EAHP 2010 survey on hospital pharmacy in Europe: Part 2 Procurement and distribution

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Hospital pharmacies in Europe are responsible for supplying medicines and 56.2% of them also have responsibility for medical devices. The number of medicines listed in formularies varies from 246 to 1982, with the median being 960. Hospital pharmacies in western Europe usually procure their supplies direct from industry, while in eastern Europe medicines are mainly sourced from wholesalers. Own production is significant only in Denmark. Overall, 45.7% of pharmacies join in an alliance with another pharmacy to purchase their supplies. Distribution is mostly centralised (70.1%) and unit-dose supply is common in a few countries (European average 23.4%). Services are also provided to outpatients by 66% of pharmacies. Robotic dispensing is being implemented in few western European countries (mainly The Netherlands, Portugal and Spain), where in average 3.3% of hospitals used such systems in 2005 increasing to 6.7% in 2010. Approximately one third of hospitals use barcode technology for stock control and manual selection of items. Large hospitals have more automation than small hospitals.

Introduction

EAHP's pan-European survey of hospital pharmacy practice is an important source for understanding future challenges and development needs in Europe. The methodology and the background of the 2010 survey were previously described in this journal.[1] In this article we present data on procurement and distribution.

Results

Hospital pharmacies in Europe are responsible for the procurement of medicines, which are commonly restricted to those listed in a formulary (77.4% of pharmacies, n=990). In a few countries (Croatia, former Yugoslav Republic of Macedonia, Greece, Ireland, Serbia and Slovenia) there are no formularies in <50% of hospitals. The average number of products in formularies is 1006 (median 960) with no significant changes since 2005 (average 1031) but with a large range from 246 (Bosnia and Herzegovina) to 1982 (UK). Price information is shown in 43.6% of formularies (n=748) and formularies are updated by 75.2% of pharmacies each year (n=747).

Medical devices are selected by 55.8% and purchased by 56.2% of hospital pharmacies (n=975). Few hospital pharmacies in Denmark and The Netherlands are involved in this activity, while more than 90% of pharmacies in Slovakia, Belgium and Luxembourg are responsible for selecting and purchasing these products.

Most medical supplies are procured from wholesalers (51%) or direct from industry (46%), with only 2% being sourced from other hospitals and 1% from own production (n=892). Large hospitals purchase less from wholesalers and more from industry, with small hospitals exhibiting the opposite trend; some large hospitals produce their own supplies. There is a clear difference between north-eastern and south-western Europe, with the latter being industry orientated and the former wholesale oriented (figure 1). Own production is significant only in Denmark (17.2% of purchasing volume). Sources of procurement have not changed significantly since 2000 in most European countries.[2]

Just under half of European pharmacies (45.7%) do not participate in group purchasing, ranging from 28.7% of hospitals in the UK having no alliance to 50% in eight other countries. Local (12.1%), regional (21.2%) and national (21.0%) groups are common and the size of the hospital plays only a minor role in terms of different alliances (n=949), except for very small hospitals where local alliances are preferred. National purchasing groups are significant in Bosnia and Herzegovina, Croatia, Denmark, Luxembourg, Norway and Serbia (>40% of pharmacies).

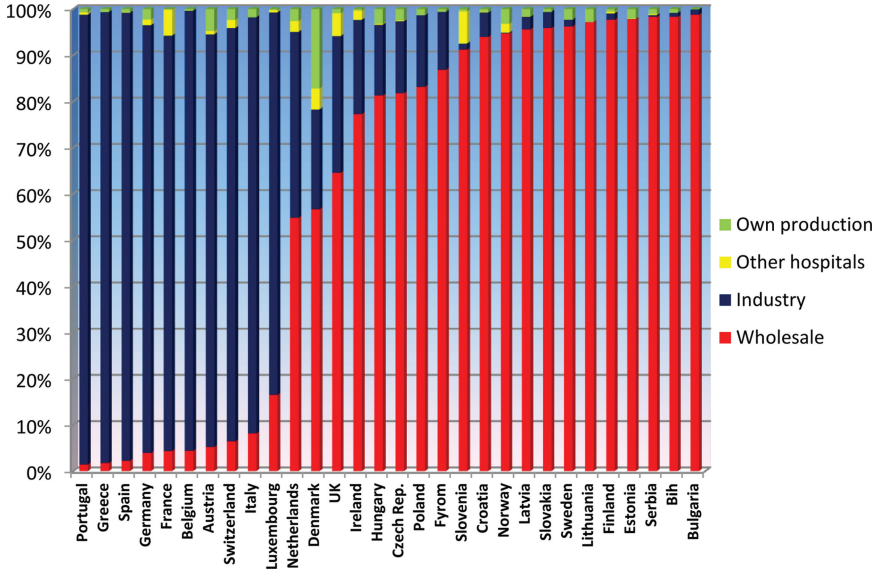

Figure 1 Source of purchasing by country (percentage of monetary value, n=892). Bih, Bosnia and Herzegovina; Fyrom, former Yugoslav Republic of Macedonia.

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Table 1 Type of distribution services by country (%)

Country	Centralised service	Decentralised service	Unit-dose service	24/7 Unit-dose service	24/7 On call service	Medication at discharge
All countries	70.1	6.5	23.4	14.6	47.9	49.5
Austria	78.9	10.5	10.5	2.9	30.6	7.7
Belgium	50.0	2.9	47.1	27.8	91.9	34.6
Bosnia and Herzegovina	62.5	12.5	25.0	0.0	33.3	100.0
Bulgaria	64.5	0.0	35.5	10.9	63.6	66.7
Croatia	94.9	0.0	5.1	7.7	25.0	30.0
Czech Republic	95.1	2.4	2.4	0.0	19.5	80.0
Denmark	66.7	11.1	22.2	0.0	85.7	40.0
Estonia	84.2	10.5	5.3	0.0	0.0	50.0
Finland	79.6	2.0	18.4	7.0	4.7	36.0
France	64.4	0.0	35.6	18.5	48.4	25.0
FYROM	77.8	11.1	11.1	12.5	62.5	87.5
Germany	80.4	0.9	18.8	7.1	65.7	28.4
Greece	72.1	0.0	27.9	6.5	93.1	60.0
Hungary	81.0	1.7	17.2	6.5	68.8	60.5
Ireland	81.1	0.0	18.9	0.0	23.3	27.3
Italy	65.7	19.0	15.3	11.1	46.6	100.0
Latvia	75.0	16.7	8.3	3.6	21.4	27.3
Lithuania	80.0	0.0	20.0	0.0	No data	0.0
Luxembourg	71.4	0.0	28.6	0.0	60.0	100.0
Netherlands	35.0	15.0	50.0	54.5	100.0	42.9
Norway	88.2	0.0	11.8	0.0	No data	No data
Poland	65.9	26.8	7.3	0.0	35.7	50.0
Portugal	50.0	0.0	50.0	88.0	48.0	50.0
Serbia	51.3	20.5	28.2	22.2	42.9	28.6
Slovakia	100.0	0.0	0.0	0.0	34.5	47.6
Slovenia	86.4	13.6	0.0	4.5	26.1	20.0
Spain	49.6	1.7	48.7	85.0	42.9	37.9
Sweden	81.0	4.8	14.3	10.5	78.9	100.0
Switzerland	52.4	33.3	14.3	5.3	63.2	0.0
UK	62.5	0.0	37.5	0.0	100.0	75.0

FYROM, former Yugoslav Republic of Macedonia.

Drug distribution in European hospitals (n=1024) is mostly centralised (70.1%). Decentralised (6.5%) and patient oriented services (unit-dose 23.4%) are less common but vary substantially from country to country (table 1). Patient oriented distribution services are very well developed in The Netherlands and Portugal (50%), Spain (48.7%) and Belgium (47.1%), but 24/7 unit-dose services are uncommon in these countries and elsewhere (on average 14.6%, n=994) and provided for only 67.9% of serviced beds (n=118). A 24/7 on-call service is provided by 47.9% of pharmacies surveyed with provision differing quite markedly across Europe (0–100%, n=1013) (table 1). Supply of medicines to patients at discharge is also common (average 49.5%, n=654) but rates also vary across Europe from 0 to 100% (table 1).

The size of the hospital does not significantly influence the distribution method, but medium-sized hospitals (100–599 beds) provide slightly more medication services at discharge.

Overall, 66% of hospital pharmacies in Europe (n=916) provide services to both inpatients and outpatients through either the hospital inpatient pharmacy department or a separately licensed outpatient pharmacy. In 62.5% of cases, the sources and prices of drugs for inpatients and outpatients are the same (n=600), ranging from 14.3% in Hungary to 100.0% in Bosnia and Herzegovina,

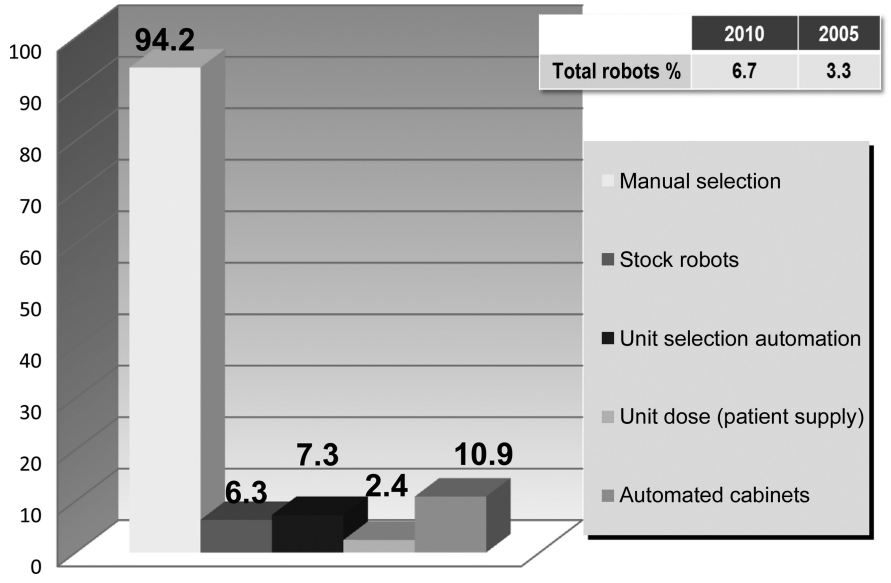

Figure 2 Use of manual selection and robotics in hospital distribution (%, n=949). Totals may be >100% as more than one system can be in use.

Table 2 Use of robotics (n=949) and barcoding (n=1000) by hospital size (%)

Hospital size (beds)	Manual selection	Stock robot	Unit selection by robot	Unit-dose automation	Automated cabinets	Use of bct for stock management of medicines	Use of bct for stock management of medical devices	Use of bct for manual selection
All hospitals	94.2	6.3	7.3	2.4	10.9	27.4	13.9	17.0
1–49	100.0	0.0	2.1	0.0	0.0	30.4	13.0	19.6
50–99	97.1	0.0	0.0	0.0	0.0	11.6	4.7	7.0
100–199	97.1	0.0	1.5	0.7	5.1	16.8	10.5	11.2
200–299	93.4	1.9	3.8	0.9	6.6	22.3	10.7	13.4
300–399	98.3	2.5	5.9	0.8	8.4	16.5	9.9	8.3
400–599	94.0	3.3	6.0	3.3	9.9	28.7	14.6	17.8
600–799	95.5	7.9	11.2	1.1	14.6	27.3	9.1	20.2
800–999	95.0	8.3	13.3	11.7	20.0	28.3	8.3	20.0
1000–1499	83.5	14.7	11.0	2.8	18.3	35.8	23.3	24.2
1500–2000	93.3	13.3	17.8	0.0	20.0	47.8	23.9	21.7
>2000	92.3	30.8	15.4	7.7	19.2	60.4	30.2	34.0

Totals may be >100% as more than one system can be in use.
bct, barcode technology.

Table 3 Use of robots (n=949) and bar coding (n=1000) by country (%)

Country	Manual selection	Stock robot	Unit selection by robot	Unit-dose automation	Automated cabinets	Use of bct for stock management of medicines	Use of bct for stock management of medical devices	Use of bct for manual selection
All countries	94.2	6.3	7.3	2.4	10.9	27.4	13.9	17.0
Austria	100.0	3.0	3.0	0.0	0.0	13.9	13.9	11.1
Belgium	91.4	2.9	20.0	0.0	40.0	19.4	8.3	8.3
Bosnia and Herzegovina	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bulgaria	96.3	0.0	0.0	0.0	1.9	3.6	0.0	3.6
Croatia	100.0	0.0	0.0	0.0	7.9	2.5	2.5	0.0
Czech Republic	92.5	0.0	0.0	0.0	15.0	90.5	50.0	2.4
Denmark	100.0	0.0	0.0	16.7	33.3	83.3	66.7	33.3
Estonia	100.0	0.0	0.0	0.0	5.6	0.0	0.0	0.0
Finland	94.9	0.0	12.8	0.0	2.6	44.2	14.0	14.0
France	100.0	0.0	4.2	4.2	16.7	21.4	7.1	21.4
FYROM	100.0	0.0	0.0	0.0	6.3	12.5	0.0	0.0
Germany	86.3	25.3	12.6	0.0	9.5	41.0	21.0	34.0
Greece	100.0	0.0	0.0	0.0	0.0	16.1	3.2	3.2
Hungary	92.5	7.5	0.0	0.0	17.5	2.1	2.1	0.0
Ireland	100.0	3.3	0.0	0.0	0.0	16.7	0.0	26.7
Italy	94.0	3.4	3.4	3.4	9.4	39.3	23.9	38.5
Latvia	100.0	0.0	0.0	0.0	0.0	14.3	7.1	7.1
Lithuania	66.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Luxembourg	100.0	0.0	20.0	20.0	20.0	60.0	20.0	20.0
Netherlands	100.0	0.0	54.5	0.0	9.1	50.0	33.3	16.7
Norway	100.0	0.0	0.0	0.0	0.0	68.8	43.8	37.5
Poland	97.1	0.0	0.0	0.0	0.0	5.0	2.5	2.5
Portugal	90.9	13.6	45.5	18.2	22.7	32.0	16.0	20.0
Serbia	92.3	0.0	0.0	0.0	7.7	7.1	3.6	3.6
Slovakia	100.0	0.0	0.0	0.0	0.0	14.0	8.8	15.8
Slovenia	95.0	0.0	0.0	0.0	5.0	22.7	13.6	13.6
Spain	78.2	23.6	32.7	12.7	49.1	27.4	14.5	29.0
Sweden	100.0	11.1	11.1	0.0	16.7	64.7	23.5	23.5
Switzerland	94.4	0.0	0.0	0.0	0.0	21.1	10.5	15.8
UK	85.7	57.1	14.3	35.7	21.4	71.4	21.4	21.4

Totals may be >100% as more than one system can be in use.
bct, barcode technology; FYROM, former Yugoslav Republic of Macedonia.

Estonia, Greece, Latvia, Luxembourg and the UK.

Automation (n=949) is not generally used in Europe (figure 2, table 2), although there has been some development with the total of 3.3% of hospital pharmacies using automation in 2005 increasing to 6.7% in 2010.[2] Portugal, Spain and The Netherlands have significantly increased automation since 2005 compared with other countries.

The use of bar coding technology (n=1000) to manage medicines and medical

devices in stock as well as for manual selection is more frequent but has only been implemented in less than one in three hospitals (table 2). The size of the hospital is relevant in that larger hospitals are generally more automated than smaller ones (table 2) and more frequently use barcode technology (up to 60.4% of very large hospitals). Automated cabinets are the most implemented technology in small and medium-sized hospitals and stock robotics are most frequently used in very large hospitals.

There are large differences in the use of robotics and barcodes from country to country (table 3). Automation is not used in eastern Europe in contrast to the situation in Germany, The Netherlands, Portugal, Spain and the UK where automation and the use of barcodes is more popular. Barcode technology is also used more in eastern and northern Europe.

Limitations

In addition to the general limitations of the EAHP survey,[1] some results concerning robotics have to be considered with caution. A zero percentage does not necessarily mean that the technology is not used as the number of answering hospitals may have been too small to detect low implementation. Also, some of the results are inaccurate, as not all hospitals stated how medicines are distributed, so the sum of manual selection and robotic technology is less than 100%.

Discussion

Roughly half the hospital pharmacies in Europe have responsibility for medical devices, so hospital pharmacists should promote their competence and expertise in this field.

Interestingly, eastern Europe pharmacies purchase medicines significantly more through wholesalers than western countries, perhaps because of the concentration of the pharmaceutical industry in western Europe and the fact that prices of medicines are almost identical for hospitals and ambulatory care in eastern Europe where there are also fewer large hospitals with a huge turn-over.

Compared with the results of a similar survey in the USA,[3] it seems that distribution in Europe is more centralised (70%) than in the USA (37%). This is also apparent when unit-dose services are examined: almost every hospital in the USA offers this service compared to only 23% in Europe.

In Europe, 49% of pharmacies provide medication at discharge and 66% provide services for outpatients, but the services are not implemented for all patients. There is therefore a need to improve hospital pharmacy provision of seamless care.

There are huge differences in technology between the USA and Europe: for example, unit-dose technology is very common in the USA but is only used by 14.6% of European pharmacies. Automated cabinets are used by 89.1% of US hospitals but only 10.9% of European ones. The use of barcoding technology for stock management is similar in the USA (33.9%) and Europe (27.4%). The reluctance in Europe to use technology is due to both economic cost and tradition; the question may be whether technology could free up human resources and improve patient safety.

Acknowledgements We acknowledge all national coordinators who were essential in providing the data.

Competing interests None.

Provenance and peer review Not commissioned; internally peer reviewed.

Data sharing statement Detailed analyses can be provided by EAHP on request.

References

1. **Frontini R**, Miharija-Gala T, Sykora J. EAHP Survey 2010 on hospital pharmacy in Europe: Part 1. General frame and staffing. *Eur J Hosp Pharm* 2012;**19**:385–7.
2. **Miharija-Gala T**, Surugue J. EAHP Survey 2005. *EJHP* 2007;**13**:93–182.
3. **Pedersen CA**, Schneider PJ, Scheckelhoff DJ. ASHP national survey of pharmacy practice in hospital settings: dispensing and administration—2011. *Am J Health Syst Pharm* 2012;**69**:768–85. doi:10.2146/ajhp110735

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Eur J Hosp Pharm 2012 19: 460-463
doi: 10.1136/ejhpharm-2012-000196