CLINICAL PHARMACIST INTERVENTIONS IN THE CRITICAL PATIENT: EVOLUTION OF A FOUR YEAR PROJECT

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BACKGROUND

Patients admitted to intensive care units (ICU) are at increased risk of prescription errors and related adverse events due to the critical nature of their disease, polypharmacy, use of high-risk drugs and high frequency of therapeutic changes.[1, 2, 3] An effective intervention to reduce this risk is the presence of a clinical pharmacist in the ICU team, contributing to the optimization of therapy and quality of service provided to the patient.[4, 5, 6]

Since 2011, a pharmacist integrates the multidisciplinary team for critically ill patients in the eight-bed polyvalent ICU. The post implementation evaluation showed a rate of 3.5 interventions/patient and a pharmacist interventions (PI) acceptance rate of about 70%. In order to assess the evolution of the pharmacist role, the same evaluation was conducted in 2015.

PURPOSE

▪ To characterize the evolution of PI after 4 years of the clinical pharmacist integration in the ICU multidisciplinary team;

▪ To identify major contribution areas in order to optimize therapeutics in critically ill patients.

MATERIAL AND METHODS

▪ Pharmacist daily tasks include team-ward round and in-ward evaluation of all patient's therapeutic profiles, during the morning period. PI are then discussed with the physicians team.

▪ PI are recorded in a record sheet (Figure 1) developed specifically for this purpose and already used in 2011.

   ✓ Possibility of multiple choices; includes demographic data of patients; medical specialty and the drug upon which intervened;

▪ Retrospective study: PI between March and June 2015: during this period the pharmacist validated the prescriptions of patients admitted to the ICU in a total of 59 days;

▪ PI were analyzed using simple statistical analysis tools of Microsoft Office Excel. The variables included were medical specialty, acceptance rate, cause, type and outcome of the PI.
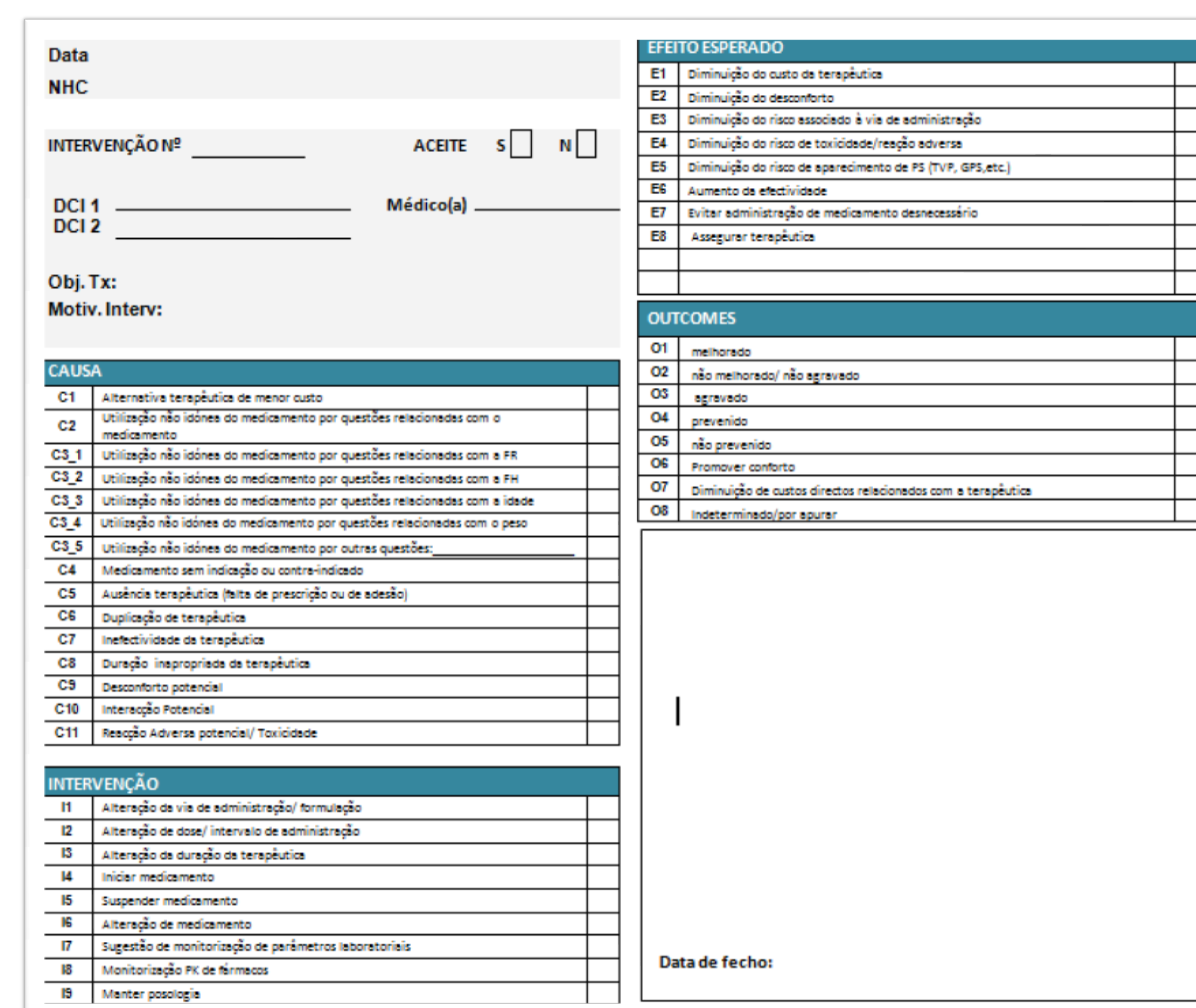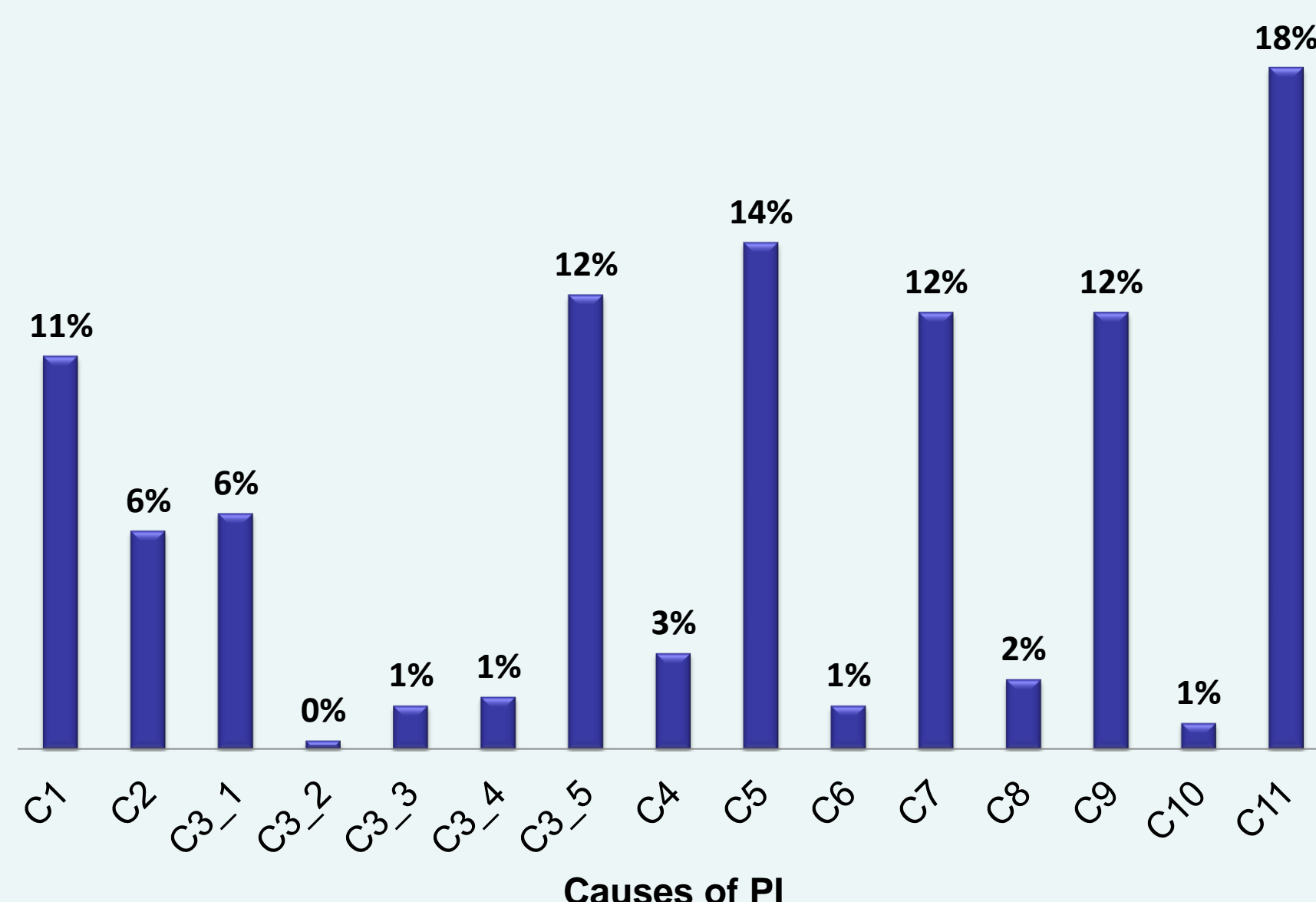

Figure 1 – PI record sheet

RESULTS

217 PI – total of 97 patients

PI acceptance rate of 82%

C1 – Less expensive drug alternative
C2 – Inadequate use of drug due to drug characteristics
C3_1 - Inadequate use of drug due to renal function
C3_2 - Inadequate use of drug due to liver function
C3_3 - Inadequate use of drug related to patient age
C3_4 - Inadequate use of drug due to patient weight
C3_5 - Inadequate use of drug due to other reasons
C4 – Drug with no clinical indication or contraindicated
C5 – Drug absence for an existent indication
C6 – Therapeutic duplication
C7 – Decreased drug clinical efficacy
C8 – Inadequate duration of therapy
C9 – Potential patient discomfort
C10 – Potential drug interaction
C11 – Potential adverse reaction/toxicity

The most frequent cause of PI was 'Potential adverse reaction/toxicity' (18%), followed by 'Drug absence for an existent indication' (14%). The most intervened drugs regarding these two causes are shown in Tables 1 and 2.
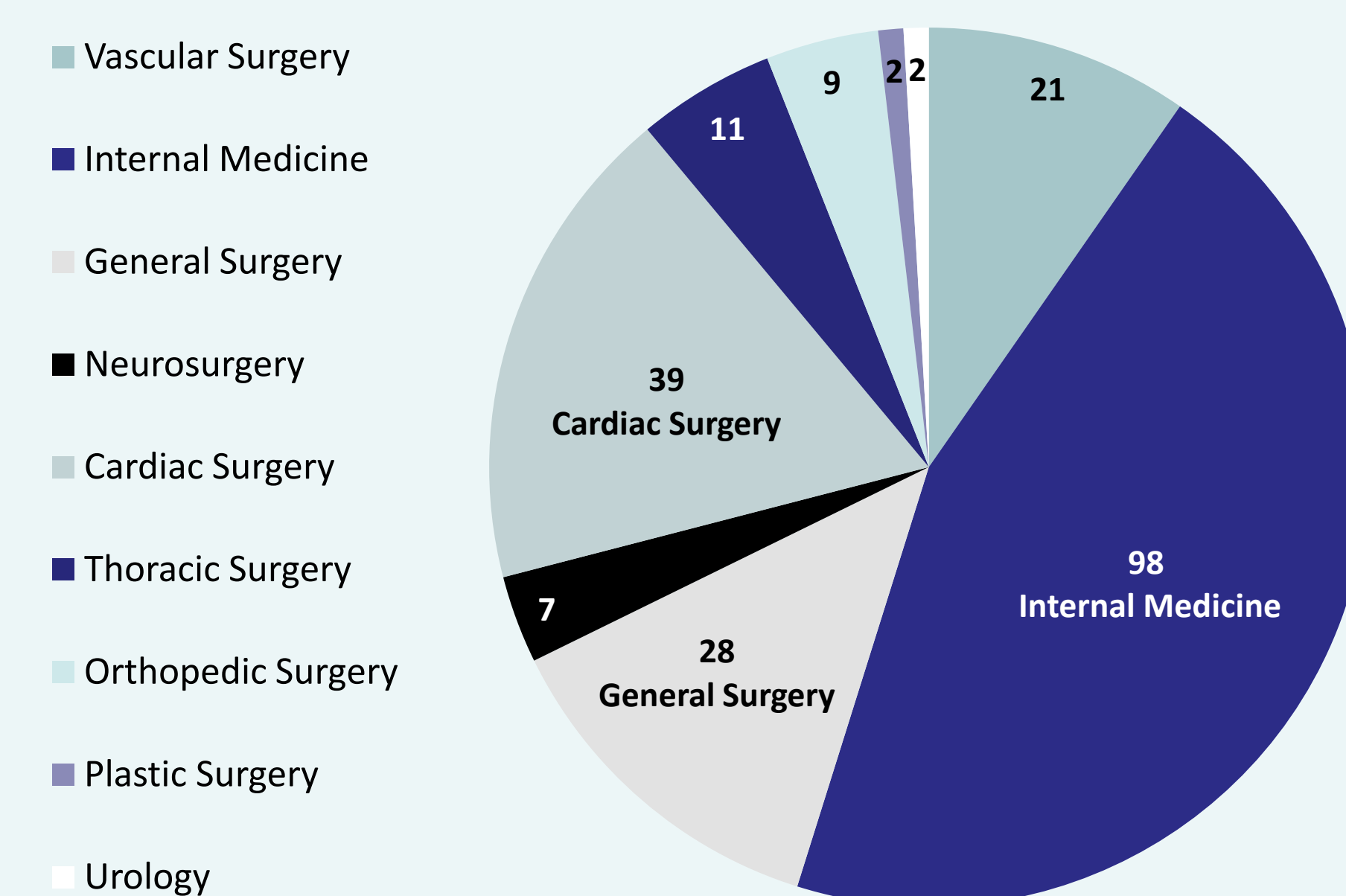

Causes of PI

Drug	No. PI
Vancomycin	22
Gentamicin	11
Enoxaparin	10
Dipyrone	8
Meropenem	6

Table 1 – Drugs most intervened regarding the cause 'Potential adverse reaction/toxicity'.

Drug	No. PI
Acetylsalicylic acid	6
Enoxaparin	5
Rosuvastatin	5
Atorvastatin	4
Pantoprazole	3
Trazodone	3

Table 2 – Drugs most intervened regarding the cause 'Drug absence for an existent indication '.

The medical specialties with more PI were Internal Medicine, Cardiac Surgery and General Surgery.
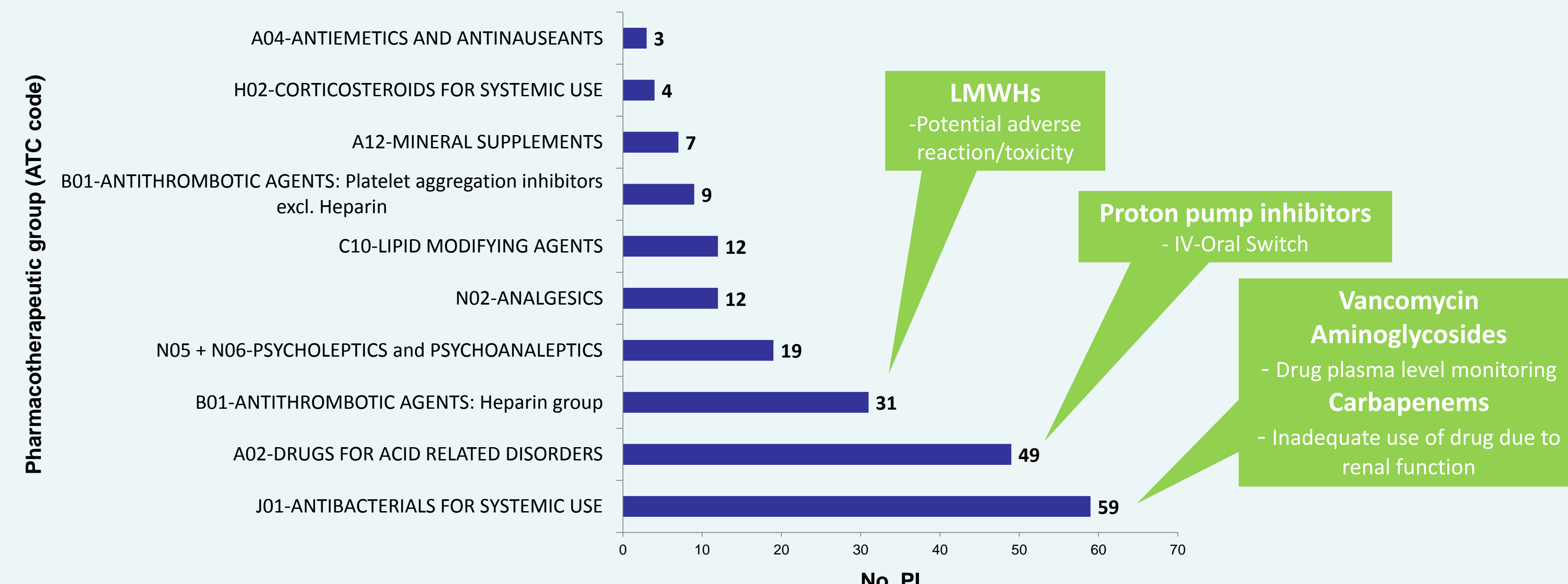

- Vascular Surgery
- Internal Medicine
- General Surgery
- Neurosurgery
- Cardiac Surgery
- Thoracic Surgery
- Orthopedic Surgery
- Plastic Surgery
- Urology

I1 – Administration route/ pharmaceutical form modification
I2 – Dose/dosing interval modification
I3 – Therapy duration modification
I4 – Drug initiation
I5 – Drug discontinuation
I6 – Drug modification
I7 – Laboratory parameters monitoring
I8 – Drug plasma level monitoring
I9 – Drug dosage maintenance

The most frequently suggested PI were 'Dose/dosing interval modification' (21%) and 'Drug initiation' (19%).

PI

The ten pharmacotherapeutic groups with more PI were:

No. PI

LMWHs
-Potential adverse reaction/toxicity

Proton pump inhibitors
- IV-Oral Switch

Vancomycin
Aminoglycosides
- Drug plasma level monitoring
Carbapenems
- Inadequate use of drug due to renal function

CONCLUSIONS

▪ Pharmacists integration in the multidisciplinary ICU team and their technical contribution are clearly positive, regarding the number of pharmacist interventions (PI) and their acceptance rate (**> 80%**);

▪ In comparison to the results shown after the implementation of the project in 2011, there is a greater diversity of intervention causes and the main areas of activity are: the **absence of important home therapy** like secondary prophylaxis of cardiac and cerebrovascular events and/or antidepressant and antipsychotic medication; **prophylactic therapy of in-hospital events** such as venous thromboembolism and stress gastropathy, and **prevention of adverse reactions and toxicity associated with narrow therapeutic index drugs**;

▪ Interesting future challenges will be to explore the **outcome measures** that can better translate the **impact of PI in the ICU** as well as to have the PI classified with a **scale of clinical impact** by one or a group of ICU clinicians.

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