticus associated with non paraneoplastic anti-NMDA RE.
Materials and Methods Revised drug-treatment history of the patient.
Results A 22-year-old woman with a family history of epilepsy and an arteriovenous malformation (AVM) of the brain, presented a generalised tonic-clonic without clear focal onset and post-critical confusion. She was in non-convulsive status epilepticus.

Treatment was initiated with various intravenous drugs during the 50 days of the status: diazepam, phenytoin, valproic acid, levetiracetam, clonazepam, midazolam, propofol, lacosamide, ketamine, and lidocaine.

It was decided to proceed with induction of barbiturate coma three times, requiring supratherapeutic doses in the second one. Oxcarbazepine was administered via feeding tube.

With these treatments, momentary remission status was achieved although epileptiform activity reappeared when the pharmacological effect expired.

Thirty days after admission, it was decided to repeat computed tomography for development of AVM and investigate again whether the cerebrospinal fluid was positive for anti-NMDA. This being the case, teatment was initiated with methylprednisolone and immunoglobulins.

She continued with clinical status, but electrical brain activity began to fade at the same time that the patient was starting to tolerate enteral nutrition and so oxcarbazepine possibly began to be absorbed.

After discontinuing sedation the patient awoke and opened her eyes. Electroencephalogram was repeated and epileptiform activity had disappeared completely. Facial dyskinesias were treated with clonazepam.
Conclusions Whereas the best treatment approach for anti-NMDA RE encompasses a combination of immunotherapy, intensive care, and rehabilitation, there is a dearth of information regarding management of psychiatric and behavioural symptoms [1]. The possibility of resolving the status by oxcarbazepine gavage opens a window into the use of drugs by this route in the event of failure of standard treatment.
Reference

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No conflict of interest.

CPC-141 TOLERABILITY AND SAFETY OF CARBOPLATIN-BASED CHEMOTHERAPY IN A HEMODIALYSIS PATIENT WITH BREAST CANCER

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Background The oncology pharmacist was consulted about the neoadjuvant carboplatin-based chemotherapy regimen for a 59-year-old woman with triple negative stage IIA breast cancer and stage 4 chronic kidney disease. She was undergoing haemodialysis three times a week, on a Tuesday-Thursday-Saturday schedule. The chemotherapy regimen was docetaxel 75 mg/m^2 IV D1, carboplatin AUC 5 IV D1, Q21D, 6 cycles. The major dose-limiting toxicity of carboplatin is myelosuppression, especially thrombocytopenia. As carboplatin is eliminated mainly through the kidneys, dosage adjustment and timing is required for patients with impaired renal function to prevent severe hematologic toxicity. Carboplatin is removed by haemodialysis.
Purpose To examine the tolerability and safety of carboplatin-based chemotherapy and the applicability of the Calvert formula in a haemodialysis patient with localised breast cancer.
Materials and Methods We reviewed the literature on the pharmacokinetics, efficacy, tolerability and dosage adjustment of carboplatin. In patients on chronic haemodialysis, the issue is how to evaluate the glomerular filtration rate (GFR) in the Calvert formula. We planned the administration of chemotherapy on a non-dialysis day and the following haemodialysis session to occur 24 hours afterwards. The GFR value was assumed to be 0 mL/min and the carboplatin dose calculated was 125 mg.
Results The first two chemotherapy cycles were found to be safe and well tolerated. Neither neutropenia nor thrombocytopenia occurred. After the first cycle, absolute neutrophil nadir count was 5.51 10e-3/mcL and platelet nadir count was 238 10e-3/mcL. Neither allergic or hypersensitivity reactions nor delayed nausea or vomiting occurred. CTCAE grade 3 diarrhoea was controlled with loperamide. Furthermore, a significant reduction in the tumour size was attained.
Conclusions Dosage adjustment and timing of carboplatin-based chemotherapy can result in a safe and well-tolerated preoperative treatment option in a haemodialysis patient with localised breast cancer.

No conflict of interest.

CPC-142 TOLERANCE TO THE BEAM PROTOCOL BEFORE AUTOLOGOUS HEMATOPOIETIC STEM CELLS TRANSPLANTATION IN CHILDREN TREATED FOR HODGKIN'S LYMPHOMA

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Background Patients with Hodgkin's lymphoma and refractory to the first line of treatment or in relapse, received the BEAM conditioning regimen (carmustine, etoposide, cytarabine, melphalan) followed by transplantation of hematopoietic stem cells.
Purpose To define the characteristics of patients who received this protocol, evaluate its effectiveness, and analyse the tolerance in relation to the carmustine, a cytotoxic agent responsible for many side effects.
Materials and Methods We conducted a retrospective study on patients who received this treatment between January 2001 and September 2011 in the paediatric haematology oncology ward.
A data collection document was created to list the patients' characteristics and information related to the protocol (tolerance, efficacy and previous chemotherapy).
Results 14 children with Hodgkin's lymphoma aged between 5 and 17 were given BEAM protocol transplantation conditioning after a relapse (79%) or after tumoural progression during the previous chemotherapies (21%).

Following the BEAM protocol treatment, the overall remission rate was 57%.

Carmustine treatment led to adverse effects in 66% of patients during the infusion. During the 3 months after the transplantation, the main adverse effects were digestive disorders, fever and hematemesis. In the longer term, various pulmonary disorders were observed (pneumonia, pulmonary tuberculosis, breathlessness on exertion, etc.).
Conclusions This protocol resulted in remission in approximately two thirds of the cases regardless of the disease stage. The overall

tolerance was relatively good, despite some severe pulmonary damage probably related to the toxicity of the carmustine.

In view of these results, the BEAM protocol could be used widely in children with relapsed or refractory Hodgkin's lymphoma.

No conflict of interest.

CPC-143 TRABECTEDIN FOR METASTATIC SOFT TISSUE SARCOMA – A RETROSPECTIVE ANALYSIS

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Background Soft tissue sarcomas (STSs) are rare tumours arising from connective tissues characterised by high morphologic and biologic heterogeneity, as well as by limited responsiveness to cytotoxic chemotherapeutic agents. Trabectedin was approved in 2007 for patients with advanced STS after failure of anthracyclines and ifosfamide, or for patients unsuited to receive these agents.
Purpose To obtain basic epidemiological information on patients with soft tissue sarcomas, standard treatment procedures and results of trabectedin treatment in clinical practise.
Materials and Methods This retrospective study analysed 31 STS patients treated with trabectedin between January 2009 and September 2012. A retrospective cohort study of all patients with a diagnosis of STS treated with trabectedin 1.5 mg/m^2, D1, 24 hours' continuous IV infusion, every 3 weeks. Toxicity was evaluated using Common Terminology Criteria for Adverse Events (CTCAE). Progression-free survival curves (PFS) and Overall Survival (a 95% confidence interval was used) were estimated by using the Kaplan-Meier method.
Results Median age at the initiation of trabectedin therapy was 52 years (18–79 years).

Leiomyosarcoma was the most frequent tumour (25.8%) and liposarcoma occurred in 16.2% of the patients.

Median number of cycles administered was 6.7 (2–16 cycles).

Thrombocytopenia, leukopenia (16.1% of patients), asthenia (12.9%) and elevation of liver transaminases (9.7% of patients) were the most frequent adverse effects.

Nine patients achieved a partial remission (PR) and in 3 the disease stabilised (SD).

Median overall survival (95% CI) was 6.0 months (0.8; 36.1), median progression-free survival (PFS) (95% CI) was 11.48 months.

PFS for all patients was 90.3% at three months and 79.0% at six months.
Conclusions Our results indicate that trabectedin shows promise as an effective and tolerable new drug for the treatment of patients with STS.

No conflict of interest.

CPC-144 TRACING THE RE-EVALUATION OF ANTIBIOTICS AT 48–72 HOURS: IT IS NOT AUTOMATIC...

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Background In our hospital, the medication system is totally managed by computers. When physicians sign the computerised prescription, an electronic sheet must be completed for controlled antibiotics. In 2011, pharmacists created a specific second part on the sheet about re-evaluating the antibiotic. Physicians can complete it 72 hours after initiation of empirical treatments as indicated in the recommendations.
Purpose To evaluate the traceability of the re-evaluation of the antibiotic in the paper medical records and in the electronic antibiotics sheets. The results were compared with an audit conducted in 2010 of the re-evaluation in the paper medical records.
Materials and Methods An audit grid was created to assess the traceability of the re-evaluation, the changes of antibiotic treatment after re-evaluation and re-evaluation deadlines.
Results Of 50 medical records audited in the 5 hospital units, 12 were excluded because patients were hospitalised for less than 72 hours. 94.7% of empirical treatments were re-evaluated, 73. 5% of them before 72 hours (84% in 2010 and 90.7% of them before 72 hours). Physicians noted the re-evaluation in 58.3% of paper medical records (38.1% explicit re-evaluation, 61.9% implicit) versus 52% in 2010 (36.4% explicit re-evaluation, 63.6% implicit). 100% of electronic antibiotics sheets were completed: 25% by physicians and 75% by the pharmacist after calling the physicians. The re-evaluation led to treatment modification in 41.7% of the patients: change of the prescribed antibiotic (33.3%), change route of administration (26.7%), termination of treatment (20%), adding another antibiotic (20%).
Conclusions The rate of re-evaluation on paper medical records wasn't significantly different to the result from a first audit conducted in 2010. Thanks to the pharmacists' involvement, traceability on electronic sheets is being noted correctly. The results will be passed on to the hospital antibiotics committee. Improvements will be proposed for better multidisciplinary collaboration between bacteriologists, pharmacists and physicians.

No conflict of interest.

CPC-145 TREATMENT OF CUTANEOUS CALCIPHYLAXIS WITH SODIUM THIOSULFATE: A CASE REPORT

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Background Calciphylaxis is a rare and potentially life-threatening condition. It is thought to result from arterial calcification causing complete vascular occlusion and subsequent cutaneous infarction. Most often, it is a complication of end-stage renal failure or hyperparathyroidism. This condition may be present in up to 4% of end-stage renal disease patients. The clinical picture is typically characterised by very painful skin lesions and ulcerations following calcification and occlusion of small cutaneous arterioles. Recently some evidence supports the use of intravenous sodium thiosulfate (STS) (Hayden M.R. *et al*, Calciphylaxis: calcific uremic arteriolopathy and the emerging role of sodium thiosulfate, Int Urol Nephrol 2008;40:443–451)
Purpose This abstract focuses on a case report of calciphylaxis successfully resolved with IV STS, as randomised controlled studies on STS efficacy are lacking.
Materials and Methods We report a case of calciphylaxis in a 77-year-old white woman with CKD. The acute presentation was seemingly precipitated by a high calcium-phosphorus product. As the patient was already taking bisphosphonates and phosphate binders, STS was suggested as a good treatment alternative. STS was administered intravenously using 25 g diluted in 100 cc of normal saline during dialysis.
Results The calciphylaxis episode was related to a high calcium-phosphorus product (P*Ca = 73), besides a high increase of parathyroid hormone (800 pg/ml). Clinical signs included cutaneous infarction and pain (photo is included). Four months after the initiation of STS injuries began to improve (photo is included) and the P*Ca was reduced but still remained high (P*Ca = 60). The parathyroid hormone level continued the same. The patient is still on IV STS treatment.

Conclusions Current calciphylaxis treatments alternatives aim to lower the serum calcium phosphate concentration thereby preventing, or even reversing, calcium phosphate oversaturation, precipitation and, finally, calcification. Administration of IV sodium thiosulfate, which sequesters calcium ions to form highly soluble calcium thiosulfate complexes, can prevent calcium phosphate precipitation.

No conflict of interest.

CPC-146 TREATMENT OF GLIOBLASTOMA RECURRENCES: ROLE OF CHEMOTHERAPY – RETROSPECTIVE AND DESCRIPTIVE STUDY WITHIN 3 CENTRES OF THE N.E.N.O. GROUP (NORTHEAST NEURO-ONCOLOGY)

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Background Glioblastoma multiforme (GBM) are primary brain tumours that are currently incurable. Despite a well codified first-line treatment with concomitant radio-chemotherapy (temozolomide), recurrences of GBM occur and have limited treatment options. Furthermore, there is a lack of effective therapies and no standard relapse treatment. Anti-angiogenic drugs, such as bevacizumab, show encouraging results for patients with recurrences of high-grade gliomas.
Purpose To describe treatments of GBM relapses within three cities in northeast France: Nancy, Reims and Strasbourg. We especially tried to assess the impact of bevacizumab on survival endpoints.
Materials and Methods This is a retrospective study with GBM patients diagnosed between 2006 and 2008. Medical data describing the population and therapeutic oncology support were collected in each site from individual patient charts. Overall Survival (OS) and Progression Free Survival (PFS) were estimated by the Kaplan-Meier method and compared by the log-rank test.
Results Between 2006 and 2008, 321 patients were diagnosed with GBM, of whom 133 patients were treated for at least one recurrence. There were 95 males and 38 females; median age at diagnosis was 58. Main relevant signs of the initial tumour were intracranial hypertension and epilepsy. Initial treatment consisted for 64% of patients in surgical excision, and 86% of patients received conventional radio-chemotherapy followed by adjuvant temozolomide.

More than 50% of recurrences were diagnosed on both clinical and radiological grounds. Discarding palliative care, almost all patients with GBM relapse received chemotherapy: 95% at first recurrence (n = 126/133), 95% at second recurrence (n = 69/73) and 100% at third recurrence (n = 26/26). Bevacizumab was used (alone or in association) in a third to half of cases.

In our population, neglecting the type of relapse treatment, median OS was 17.8 months [5–50 months]. When patients received bevacizumab at some point in their care, median OS was 20.2 months [7–50 months]. This OS is significantly different from the median OS observed without bevacizumab which was 13.5 months [5–41 months]. PFS until the second recurrence with bevacizumab was 5.5 months compared to 3.1 months without bevacizumab. PFS until the third recurrence with bevacizumab was 5 months against 2 months without bevacizumab. However, these results do not show bevacizumab providing significant PFS improvement, especially in the long term.
Conclusions Bevacizumab seems to improve OS in patients with GBM recurrences. However only prospective randomised studies will define the appropriate strategy treatment in recurrent glioblastoma. This work is one of the several projects of the NENO group which aims to standardise practise and build rational standards.

No conflict of interest.

CPC-147 TREATMENT OF HEPATIC METASTASES FROM MELANOMA WITH IRINOTECAN LOADED IN ELUTING BEADS

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Background Chemoembolization of hepatic melanoma metastases refractory to treatment using irinotecan-loaded DC beads [embolic Drug-Eluting Beads]: a novel palliative treatment with which there is as yet little experience.
Purpose To show the progress of a clinical case of metastatic choroidal melanoma treated with irinotecan-loaded DC Beads.
Materials and Methods The pharmacy department loaded the particles with irinotecan ourselves and monitored the patient through the clinical history. The patient was a 38-year-old man with stage IV choroidal melanoma in the left eye (2007).
Results In October 2011, 4 hepatic nodules were detected: 3 in segment VII (23, 25, 11 mm) and 1 in segment II (16 mm). 2 cycles of dacarbazine treatment (1649 mg × 1day) stabilised the disease. The patient experienced emesis and diarrhoea. Given this intolerance and negative BRAFV600E mutation, ipilimumab reinforcement treatment was administered (225 mg × 1day q21days). After 4 cycles of ipilimumab, the disease stabilised for 5 months. In May 2012, an increase in size of the nodules was described and 6 new nodules in both hepatic lobes: segment II (42 × 34 mm), IVb (15 mm), VII (25, 26 and 61.4 × 43 mm) and VIII (14 mm) were observed. Surgery was rejected due to the presence of multinodular lesions and transarterial chemoembolization with irinotecan-loaded DC beads was attempted.

Hypervascular lesions were observed in the distal branches of the hepatic artery by bilobar hepatic arteriography using selective catheterization of both hepatic arteries. Subsequently, hepatic chemoembolization was performed by administering 100 mg irinotecan-loaded beads (75–100 microns). After 2 cycles in each hepatic lobe, treatment response was assessed by the RECIST criteria. One month after the last chemoembolization, stable disease (no new nodules and arterial necrosis <30%) was confirmed. No immediate complications were observed, except for a slight elevation of hepatic enzymes that resolved.
Conclusions Hepatic chemoembolization using irinotecan-loaded beads is a viable alternative with good prognosis for hepatic metastases of choroidal melanoma. A higher concentration of chemotherapeutical drug is achieved within the hepatic lesions using lower doses of irinotecan, which therefore has less systemic impact.

No conflict of interest.

CPC-148 TREATMENT OF SEVERE PSORIASIS WITH BIOLOGICALS

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Background Biological drugs are a relatively new class of treatment for severe psoriasis (SP).
Purpose To analyse the use and outcomes of biologicals in SP.
Materials and Methods Retrospective observational study for 23 months of patients with SP who had not previously received

biological therapy (treatment-naive). Data were collected from the pharmacy outpatient dispensing programme and the clinical history.
Results 46 treatment-naive patients started treatment, mean age 43 (17–83), 58.7% men. They were treated with: adalimumab (20 patients), infliximab (17) and ustekinumab (9); none with etanercept.

Abstract CPC-148 Table 1

	Adalimumab	Infliximab	Ustekinumab
Lost to follow-up	5% (1/20)	23.5% (4/17)	22% (2/9)
Continuing treatment	40% (8/20)	29.4% (5/17)	67% (6/9)
Withdrawal/ Discontinuation by doctor	5% (1/20)	5.9% (1/17)	11% (1/9)
Discontinuation due to good response	20% (4/20)	–	–
Change of treatment	30% (6/20)	41.2% (7/17)	–

The causes of the discontinuation/change of treatment were:

Abstract CPC-148 Table 2

	Adalimumab	Infliximab	Ustekinumab
Lack of efficacy	27.2% (3/11)	25% (2/8)	–
Adverse reactions	18.2% (2/11)	37.5% (3/8)	–
Lack of response + adverse reactions	18.2% (2/11)	12.5% (1/8)	–
Lack of adherence	–	25% (2/8)	–
Good response	36.4% (4/11)	–	–
Other reasons	–	–	100% (1/1)

Adverse reactions that caused withdrawal or change were:

Abstract CPC-148 Table 3

Adalimumab	Autoimmune hepatitis 25% (1/4)
	Asthenia and mood changes 25% (1/4)
	Psoriatic arthritis 25% (1/4)
	Pharyngitis and candidiasis 25% (1/4)
Infliximab	Acute infusion reactions 75% (3/4)
	Psoriatic arthropathy 25% (1/4)

Conclusions The first biological in treatment-naive patients was 1st) adalimumab, 2nd) infliximab and 3rd) ustekinumab. Ustekinumab was the biological drug that achieved the best retention rate. Several patients discontinued their treatment with adalimumab because of good response, since it can be used in intermittent treatment schemes. Change in treatment was more frequent with infliximab, mainly because of infusion reactions. Ustekinumab was the only biological that didn't cause adverse reactions that caused withdrawal or change.

No conflict of interest.

CPC-149 TRIMEBUTINE: A CASE OF ABUSE AND POSSIBLE DEPENDENCE

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Background Trimebutine has an agonist effect on digestive tract and brain mu, kappa, and delta opiate receptors.
Purpose To describe a case report of an abuse and a possible dependence on trimebutine.
Materials and Methods Medical record review and literature search about trimebutine dependence.
Results A 46-year-old woman with a history of Chronic Intestinal Pseudo-Obstruction (CIPO) was prescribed amikacin and trimebutine in the hospital since 2011. Her gastroenterologist initially prescribed trimebutine at 100 mg intravenously three times a day, with a possibility of 100 mg shots if necessary without a maximum dose. At the same time she obtained another prescription by her general practitioner (50 mg IV if needed). Finally 735 ampoules were delivered in seven weeks (15 a day).This overconsumption alarmed the pharmaceutical team and a literature review was made. Dependence is described in a French register: six cases of intravenous abuse or dependence were reported between 1993 and 2009. At high doses trimebutine is cardiotoxic (bradycardia, rhythm disorders) and neurotoxic (convulsions). We alerted the prescribers and reported this abuse to our pharmacovigilance centre. A questionnaire to evaluate the level of dependence was sent to the general practitioner.

Once the general practitioner had been informed, the gastroenterologist alone managed her CIPO treatment and a new prescription was established with a trimebutine posology more consistent with the marketing authorization.
Conclusions Provision from a hospital enabled us to detect the overuse of this drug. Dependence is difficult to prove and drug abuse screening test in the assessment of DSM IV should be used to establish it.

No conflict of interest.

CPC-150 TUBERCULOSIS AND SYSTEMIC DISEASES

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Background The immunosuppression of systemic diseases makes the management of patients with tuberculosis more complicated.
Purpose To monitor the clinical evolution of tuberculosis in patients suffering from systemic diseases.
Materials and Methods A retrospective study, from 1998 to 2012, in the internal medicine service in Rabta hospital, Tunisia, of 9 patients (8 women and a man, median age: 54 years) suffering from connective tissues disease, treated by corticosteroids linked in one or several treatments to immunosuppressants, who subsequently developed tuberculosis.
Results The median time to diagnosis was 116 days (7d – 1 year). The location of the tuberculosis was pulmonary (n = 2), ganglionic (n = 3), urogenital (n = 2), tubercular spondylodiscitis (n = 1), more than one location (n = 1). The diagnosis of tuberculosis was confirmed by bacteriology (n = 4) four cases, histologically (n = 5) and by a test treatment (n = 1). Systemic illnesses were: systemic lupus erythematous (n = 5), Gougerot-Sjögren syndrome (secondary or primary) (n = 3), sarcoidosis (n = 1), systemic scleroderma linked to pernicious anaemia (n = 1), rheumatoid arthritis (patient 2 linked to lupus) (n = 1) and multiple auto-immune syndrome (n = 1). The diagnosis of systematic illness was made before that of tuberculosis in 8 patients and concomitantly in only one. Under treatment by four drugs then by two drugs, the evolution of tuberculosis was favourable in five of nine patients. One of the patients developed an allergy in isoniazid and resistance to the anti-tubercular treatment. Five of our patients recovered from their illness.
Conclusions This study confirms the often extra-pulmonary character of tuberculosis in patients with systemic disease as well as the difficulty of diagnosis and problems multiplied by this association.

No conflict of interest.

CPC-151 TYPE OF CANCER AND RISK FACTORS IN HIV PATIENTS ON ANTIRETROVIRAL TREATMENT

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Background HIV infection is associated with increased risk of cancer:

1. AIDS-defining cancers (ADC): Kaposi's sarcoma (KS), non-Hodgkin lymphoma (NHL), cervix cancer.
2. non-AIDS-defining cancers (NADC): Hodgkin lymphoma (HL), anal cancer, lung, head, neck, hepatocarcinoma.

Purpose To analyse patients with antiretroviral therapy and chemotherapy, type of cancer and associated risk factors.
Materials and Methods Descriptive study of patients with antiretroviral and chemotherapy between 2004–2011, extracting data from medical records and the Farmatools programme, analysing using SPSS 11.0.
Results 33 patients were obtained (3.7% of all HIV patients on antiretroviral treatment); 82% men: 16 with ADC (11 NHL, 3 KS, and 2 with NHL and KS) and 17 with NADC (5 HL, 3 lung cancer, 3 head-neck, 3 anal, 1 ovary, 1 gastric and 1 chronic lymphocytic leukaemia). When cancer was diagnosed patients presented: CD4<200 cells/microliter (27.3%), detectable viral load (VL) (33.3%), C3 category (63.6%), smokers (63.6%), human papillomavirus (HPV) (6.1%), Epstein Barr virus (21.2%), human herpes virus 8 (HHV8)(21.2%), hepatitis B-C (48.5%), intravenous drug addict (24.2%). 8 patients died.

80% KS patients and 66.7% head-neck cancer had CD4<200 (P = 0.036). 62.5% of those who died presented CD4<200 (P = 0.009). 66.6% of anal cancer patients presented HPV (P = 0.006). 100% of KS presented HHV8 (P = 0.002).
Conclusions 3.7% of HIV patients on treatment developed neoplasms, more than 50% were NADC, of which 88% started in patients with an undetectable VL, confirming a nice immunological status when cancer was diagnosed.

No conflict of interest.

CPC-152 USE OF OMALIZUMAB IN CHRONIC COLD URTICARIA: A CASE REPORT

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Background Omalizumab is a recombinant humanised monoclonal antibody which prevents the binding of IgE to the high-affinity receptor type I (FcεRI). A complicated series of reactions results in a reduction of free IgE responsible for the allergic inflammatory cascade. Omalizumab is indicated as add-on therapy to improve asthma control in adults and adolescents (from 12 years). In addition, several studies show that omalizumab is effective in the treatment of chronic urticaria.
Purpose We report the case of a patient with chronic cold urticaria resistant to conventional treatments.
Materials and Methods The patient was a 67-year-old man, who had suffered from chronic urticaria for over 30 years. The disease was disclosed by pressure urticaria, which had been neglected for a long time. It then turned into a cold urticaria in the 90s. The latter showed itself in 2002 as the patient experienced an anaphylactic shock in a bath at 24°C.
Results Several lines of treatment, all unsuccessful, were tested on the patient: high-dose H1 antihistamine, montelukast, methotrexate, anakinra. In view of this therapeutic impasse, omalizumab appeared as an alternative: doses of 375 mg were administered to him every 15 days as a start. In total, 12 treatments were performed in dermatology outpatients. No side effects were encountered except for an episode of nausea. The results were: a decrease in consumption of H1 antihistamine, ice test negative and significant clinical improvement of his urticaria.
Conclusions In view of the results obtained for this patient, omalizumab appears to be an alternative for treating chronic urticaria in treatment failure. Indeed, it is well tolerated, the risk-benefit ratio is positive, the only problem is the cost incurred for such care.

No conflict of interest.

CPC-153 WARD PHARMACIST: MANAGING INTERACTIONS IN THE DEPARTMENT OF HAEMATOLOGY AND BONE MARROW TRANSPLANTATION

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Background The Milan National Cancer Institute Pharmacy began a collaboration with the haematology and bone marrow transplantation (ETMO) department, to optimise concomitant conditioning protocols of bone marrow transplants; the pharmacokinetics and pharmacodynamics are affected by the high doses of chemotherapy administered. The drugs analysed were those in the conditioning schedules used in accordance with international guidelines.
Purpose To provide a practical guide for managing drug interactions between the drugs commonly used by ETMO and those in the transplant conditioning schedules.
Materials and Methods The presence of the ward pharmacist, funded by the Italian Haematology Society, allowed the daily management of treatment to be investigated. Databases were used (Micromedex, Codifa) and literature meta-analyses were conducted, in order to obtain the pharmacokinetic and pharmacodynamic characteristics of these drugs and possible interactions.
Results Within our Institute, 72 transplants that used conditioning were performed in a year, 32 autologous and 40 allogeneic. In particular, 28 transplants used a high-dose melphalan scheme, 28 used thiotepa/fludarabine/cyclophosphamide, 4 used BEAM, 4 used TBI/fludarabine/cyclophosphamide and 8 used the KROGER scheme. Therefore the interactions between drugs used in the protocols themselves and the drugs commonly used within the department by transplant patients were analysed. For this purpose the following drugs were considered: ciclosporin, allopurinol, acetazolamide and IPP. Following this analysis, it was shown that there were significant interactions between the drugs used in the conditioning scheme and drugs commonly used in patients with bone marrow transplants.
Conclusions The pharmacist set up a means of enabling a clinician to browse for a more informed choice: dedicated schemes are being developed, in which they report any interactions observed, associated with the treatment protocols. All this has therefore contributed to the rational use of the drugs and resources, for example the use of antifungals after transplantation and not before, and the introduction of pantoprazole instead of omeprazole. A future goal will be the analysis of the interactions between the drugs and concomitant haematology chemotherapy.

No conflict of interest.

International posters

INT-009 POINT PREVALENCE STUDIES ON ANTIBIOTIC USAGE AT THE CHILDREN'S UNIVERSITY HOSPITAL

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Background Due to higher use of broad spectrum agents in the treatment of both adults and children, hospitals are considered to be centres of antimicrobial resistance. According to several studies, approximately 60% of hospitalised children will receive at least one antibiotic.

Purpose To analyse the use of antibiotics at the Children's University Hospital.
Materials and Methods Two point prevalence surveys undertaken on a single day in May and November, 2011. Data collected included demographic details, antibiotic, route and indication. This study included all in-patients, who were present in hospital at 8 am on the days of surveys and to whom a systemic course of antibacterials (ATC J01) were prescribed for treatment. Day-cases were excluded. Microsoft Excel and SPSS 20.0 were used for data analysis.
Results The total number of patients to whom antibacterials was prescribed: 125/418 (30%) in May, and 159/424 (38%) in November. The number of patients to whom antibacterials were prescribed (for treatment): 105 (84%) in May, and 125 (79%) in November. The main age group was 1–5 years: 27 (22%) patients in May, and 33 (21%) in November. Males made up a greater proportion of in-patients. The most common groups of antibiotics prescribed for treatment were extended-spectrum penicillins with 31/117 (27%) treatment courses and the third generation cephalosporins 29 (25%) in May, and 38/158 (24%) and 41 (26%) in November. The top five antibiotics prescribed for treatment were ampicillin, penicillin G, ceftriaxone, cefotaxime and amoxicillin both in May and November. The most common indication for antibiotic treatment was lower respiratory tract infection. Antibiotics were mostly used intravenously: 92 (88%) patients in May, and 109 (87%) in November.
Conclusions These prevalence studies indicated the main problems in antibiotic prescription and areas of improvement: the high use of third generation cephalosporins and predominant intravenous administration.

No conflict of interest.

B.E.A.M. Summit

BEA-001 BUILDING UP A REGIONAL AND INTERDISCIPLINARY NETWORK FOR BETTER USE OF MEDICINES IN INTENSIVE CARE UNITS

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Background Clinical pharmacy in intensive care units (ICUs) showed beneficial effects on safety and economics. The establishment of a regional network including pharmacists, physicians and nurses of all ICUs seemed useful for the following reasons:

- Issues regarding medicines use in ICU are similar in all hospitals.
- Patients are often transferred from a tertiary care hospital to a secondary one or vice versa.
- Health care givers move from a hospital to another one during their career.

In 2007, an interdisciplinary group, Sipharom, was set up in order to create a network in the French and Italian speaking parts of Switzerland.
Purpose The goals of the project were to exchange data on drug administration in ICUs, share knowledge and skills, and establish standards for the administration of drugs.
Materials and Methods Sipharom now involves 13 hospitals. Each is represented by an ICU physician, an ICU nurse and a pharmacist. The group meets twice a year. Then, each member has to implement the decisions in his/her hospital.
Results Four main areas of action have been developed:

- Harmonisation of the dilution and preparation of intravenous drugs: 52 standard dilutions have been defined. This led to collaborations with manufacturers in order to obtain ready-to-use preparations at the defined dilutions.
- Harmonisation of the labelling of syringes: definition of the minimal list of elements that labels have to include.
- Exchange of critical data
- Drafting of joint guidelines

Conclusions Establishing a network is an effective way of increasing the exchange of expertise. It can lead to the simplification and harmonisation of practises and therefore help reducing risks and medicines errors and limit problems related to the movement of patients and caregivers. Pharmacists have to be the driving force of such interdisciplinary projects focusing on drug use.

No conflict of interest.

BEA-002 ONLINE INTERNET SURVEY ON LEADERSHIP AND MANAGEMENT FOR PHARMACISTS WORKING IN THE ITALIAN NATIONAL HEALTH SERVICE (SSN)

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Background Hospital pharmacists working in the Italian SSN need a compendium of leadership and management skills. Currently, the health system does not envisage in-depth assessment of these skills when it comes to choosing heads of department who coordinate and manage other professionals. So we have to envisage meeting these training needs, mostly for the heads of departments, services and pharmacies. We think that even if shared leadership is not restricted to such people, head pharmacists and experienced practitioners should be trained for the greater complexity and responsibility of their roles. The BEAM summit held by the European Association of Hospital Pharmacists (EAHP) offered material and tools with which to disseminate this knowledge in Italy.
Purpose The first step probably is for head pharmacists and experienced practitioners to become aware of the skills they have in this field; therefore an on-line internet survey for SSN pharmacists is being organised to cheque the situation regarding individual knowledge. Furthermore, the intention is to raise awareness of the areas of expertise required among the pharmacy colleagues and communicate their personal level of knowledge and their leadership and management abilities to SIFO. Courses can then be designed to cover areas of skills that are most lacking. Later on, all of those who have got a global mark below the expected value will be invited to attend more training to fill in the gaps regarding these competences.
Materials and Methods The aim is to use the leadership competence framework of the Royal Pharmaceutical Society (RPS) in which competency statements describe the activity all pharmacy professionals should be able to demonstrate. The statements will be subdivided by areas: 1) demonstrating personal qualities, 2) working with others, 3) managing services, 4) improving services, 5) setting directions. To develop the questionnaire, we will ask questions based on examples of situations pharmacists may be faced with in their daily work. The statements will be handed over to experienced practitioners and each question will have several possible answers, each of them providing a different rating (10 being the most correct answer, 0 being the wrong one). The most correct answer will be set based on answers we expect from experienced pharmacists with leadership skills. The software used will limit the time to answer each question. The final score will be shown as a percentage and those receiving a total score higher than 50% will be considered sufficiently competent. The data will be statistically analysed and means, medians, by age, by region, by function, by area, etc. will be calculated. Attending a specific training course will

be recommended to those individuals that achieve a score under 50%. The software that will be used is Question Writer professional 4, which is licenced to SIFO.

Results In order to be able to present the results at the EAHP congress in Paris, the questionnaire will be available online, to be answered during January–February 2012. The SIFO will dispatch the survey to some 2000 SSN pharmacists via email making use of the society's mailing list. The results will be presented in a poster and the final situation about the general skills of Italian SSN pharmacists regarding leadership will be presented by area as specified in the RPS framework. These results will provide an overview of the knowledge of Italian pharmacists and SIFO intends to arrange specific training courses in follow-up and to encourage the participants who do not get good scores to engage in autonomous training.

Conclusions Pharmacists' awareness of leadership and management, acquired by completing the questionnaire and being awarded an individual skills level, will be an incentive for the SIFO and other professionals to undertake the necessary corrective activities, such as education and specific training. We would like to start a self-awareness path regarding the importance of leadership competences in the personal CVs of pharmacists working in the Italian SSN. The ultimate aims of improving leadership skills are improved cost-effectiveness, better quality services, and risk reduction in patients who benefit from the SSN services. The questionnaire will be available in English, for it to be used within the EAHP and other European scientific societies.

No conflict of interest.

BEA-003 OPTIMIZATION OF TREATMENT SAFETY AT THE IN- AND OUT-PATIENT INTERFACE IN NEUROSURGICAL CARE

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Background At admission and discharge to/from hospital information concerning the correct medicines has to be transferred between health professionals. If this information is incomplete or lost, the correct medicines for patients are at risk. We therefore analysed adverse events at the in-/out-patient interface in order to optimise the medical treatment of patients at these critical steps.

Purpose To optimise the medical treatment of patients at admission and discharge to/from hospital.

Materials and Methods The prescription and resulting administration of medicines of all patients who underwent spinal stabilisation surgery in our clinic in the year of 2011 were recorded retrospectively. We analysed the resulting dataset in terms of frequency and severity of medicines errors.

Results 147 datasets were included, while only 144 of these contained complete information concerning post-discharge medicines.

The medicines taken before admission to the hospital were not documented correctly in 16% of the admission reports. Complete transfer of the previously taken medicines to drugs listed by the hospital pharmacy was missing in 72%. Both these factors frequently led to incomplete continuation of the medicines taken previously (before admission). Uncertainty concerning the listed drugs [the medicines prescribed for use in hospital] was identified as the main reason for this problem.

At discharge the prescribed medicines did not match the medicines taken before admission in 78%. An indication for this change was however only documented in 9%.

Missing documentation of the medicines taken before admission and an unconsidered transposition of the drugs listed in the hospital pharmacy to the discharge information were identified as the most common risk factors.

Furthermore in 37% (n = 41 who received anticoagulation treatment) and in 67% (n = 9 who received metformin) these treatments, which were paused preoperatively, were not resumed postoperatively.

So in order to optimise treatment at the in-/out-patient interface a number of processes were modified:

- At admission – the medicines history is now taken by a clinical pharmacist, who was employed for this purpose instead of a physician. The pharmacist is informed via the hospital administration software (SAP) or the admissions management system when a new patient is admitted.
- The hospital pharmacist transfers previously taken medicines to the listed drugs.
- A new admission sheet was designed standardising the recording of medicines history and transfer to listed drugs. This sheet provides all the necessary information concerning the drugs taken previously to physicians and nurses in a standardised form throughout hospitalisation and when composing the discharge information.

These measures allow continuous administration of the medicines taken before admission over the in-/out-patient interfaces and re-administration after the perioperative period of suspended drugs like anticoagulants and metformin. The clinical pharmacist furthermore cheques the medicines in stock of each unit of the clinic and orders any new or special drugs form the hospital pharmacy. During hospitalisation the physicians consult the clinical pharmacist on specific medicines issues.

Conclusions In order to achieve a high level of medicines safety physicians, nurses and clinical pharmacists have to cooperate closely and frequently. Each step in the medicines process should be performed by the specialist most suited for this task. The medicines process has to be standardised and transparent, so that each group involved (nurses, physicians, clinical pharmacists) knows at any time where to find the required information. In order to achieve this, the neurosurgical department now employs our 'own' clinical pharmacist. A final review of the measures taken and the overall quality of medicines at the in-/out-clinic interface is scheduled for 2013.

No conflict of interest.

BEA-004 TAKING A LEAD IN WARD PATIENT SAFETY

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Background The pharmacist workforce is limited in terms of patient safety due to the 'one pharmacist to every one hundred beds' rule in Turkish state hospitals. Our hospital is being rebuilt, and having fewer patients in wards has resulted in all departments working under capacity for a certain period.

Purpose To take advantage of this unique situation that allowed pharmacists to raise the standards of patient safety by using the extra time and workforce granted; and also to prove that good leadership in pharmacy care can result in better patient health.

Materials and Methods Pharmacists were encouraged to appraise the clinical skills of their department, determine the level of the need of ward patients for better patient safety and judge the resources currently available for implementation, before considering the potential sources of collaboration with other health professionals. 'Rx Media Pharma' software was used for gaining detailed results on patient chart evaluations. All documentation was performed online with 'Google Docs', allowing participants to share and make changes online directly with selected health professionals.

Results For 23 working days, 200 patient charts were reviewed. The average number of drugs used was 7.6 and the drug-drug interactions identified were 2.02 per patient. The importance of the interactions was evaluated in 3 levels; major (42.82%), moderate

(51.23%) and minor (5.94%). The numbers of recommendations regarding the drug-drug interactions spotted were: 31 therapeutic exchange (7.67%), 88 dosage recommendation (21.78%), 4 adding drug to the treatment (0.99%), 99 proposal to withdraw a particular drug (24.50%), 182 monitoring (45.04%). Total number of food-drug interactions was 286 (1.43 per patient), with 118 instances of intravenous incompatibility warnings made to the ward nurses (0.59 per patient). 62 inappropriate drug dosages (0.31 per patient) and 3 drugs containing the same active substances in different formulations (0.015 per patient) were reported to the prescribing physicians. In 124 cases (0.62 per patient), pharmacists requested information about the use of the drugs prescribed for treatment.

Upon discussion of the results, the physicians provided feedback and acted according to three options: (9.14%) the physician didn't agree (they believed the situation didn't require an intervention), (58.53%) the physician felt it was sufficient to monitor the patient's status, considering the suggested change in treatment, (32.31%) the physician agreed to a change in the patient's treatment, applying the recommendation pharmacists made.

Conclusions Our pharmacy department discovered that continuous service at this level of quality is needed for ward patients. Similar studies should be encouraged by health care leaders in Turkey to improve hospital care.

No conflict of interest.

BEA-005 UNLICENSED AND OFF-LABEL DRUG PRESCRIPTION AT DISCHARGE FROM A SWISS CHILDREN'S HOSPITAL

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Introduction.

For children, many drugs are used without marketing authorization ("unlicensed", e.g. imported drugs, drugs prepared by a pharmacy) or outside the terms of marketing authorization ("off-label"). In Switzerland, around half of all prescriptions for paediatric inpatients were either off-label or unlicensed [1].

Purpose To determine the proportion of unlicensed and off-label prescriptions at discharge, which has not been investigated previously, and the proportion of parents informed about such a prescription.

Materials and Methods Prospective study including all discharge prescriptions of inpatients over a two-month period at the Children's Hospital of Aarau. Exclusion criteria: hospitalisation for chemotherapy only, age over 18, re-entry during study period, no informed consent of parents. At discharge parents were asked to fill in a questionnaire about the information they got on discharge medicines as well as about their satisfaction with this information. This questionnaire was available in German, French, Croatian, Turkish, Albanian, Spanish and English.

Results During the study period 503 children were discharged, 231 children could be included. Discharge prescriptions were written for 140 children (61%). A total of 227 drugs were prescribed, especially anti-inflammatory/analgesic, anti-asthmatic and anti-infective drugs. 38.5% of all prescriptions were off-label, regarding dosage in 51%, age in 40% and indication in 9% of all cases. Only 0.5% of drugs were unlicensed. Discharge questionnaires were returned by 103 of 140 children. Most parents (>80%) were informed about purpose, dosage and use of the drugs for their child, and satisfied with obtained information, but only 9% of parents getting an off-label/unlicensed prescription for their child were informed about the off-label/unlicensed use.

Conclusions There is a high percentage of drugs prescribed off-label at hospital discharge. Most drugs are well known substances and regularly prescribed for children. This emphasises the need to update marketing information for older substances, or the need for a national database for drug use and dosage in children.

Reference

1. Paolo, E *et al*, 2006. *Swiss. Med. WKLY*. 136, 218–222.

No conflict of interest.

BEA-006 USING LEADERSHIP TO TURN DEFEAT INTO SUCCESS

doi:10.1136/ejhpharm-2013-000276.617

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Background I was a manager at the Hospital Pharmacy at the University Hospital in Uppsala. The hospital has about 1100 beds. The hospital pharmacy employs a staff of about 75. Production consisted of both chemotherapy unit preparations and other sterile preparations. This Friday afternoon in November, I was summoned to the hospital's Chief Medical Officer. Once there, I receive complaints on the service from our production unit for Chemotherapy Preparations. Orders were often delivered too late – No notice of delays – Lack of communication between the hospital staff and the staff at the production unit.

Purpose To show how we improved the service from the Centralised Chemotherapy IV Preparation Unit.

Materials and Methods It was important to use my leadership to see something positive in what happened. It was not our skills that were complained about, but our service, which made it all easier. My point was, we are competent and skilled, now we have to improve our service. Together with the staff we decided:

- The complaint in terms of communication was true. Action: Hospital staff were invited.
- Tuesdays and Thursdays we had information for the staff, and we were always late. Action: We changed to providing more written information and just assembled the staff one Tuesday and Thursday every month.
- We did not answer the phone, or call and notify the delay. Action: We extended the staff in the morning by a technician who could answer the phone. Then we agreed to measure the delays. We completed a document in which we recorded when orders come in, if they were complete or if it needed a phone contact before they would be prepared. Then we documented when the preparations were ready. We decided to measure for 4 weeks in December. This measurement has since then been performed every year. We could pretty quickly see that we often received orders late and they were not complete.

Delivery of chemotherapy from Centralised Chemotherapy IV Preparation Unit at Uppsala University Hospital. Data for each year show the fraction of preparations delivered on time, fraction delivered after the requested time and the average time delay.

Abstrtact BEA-006 Table 1

Year	2005	2006	2007	2008	2009	2010	2011
Percentage delivered on time	90%	96%	94%	93%	98%	95%	99%
Time delay	19 min	32 min	16 min	18 min	32 min	28 min	36 min

These results were discussed later with the hospital staff and together we were able to improve the ordering schedule and we improved service with the deliveries. More preparations could be delivered on time.

Conclusions Inform your manager and staff. Take your time and plan how to handle the situation. Try to find out what you and your staff can learn. Try to understand the cause of the complaint and motivate staff for change. Try to measure in order to have a base for discussion and change. Good management is extra important for to support your staff when you and your staff are questioned.

No conflict of interest.

BEA-007 WHAT DO YOUR EMPLOYEES THINK ABOUT TOTAL QUALITY MANAGEMENT SYSTEMS?

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Background A Total Quality Management System (TQMS) is being implemented in the pharmacy of a 1456-bed hospital in Vienna, Austria. The hospital pharmacy consists of five departments; dispensary service, clinical pharmacy service, pharmaceutical compounding, cytotoxic reconstitution, medicines information.
Purpose First to look at the expectations of pharmacy staff relating to the structural reorganisation needed as a result of the implementation of a TQMS, and second to gather suggestions for quality improvements in their everyday work.
Materials and Methods Data collection was achieved using a non-disguised questionnaire consisting of 8 questions. Two open-ended questions (unstructured, key ideas), five closed-ended dichotomous questions (followed by contingency questions) and one question using a rating scale from one to ten were asked. All staff members of the pharmacy were asked to fill out the survey. For data evaluation a Grounded Theory-based coding system was used.
Results Establishing a TQMS was deemed to be important by 90.5% of the respondents. A total of 21 usable responses were received, for a response rate of 72.4%. The areas in which a TQMS was deemed to be important were: improvements of work processes (~30%), quality control (~20%), communication (~15%) and training (~10%). Further we found that the respondents wanted to improve quality in work processes, through implementation of regular training (~20%), better communication (~15%) and better working conditions (~15%).
Conclusions From this project we can state clearly that pharmacy staff welcomes the introduction of a TQMS to their workplace. TQMS was expected to be most important for improving work processes. The frequency of importance of communication and training being highlighted by the respondents was of interest and should be borne in mind during the implementation process.

No conflict of interest.

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