Evidence-based recommendations for the safe use of diltiazem and verapamil in patients with liver cirrhosis

Safe Drug Use Cirrhosis

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COMMENTARY

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Oral communications I: Community pharmacy

CP-PC001: Clinical decision support and creatinine point of care testing for antibiotics

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Background and Objective: An impaired renal function, which is common in the elderly, is an important risk factor for medication related hospital admissions. We aimed to investigate the management of drug therapy alerts on safe use of antibiotics in elderly patients with (potential) renal impairment in combination with the option of creatinine point of care testing (PoCT) in community pharmacy practice.
Setting and Method: Community pharmacists used a clinical decision support system (CDSS) for seven antibiotics. Alerts were generated during prescription processing in case of previously registered renal impairment, and when no information on renal function was available for patients aged 70 and over. Pharmacists could perform PoCT when renal function could not be retrieved from other health care providers. Actions were registered in the CDSS. A retrospective descriptive analysis of alert management and medication dispensing histories was performed. Logistic regression was performed on PoCT cases to analyse determinants of identifying patients with renal impairment.
Main outcome measures: Nature and frequency of CDSS alerts, interventions, and performed PoCT; determinants for identifying patients with impaired renal function by PoCT in community pharmacy.
Results: 351 pharmacists registered the management of 88,391 alerts for 64,763 patients. For 49,178 patients (75.9%) renal function was registered in the CDSS. 1.8% of the alerts (n = 1532) led to dose adjustment or drug replacement. Pharmacists performed 1988 PoCTs (2.2%). In 9.2% of these PoCTs, the renal function was impaired (estimated glomerular filtration rate $\leq$ 50 ml/min/1.73 m^2). Determinants for finding renal impairment were higher age and higher number of medicines in use.
Conclusion: Implementation of a CDSS and possibility to perform PoCT in community pharmacies prevented potential inappropriate (dosing of) antibiotics in elderly patients with renal impairment. Pharmacists retrieved renal functions mostly from other health care providers. Creatinine PoCT was of added value in a limited number of cases, especially in the very elderly.

CP-PC002: Novel technology-enabled pharmacist and patient education program enhances adherence to stroke prevention medications

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Background and Objective: Atrial fibrillation (AF), the most common heart rhythm disturbance in Canadians, increases the risk of fatal and permanently disabling stroke. Antithrombotic treatment decreases this risk by up to 65%. The Canadian Cardiovascular Society (CCS) AF guidelines indicate that Non-vitamin K oral anticoagulants (NOACs) are the preferred agents for stroke prevention in eligible patients. Optimizing the protection conferred by these agents requires both high adherence and persistence. Registries and claims database evaluations indicate that persistence rates with NOACs range from 60% to over 90%; decreases in persistence have been associated with increased stroke and death.
Setting and Method: Pharmacists were invited to participate in a web-based education program, PAACT-AF, with the goal of helping counsel and educate patients with AF taking NOACS. Pharmacists were asked to assess up to 20 patients each, and for each patient a structured questionnaire measured knowledge and adherence. The platform outputted a counselling checklist based on the individual patient being assessed. Patients were followed for 1-4 months and a subsequent questionnaire was completed.

Medication adherence was calculated using Medication Possession Ratio (MPR), the sum of day's supply for all fills in a period over the number of days in the period.
Main outcome measures: Outcomes measured included an objective measure of adherence (MPR), pharmacist perception of patient adherence, and patient knowledge of AF and NOAC usage.
Results: Upon interim data analysis (April 2017), 70 pharmacists from 6 provinces (AB, BC, NB, NS, ON, QC) had participated in the program. 338 patients were counselled at an initial assessment, 242 returned for a follow-up assessment (72%). Patient knowledge of AF and NOAC use was assessed using five different questions, and all areas of patient knowledge increased significantly over the follow-up period from an average of 3.7/5 to 4.3/5 (Fig. 1). Persistence rates increased significantly ($p < 0.0001$) from 93% at baseline to 98% over a period ranging from 1 to 4 month. Pharmacists identified that 17% of the patients had at least one drug therapy problem (DTP) related to their NOAC; 14 (8%) of patients were nonadherent, 9 (5%) had a drug interaction requiring intervention, 4 were prescribed the wrong dose (dose too high in 2, dose too low 2) and in 10 patients the DTP was due to other reasons.
Conclusion: This novel technology-enabled pharmacist and patient education program positively impacted patient awareness of the risks, benefits and importance of their NOAC therapy and increased persistence rates in a meaningful way. Pharmacist feedback about the program supports broader implementation to enable them to impact more AF patients across the country.

CP-PC003: Use of health-related goals during medication review; process analysis of the DREAMeR-study

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Background and Objective: Studies have shown that clinical medication review (CMR) can identify and resolve drug-related problems (DRPs). An effect on clinical outcomes, like health-related quality of life has not yet been demonstrated. This could possibly be due to insufficient attention to health-related complaints and goals of patients. Goal Attaiment Scaling (GAS) is a tool for measuring the attainment of health-related goals. This outcome measure will be used during the DREAMeR-study[1]. The objective of this process analysis is to determine whether GAS is a useful tool for measuring health-related goals during CMR.
Setting and Method: The DREAMeR-study is a randomized controlled trial conducted in 35 community pharmacies spread throughout the Netherlands. Patients aged $\geq$ 70 years with polypharmacy were included. Half of the patients were randomized into the intervention group and received a CMR. If possible, health-related goals were proposed with the patient.
Main outcome measures: Number of health-related goals, three most common GAS topics, achievement of goals after three and 6 months and implementation rates of recommendations for GAS-related DRPs.
Results: In total, 432 health-related goals were proposed for 306 of 343 patients (89%) in the intervention group. Three most common GAS topics were: pain reduction (16%), reduction of medication (14%) and improvement of mobility (9.3%). Of the evaluated goals, 50% was (partly) achieved, 41% did not change and 9% worsened after three months and respectively 54, 35 and 11%, after 6 months. The implementation rate of recommendations for DRPs related to GAS was 71% compared to 52% for not GAS-related DRPs ($p < 0.05$).
Conclusion: Goal Attainment Scaling seems to be a useful tool to measure the attainment of health-related goals during medication review.
[1]DREAMeR is an acronym for: Drug use Reconsidered in the Elderly using goal Attainment scales during Medication Review

CP-PC004: Initial evaluation of medication literacy using a newly developed questionnaire among general population in Slovenia

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Background and Objective: Medication literacy plays a vital role in correct and safe use of medication. The purpose of this research was to assess medication literacy of the general population in Slovenia and to examine predictors of medication literacy using a questionnaire previously developed and validated by authors.
Setting and Method: A questionnaire consisting of 30 items focusing on correct and safe use of medications was sent by mail to a random sample of 1500 adult Slovenian residents. The analysis was done using descriptive statistics as well as multiple linear and binary logistic regression.
Main outcome measures: Level of medication literacy; association of medication literacy with sociodemographic and health-related variables.
Results: Of 1,500 included residents, 402 returned questionnaires (26.8% response); 62.7% were women; the average age was 52 years, most of them had secondary school (52.7%) with less than 600€ monthly income (36.3%).
Results indicate relatively high level of medication literacy in Slovenia with the 80.3% average of correct answers. Most problems were seen with items related to dosing, that require an understanding of information from longer texts and some level of numerical skills. Factors associated with medication literacy score were resident's age ($\beta = -0.075$), income ($\beta = 1.735$) and current self-perceived health state ($\beta = 1.695$). The results of logistic regression show that the odds of belonging to the quartile with the lowest medication literacy scores increase with increasing age (OR = 1.04), decreasing income (OR = 0.297), decreasing self-perceived health state (OR = 0.3) and absence of any chronic disease (OR = 0.52).
Conclusion: Although a high medication literacy level was observed among Slovenian residents, there are some areas, which require attention. Participants encountered difficulties when dealing with information written in longer texts, which require numerical skills, especially related to dosing instructions. Special attention should be paid to older people with lower income, worse health state and people without any chronic conditions.

CP-PC005: Development and validation of patient-friendly medication plans

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Background and Objective: A medication plan, usually in a grid design, can potentially help patients in their medication use. It comprises information on the current chronic medication of the patient, including the name of the medication, dosage and time of intake. As readability for patients is questionable, two patient-friendly instruments were recently developed in a codesign process with 16 patients.

This study aimed to test to what extent patients are able to prepare their medication therapy using the developed instruments and to evaluate patient experiences.
Setting and Method: Using purposive sampling, 21 vulnerable polymedicated patients were included. Each patient made a choice between two designs: an overview with a grid design for the time of intake or an overview with intake instructions in sentences. Unique for both medication plans were the categorization per part of the day and the presence of a picture of each pill or package. Additionally, the indication was mentioned for each of the medicines. Usability was investigated immediately after the intervention and one month later, with the "evaluation tool to test the handling of the medication plan" test. Face-to-face semi-structured interviews were conducted after one month and were analysed using a thematic framework.
Main outcome measures: Usability of the medication plan and patient experiences.
Results: Over half of the patients preferred the design with intake instructions in sentences (12/21). The usability test showed high comprehensibility immediately after the intervention (mean 97.5%). This was reaffirmed one month later (mean 99.3%). The interviews showed that the medication plan was (daily) used by 12/21 patients. Reasons for not using the medication plan was that patients did not experience a need for using it or they already had a list themselves. Six patients who did use the plan explained it provided (re)assurance. The semi-structured interviews confirmed the developed design of the patient-friendly medication plans. Strengths of the designs were: the presence of indication, medication pictures, colour and structure.
Conclusion: This research validated two patient-friendly, comprehensible medication plans in regular community pharmacy patients and confirmed the importance of the availability of different designs. Both types of plans should be implemented in each pharmacy software to generate these patient-friendly formats.

CP-PC006: SMART pharmacy program: guiding the nationwide implementation of pharmaceutical care practices—preliminary results of the asthma/COPD module

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Background and Objective: There is a large body of evidence showing that pharmaceutical care services in community pharmacies improve patient health and reduce health care costs. "SMART Pharmacy Program" is a program run by the Turkish Pharmacists' Association (TPA) which is the public professional organization representing all of the community pharmacists in Turkey. This program aims the nationwide implementation of pharmaceutical care practices through Continuing Professional Development (CPD). This preliminary report describes benefits of the ongoing asthma/chronic obstructive pulmonary disease (COPD) module of the SMART Pharmacy Program.
Setting and Method: TPA assigned trainer pharmacists from each Regional Chamber of Pharmacy. Professional staff trained the trainer pharmacists during a 3-day (train the trainer course) on CPD and asthma/COPD management. The trainer pharmacists then trained the community pharmacists participating in the program coordinated by their regional chambers. During the pharmaceutical care practices, the pharmacist informed the patients about the program and enrolled the ones who accepted to be included in the program. At the first visit, the pharmacist collected demographic, disease-related and medication data. At the first and every visit, the pharmacist measured the peak expiratory flow rate of the patients, administered asthma control test (ACT) or COPD assessment test (CAT) and assessed the inhalation technique and medication knowledge of the patients. At every visit the pharmacist identified the pharmaceutical care needs of the patients and addressed them accordingly; and also provided education on inhalation technique.
Main outcome measures: The improvement in the peak expiratory flow rate and disease control states of the patients (measured by ACT and CAT); as well as the decrease in reliever medication use was assessed by comparison of the last measurements with the initial ones.
Results: The patients with at least two visits (n = 460) from 140 pharmacies were included in the analysis. Mean (SD) age was 57.9 (16.5) years. Median (min–max) follow-up period was 36 (2-510) days. For the 313 patients with asthma, peak expiratory flow rate and ACT scores improved significantly (286 L/min. vs. 310 L/min. and 19.6/30 vs. 20.9/30; $p < 0.001$ for both). Salbutamol use decreased from 6.7 doses/week to 4.9 doses/week ($p < 0.001$). For the 147 patients with COPD, CAT scores improved significantly (19.5/30 vs. 17.9/30; $p = 0.001$). Salbutamol use decreased from 8.2 doses/week to 5.2 doses/week ($p = 0.006$).
Conclusion: Pharmacists taking part in therapy and management of asthma and COPD can improve disease control and therapy outcomes; while, helping patients be more educated about their disease and medications. The nationwide implementation of this program will serve to maintain the continuity of a respected pharmacy profession and hopefully lead to reimbursement for pharmaceutical care services.

CP-PC007: Project PRIMA—implementation of the German National Medication Plan from community pharmacists' and physicians' perspective

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Background and Objective: In Germany, a common data format and an infrastructure to electronically exchange medication data between health care professionals (HCPs) are not available in primary care. Accordingly, to generate and exchange electronic medication plans (MPs) by HCPs in this setting is not yet possible.
To pilot potential processes for generating and exchanging medication data in form of MPs between local software applications of community pharmacies (CPs) and general practices (GPs), the project PRIMA was conducted from October 2014 to December 2016. One aim of the project was to evaluate the acceptance of the medication management (MM) process and the MP by the participating HCPs.
Design: In PRIMA, 12 teams of one CPs and one GPs each were involved to generate and update MPs in a MM service according to previously specified processes and responsibilities (1).
The aim was to recruit at least 100 patients. HCPs operated in their local software applications and exchanged MPs via a central server.

A questionnaire was developed to evaluate the HCP's acceptance of the MM service including the MP. Additionally, HCPs joined a workshop in September 2016 to discuss their experiences regarding collaboration, communication and benefits of the MM service for their patients.
Results: Of the 12 teams of CPs and GPs one dropped out due to technical problems. The remaining 11 teams recruited 196 patients. In total, 35 HCPs participated in the workshop (in some cases more than one HCP per GP or pharmacy was involved).

HCPs named improvement of medication safety as the major motivation to participate (83.3%, n = 18). 75.0% (n = 8) of the pharmacists and 60.0% (n = 10) of the physicians agreed with the previously specified processes and responsibilities in the MM service. HCPs estimated that the service improved the implementation of drug therapy (83.3%, n = 24) and appropriateness of medication (78.6%, n = 28). Furthermore, HCPs expected a reduction in overall health-related costs (82.1%, n = 28).

Conclusion: The electronic MP as well as the MM service were successfully implemented and accepted by the HCPs. This is an important precondition to further implement both the MM service and the MP in primary care in Germany.

Reference

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Oral communications II: Hospital pharmacy

HP-PC001: Value of Pharmacists in detecting atrial fibrillation during World Heart Rhythm Week

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Background and Objective: Atrial fibrillation (AF) is the most common cardiac arrhythmia globally, responsible for one third of strokes, and often resulting in death or incapacity. This condition is estimated to be up to 50% undiagnosed. The International Pharmacist for Anticoagulation Care Taskforce- [iPACT] created a partnership with the Atrial Fibrillation Association (AFA) whereby pharmacists are actively involved in opportunistic screening for AF and demonstrate the feasibility of pharmacists implementing pulse checks and enable identification of new cases of AF.

Setting and Method: A steering group was constituted to develop and implement the study protocol. iPACT was used as the platform for recruiting pharmacists worldwide. An e-learning platform was developed to support education and dissemination materials for display in pharmacies. A secure web based application was developed for all pharmacists to enter patient relevant data and findings. During world heart rhythm week (5–11th June) pharmacists were instructed to take the pulse manually, assess symptoms and risk factors. Whenever an abnormal heart rate or rhythm was detected, the patient was referred to a physician with a referral letter containing additional information.

Main outcome measures: Detection of irregular pulse and confirmation of atrial fibrillation.

Results: Ten countries participated in the initiative, across 4 continents, where 2706 participants were involved in the awareness campaign. For the screening event, individuals younger than 40 and those already on anticoagulants were excluded (n = 133). A total of 2573 patients were included in the analysis. The majority were female (68.9%; n = 1773); mean age was 64.71 ± 12.95, ranging from 40 to 101 years, median 66. The most common risk factor identified was: hypertension (n = 1258; 48.9%), followed by diabetes (n = 508; 19.8%) and peripheral heart disease (n = 397; 15.4%). The least common was having had a stroke, Transient Ischaemic Attack (TIA) or Thromboembolism (TE), which had only occurred in 26 patients (1.1%).

Mean heart rate detected was 72.7 ± 12.0, ranging from 32 to 134. Bradycardia was detected in 107 patients (< 55 bpm) and tachycardia in 14 patients (> 100 bpm). An irregular pulse was detected in 212 patients (8.3%). So far, atrial fibrillation has been confirmed in 35/2572 (1.4%).

Conclusion: European international guidance recommends opportunistic screening for AF by pulse taking or ECG rhythm strip in patients > 65 years of age. Our data is synonymous with meta-analyses identifying 1.4% of those aged 65 or older on a single time point check for presence of AF. Pharmacies are ideally located to support awareness campaigns and in the case of atrial fibrillation, early detection.

HP-PC002: A retrospective analysis of pharmaceutical interventions concerning QT-prolongation and exploration of implementation of a validated risk score in a teaching hospital

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Background and Objective: Prolongation of the QT-interval is often drug-related. Numerous drugs have been associated with possible or probable QT-interval prolongation and risk of Torsade de Pointes (TdP). Our hospital guidelines advise an ECG when a patient is on at least 3 drugs (mentioned on a limitative list) known to prolong QT-interval, regardless of patient-related risk factors. Recently a risk score and model (RISQ-PATH)[1,2] were developed. The objective was to evaluate pharmaceutical interventions of QT-interval prolongation and to explore the implementation of a validated risk-score in adults hospitalized at the Ghent University Hospital, Belgium.

Setting and Method: From a database with pharmaceutical interventions (Oct–Dec 2016), those concerning interactions/QT-prolongation were retrieved. Clinical parameters were obtained from the patient's medical files. The acceptation or non-acceptation of the interventions was checked (ECG within 72 h post intervention). For each patient the RISQ-PATH score and model was calculated. To gain insight into the clinical relevance of these interventions, a panel of cardiologists was consulted to evaluate 30 cases, judge the recommendations given by the pharmacist (in 14 cases).

Main outcome measures: The main outcome measures were acceptance of pharmaceutical interventions, implementation of a validated risk score and a qualitative evaluation of 30 case files to assess clinical relevance.

Results: A total of 1149 prescriptions was evaluated (219 patients < 18 years; 900 patients ≥ 18 years). According to the current guidelines, for 300/1149 (26.1%) medication orders, an advice for an ECG should have been mentioned in the patient's file. However, in only 36 (12.0%) this was performed. Only 1 recommendation (2.0%) was accepted and an ECG was carried out. The modified RISQ-PATH score and model was calculated for the 900 adult cases: of these 662 (73.8%) had a modified RISQ-PATH score >=8 and 740 (82.2%) had a RISQ-PATH model score ≥ 0.035. Clinical significance was estimated for 14 cases by rater 1 as very significant (3) and significant

(11) and as very significant (4), significant (5), moderately significant (4) and insignificant (1) by rater 2. As for the acceptance of the recommendations (14/30), rater 1 would have accepted 12/14 recommendations and 2/14 partially. Rater 2 would have accepted 4/12, 7/12 partially and would not have accepted 3/12 recommendations. For the other 16 cases which did not receive a recommendation, both raters would have intervened more frequently than current guidelines advise.

Conclusion: To date, knowledge of clinical relevance of drug-related QT-prolongation and risk of TdP is rather limited. Our observational study has shown that pharmaceutical recommendations are poorly accepted. In addition, identification of high-risk patients based on current guidelines is insufficient and the estimation of the patient specific risk is very time consuming when using these risk scores. Cardiologists would more frequently recommend an ECG and monitor electrolytes more intensively. A more sensitive risk score could be developed in prospective research.

HP-PC003: Implementation of a medication assessment tool for long-term management of atrial fibrillation

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Background and Objective: Optimisation of drug therapy is essential in the care of older persons and may be facilitated by implementation of medication assessment tools (MATs). The objective was to assess whether implementation of an innovatively developed validated MAT for the long-term management of atrial fibrillation (MAT-AF) in clinical practice contributes to optimisation of drug therapy and clinical pharmacist intervention.

Setting and Method: Adherence to MAT-AF was tested by the researcher (pre-MAT implementation) in a sample of 150 patients aged ≥ 60 years admitted to a rehabilitation hospital with a diagnosis of atrial fibrillation. The pharmacy patient profile of each patient was reviewed by the researcher to assess clinical pharmacist intervention documentation. MAT-AF was introduced as a clinical tool for identification of pharmaceutical care issues in atrial fibrillation patients. Adherence to MAT-AF and pharmacist intervention documentation were assessed by the researcher (post-MAT implementation) for a further 150 patients. The 'differences between two population proportions z-test' was used to compare adherence to MAT-AF and pharmacist intervention pre- and post-MAT implementation.

Main outcome measures: Adherence to MAT-AF review criteria; documentation of clinical pharmacist interventions on pharmacy patient profile.

Results: Adherence to MAT-AF review criteria increased from 71.0% (95% CI 66.9, 75.1) pre-implementation to 89.6% (95% CI 86.9, 92.3) post-implementation (z-score 7.089, $p < 0.001$). MAT-AF implementation resulted in a significant improvement in prescription of anticoagulation in patients with a CHA_2DS_2VASc score ≥ 1 (z-score 4.416, $p < 0.001$), monitoring of laboratory parameters for digoxin (z-score 4.793, $p < 0.001$), ophthalmic and pulmonary monitoring for amiodarone (z-score 2.426, $p = 0.015$) and referral to cardiologists for patients on antiarrhythmic agents but not maintained in sinus rhythm (z-score 1.992, $p = 0.047$). Clinical pharmacist intervention improved significantly post-implementation of MAT-AF (z-score 20.249, $p < 0.001$).

Conclusion: Implementation of MAT-AF within an interdisciplinary health care team significantly improved the quality of drug therapy and pharmacist intervention in older persons admitted to a rehabilitation hospital.

HP-PC004: A pragmatic in-hospital service to reduce workload of community pharmacists after discharge: a randomised controlled trial

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Background and Objective: Community pharmacists often lack sufficient information after hospital discharge. Extensive effort is required for adequate pharmaceutical care. The objective was to reduce post-hospital workload with a pragmatic in-hospital discharge service.

Setting and Method: Internal medicine patients admitted to a Swiss teaching hospital were enrolled. When discharge was planned, the prescription was prepared, and the patient was randomised into the control or intervention group. Control group patients underwent usual care. The pragmatic service in the intervention group consisted of a standardised prescription check by the clinical pharmacist focusing on medication changes, interactions, or therapy duration, and any issues were clarified and/or explicitly commented on the prescription. Workload in the pharmacy was assessed when the patient filled his prescription.

Main outcome measures: Frequency and type of the community pharmacists' interventions documented by pharmDISC and $CLEO_{de}$, time needed for prescription filling, satisfaction of pharmacies on a Likert scale.

Results: In 172 patients randomised to a control and an intervention group, no statistically significant differences in baseline characteristics like age, number of medicines and length of stay were found. A total of 20 dropouts never filled the prescription. In the intervention group, the number of prescriptions requiring at least one intervention by the community pharmacy was lower than in the control group (both n = 76, 64.5% vs. 80.3%, $p = 0.046$). The most frequent reason for an intervention in the controls (inappropriate therapy duration) was reduced in the intervention group (13.3% vs. 19.2%). There was a statistically significant difference in performed interventions between the groups ($p = 0.037$), e.g. the substitutions were increased from 26.2% to 36.2% in the intervention group, and clarifications were reduced from 21.5 to 15.2%. Clinical relevant interventions were slightly lower in the intervention group (53.3 vs. 60.6%, $p = 0.106$). The time required to fill the prescription was similar (both medians 10 min, $p = 0.549$). Concerning the prescription quality, community pharmacists were more satisfied in the intervention group (highest satisfaction 68.4 vs. 53.9%, $p = 0.05$). In depth analysis of the data is ongoing.

Conclusion: The in-hospital discharge service provided by a clinical pharmacist reduced the proportion of prescriptions triggering an intervention at the community pharmacy and increased satisfaction of community pharmacists.

HP-PC005: Implementation of medication reconciliation in a rheumatology ward: a French pilot study to evaluate clinical relevance of patients' selection

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Background and Objective: In our centre, retrospective admission medication reconciliation (AMR) was implemented during a two-month test phase (January–March 2017) in the rheumatology

department. It confirmed that AMR is useful to prevent Unintended Medication Discrepancies (UMD) but is very time-consuming. Therefore, to routinely implement AMR, it was necessary to identify prioritization criteria for patients' selection. Our aim was to evaluate the clinical relevance of this patient's selection based-approach through a pilot study.

Setting and Method: The pilot study was conducted from April to June 2017. Selected patients were those first admitted by the emergency ward and otherwise with a number of prescribed drugs at admission exceeding five. We also prioritized patients who did not bring with them their recent valid prescriptions. As the information about the prescriptions availability was not mentioned in the patient computerized medical file, this criterion was more complex to take into account. Thus, its impact was analysed retrospectively.

Main outcome measures: AMR patients' coverage rate, mean AMR duration, mean number of UMD/patient and mean number of UMD corrected/patient were measured for each criterion.

Results: A total of 104 patients beneficiated from AMR (52% of all admitted patients). 81% of the patients admitted by the emergency ward beneficiated from AMR. A mean of 1.23 UMD was found for them. Of these 73% were corrected by physicians.

When not admitted by the emergency ward, coverage rate for patients with more than five prescribed drugs reached 80%. AMR highlighted 1.29 UMD per patient, 42% of which were corrected.

49% of patients who beneficiated from AMR did not bring their recent valid prescriptions. For them, the mean number of UMD was 1.44 compared to 0.74 otherwise. Of these, 59% and 56% were corrected respectively.

Mean AMR duration was approximately 45 min for all categories except if all recent valid prescriptions were available. In this case, AMR necessitated only 34 min.

Conclusion: Even if not easily extractible, unavailability of all recent prescriptions was worthwhile studying. It was associated with the highest mean number of UMD. An improvement of patients' computerized medical file will be discussed to include this criterion in admission medical notes. Besides, it will be reminded to patients to bring all there valid prescriptions for scheduled hospitalizations. An evaluation of therapeutic classes of UMDs less corrected by prescribers will also be conducted.

DI001: Melatonin use for premedication in children undergoing diagnostic procedures in French hospitals

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Background and Objective: Melatonin (MLT) has been used since decades in the treatment of sleep disorders. In France, numerous drugs are available without a prescription, as food supplement. A worldwide use as a sedating agent before diagnostic procedures is common in children.

In 2015, French health authorities conducted a national survey about hospital preparations (HP) made by pharmacies. Eighteen hospitals answered they prepared HP of MLT for premedication before diagnostic procedures in children. The aim of this study was to assess this use and its usefulness.

Setting and Method: The survey was conducted in January-March 2017 in 18 French hospitals, among pharmacists and clinicians from Intensive Care Units, Neurophysiology, Otorhinolaryngology and Neonatology wards.

Main outcome measures: Pharmacists and clinicians were interviewed using a standardized questionnaire with 15 closed and opened questions, on the use of MLT in their hospital: indication, pharmaceutical form and strength, posology, age/number of treated patient.

Results: Thirteen hospitals (17 pharmacists and 7 clinicians) answered the questionnaire.

Immediate-release MLT preparations were used in different ages: from preterm infants to teenagers. MLT was administered 15 min to 1 h before electroencephalography (n = 12/13), auditory brainstem response test (n = 6/13) or medical imaging (n = 4/13).

Sleep deprivation was said to be generally sufficient to obtain an appropriate sleeping state for children under 3 years.

Two pharmaceutical forms were used: from 1 to 10 mg hard capsules (n = 12/13) and 5 mg/mL oral suspension (n = 1/13). For young or intubated child, hard capsules were opened by nurses who suspended the powder in various liquids (milk, water, fruit juice or glucose).

Concerning hard capsules, age/bodyweight adjusted dosing were adapted by 2 mg (n = 6/12) or 5 mg (n = 4/12) levels. Doses per intake were from 2 to 20 mg.

All respondents associated MLT with a satisfying efficiency and a good safety profile.

A majority of hospitals (n = 9/13) considered hard capsule as the most appropriate form for MLT use in premedication before diagnostic procedures. Oral suspension was also mentioned by 46% of hospitals (n = 6/13). Hard capsule was said to bring an extended shelf-life and no taste problem; oral suspension was said to allow an administration in young or intubated children and an accurate adjustment of posology.

Conclusion: According to this survey, hospital pharmacists and clinicians confirmed their interest for a preparation of MLT for premedication before diagnostic procedures in children.

Doses are quite consensual and times of administration before the procedure are coherent with MLT half-life which is between 30 and 50 min.

Given the specificity of MLT use in that indication (one-shot administration, few intake per patient), hard capsules appeared in this survey as the most appropriate pharmaceutical form.

Multidisciplinary meetings will be necessary to choose the best pharmaceutical form and strength.

DI002: Treatment of clostridium difficile infections: are dificlir® promises fulfilled?

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Background and Objective: *Clostridium difficile* is the main cause of nosocomial diarrhoea with adults.

Only toxin-producing strains are pathogenic, therefore the presence of *C. difficile* is asymptomatic twice out of three at least.

C. difficile infections (CDI) are a rapidly evolving threat worldwide, mostly for two reasons:

Increasing impact

High risk of recurrence, related to the production of endospores

DIFICLIR® (fidaxomicin) is a first-in-class macrocyclic antibiotic that specifically targets *C. difficile* bacteria. DIFICLIR® is indicated to adults for the treatment of CDI.

This work aims to evaluate whether DIFICLIR significantly reduces the number of CDI recurrences compared to vancomycin, and secondarily, where it fits in the therapeutic landscape.

Design: We have undertaken a one-year retrospective study (from June 2014 to June 2015). Patients were followed at AP-HM (Assistance Publique—Hôpitaux de Marseille, third largest health centre in France); they were over 18 and were treated with a full cycle of DIFICLIR®.
We compiled all data alongside both clinicians and patients, and with the help of aXigate® (clinical information management platform) and Pharma® software (computerized prescription system).

Recurrence is defined as the return of diarrhoea within 30 days after treatment completion.

Recurrence rates for DIFICLIR® and vancomycin were calculated from monotherapy treatment only. Each group contains 25 patients. Prescriptions followed the official prescribing information and ESCMID 2009 recommendations.
Results: The average age was 69.6 years old.
The use of DIFICLIR® as a first-line treatment was limited to 18% of cases. This percentage increases with the number of recurrences and we observed later that clinicians do not hesitate to use DIFICLIR® in association with vancomycin and metronidazole (38% for patients who had 2 recurrences).

Our study does not show a significant difference between the recurrence rate under DIFICLIR® and the one under vancomycin ($p < 0.001$). In addition to that, the recurrence rate we had under DIFICLIR® (32%) was twice the recurrence rate that emerges from clinical trials (15.4 and 12.8%).

However, none of the patients treated with DIFICLIR® as a first-line treatment relapsed (0/5). If used after the first recurrence, the rate was 11% (1/9). After 3 recurrences, DIFICLIR® turns out to be ineffective.
Conclusion: In regards of our local bacterial ecology, this study confirms the effectiveness of DIFICLIR® in treating CDI, but it does not substantiate any difference about the recurrence rate compared to vancomycin.
The place of DIFICLIR® remains to be defined, considering the cost of a cure: 1416 € for 10 days of DIFICLIR® versus 66 € for 14 days of vancomycin. Should it be reserved for the first episode of patients with a high risk of relapse: subjects over 65 years old, long-stay patients? Systematically after any first recurrence?

In a randomized trial, the faecal microbiota transplantation demonstrates superiority over antibiotics in treating recurrent CDI. It could thus be an interesting alternative to DIFICLIR® for relapsed patients.

PT001: Experience of biosimilar infliximab in daily practice in a third level hospital

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Background and Objective: Patents biotech drugs begin to expire, giving way to a new market biosimilar drugs, with similar clinical efficacy to the reference product. Once the market is important to monitor pharmacovigilance of these drugs to confirm its effectiveness and safety in clinical practice. In February 2015 it was authorized by the Competent Authority marketing biosimilar drug infliximab.
Objective: Study effectiveness and any event occurred after infusion of biosimilar infliximab in daily clinical practice.
Design: A retrospective observational study in a third level hospital. The study was performed in a different services, digestive, rheumatology and dermatology. The analysis period was from March 2016 to March 2017. During the period analysed were registered all patients treated with infliximab biosimilar with Farmatools program. The end point examined were, indication, disease outbreaks, switching and events during treatment.
Results: 36 patients were recorded during the study of which 22 belonged to serve digestive, 6 to rheumatology and 8 dermatology. The indications were: 18 Crohn's disease, 4 with Ulcerative Colitis, Psoriasis 8 and 6 Rheumatoid Arthritis. In 21 patients was done switching (change of a biological drug for another) 7 dermatology, 12 digestive and 2 of rheumatology. All patients who were administered infliximab biosimilar, did not have any negative effect to effectiveness. Regarding security, 36 patients had no problem significant with the prescribing physician.
Conclusion: To bring to market these drugs, biosimilar industries have had to carry out comparative clinical trials, non-immunogenicity and a risk plan, like innovative drug. Still they are not free to produce less efficacy during treatment, any immune reaction or a rare adverse reaction. It is essential carefully observe the use of new biosimilar drugs in the post-marketing phase to identify, evaluate and prevent the risk of their use once administered in daily clinical practice.

Oral communications III: Pharmacotherapy and pharmacoepidemiology

PE001: Drug Burden Index and physical function measures in older adults with intellectual disabilities

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Background and Objective: Drug Burden Index (DBI) is a quantitative, dose-related measure of the burden of anticholinergic and sedative medications on an individual. DBI has been associated with poorer performance in physical function measures in older adults in the general population. DBI and physical function in older adults with intellectual disabilities (ID) has not previously been studied.
Objectives were: To evaluate the relationship of DBI score, anticholinergic only Drug Burden (DBA) and sedative only Drug Burden (DBS) with two physical function measures, grip strength and timed up and go (TUG), in a cohort of older adults with ID.
Setting and Method: This study used data from Wave 2 of the Intellectual Disability Supplement to the Irish Longitudinal Study on Ageing (IDS-TILDA), a nationally representative study of older adults with ID in Ireland. A health assessment was carried out to collect data on grip strength and TUG. Analysis of Covariance (ANCOVA) identified associations and adjusted means for these physical function measures.
Main outcome measures: DBI, DBA and DBS scores were tested as dichotomous (= 0 or > 0) and ordinal variables (0, 0 > 1, ≥ 1) to measures associations with grip strength (kg) and TUG (seconds) scores.
Results: After adjusting for confounders, grip strength was not significantly associated with DBI, DBA or DBS score > 0 ($p = 0.641$, $p = 0.885$ and $p = 0.830$). TUG was not significantly associated with DBI or DBA > 0 ($p = 0.336$ and $p = 0.620$), but was significantly associated with DBS > 0 ($p = 0.003$). This relationship was also identified in adjusted means for TUG (DBS 0 > 1 $p = 0.016$; DBS ≥ 1 $p = 0.011$).
Conclusion: No significant association was found between DBI and DBA scores and grip strength or TUG measurements. This could be as a result of existing low physical fitness levels in older adults with

ID. Poorer TUG scores were associated with sedative drug burden. This finding can inform practice for the therapeutic management of older adults with ID as it identifies that sedative exposure is associated with poorer performance in an objective measure of proximal muscle strength, balance and executive function.

PE002: Perception of Predictors for the Occurrence of Medical Conditions during Pregnancy

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Background and Objective: Cardiovascular complications during pregnancy are health problems which can involve the mother, the baby or both. It could lead to further complications, even after delivery. It is great importance to evaluate the possible factors that put women at further complications and thus receive more health care before and during pregnancy to decrease the possible risk of pregnancy-related complications. The objective of this study was to evaluate the perception of certain factors for the occurrence of certain medical conditions during pregnancy.
Setting and Method: A prospective cross-sectional observational study carried out on 92 pregnant women at different gestational terms admitted at a gynaecological clinic in a certain sector of Baghdad Governorate. Patients were divided into two groups according to the presence or absence of cardiovascular-related conditions. Gestational, demographic and health records were collected for each patient during the study including gestational age of the pregnant women, family history, medical comorbid conditions, medication history and certain biochemical profiles.
Main outcome measures: Perception of factors for the occurrence of cardiovascular –related conditions upon the evaluation of certain demographic gestational and biochemical parameters as well as a 10-year CVD Framingham Risk Score.
Results: A 32.6% of the pregnant women were suffering from medical conditions. Concomitant occurrence of hypertension with DM (60%) was the most common among those conditions. A 60% of the participants were using dydrogesterone tablets; 50% methyldopa tablets; 39% aspirin tablets; 13% amlodipine tablets and 17.4% rapid-acting insulin. A 32.6% of patients suffering from medical conditions were at a gestational age (25–37 weeks). A 34.8% had a positive family history of medical conditions. Participants that suffering from medical conditions were multigravida (32.6%) and multipara (13%). Most of the pregnant women with medical conditions had a significant elevation of systolic blood pressure, diastolic blood pressure ($p = 0.001$), total serum cholesterol ($p = 0.0001$), LDL-cholesterol ($p = 0.007$), and non-HDL cholesterol ($p = 0.0001$) compared to patients who did not have medical conditions. There were a significant correlation between the presence of pregnancy- related medical conditions with the Framingham Risk Score at 1% ($p = 0.0001$) and at 3% ($p = 0.0419$).
Conclusion: The results of this study revealed that hypertension and DM were the most common medical conditions during pregnancy. Certain factors like gestational age in weeks, gravidity, parity and the influence of 10-year Framingham score could be regarded as additional involvements to predict the influence of these conditions during pregnancy. These perceptions could be of contribution for better clinical pharmacy implementation in gynaecological ward discipline.

PE003: Temporal synchrony between drug dispensing and adverse drug events? The example of statins and rhabdomyolysis and metamizole or clozapine and agranulocytosis

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Background and Objective: Pharmacovigilance collects and explores, among others, spontaneous reports of adverse events (AE) of pharmacotherapy, mainly in order to detect new, hitherto unknown adverse drug reactions (ADRs). However, a lot of information e.g. the total number of patients at risk is missing. We aimed to complete and enrich pharmacovigilance data from the Federal Institute for Drugs and Medical Devices (BfArM) with dispensing data from the DAPI database for potential temporal synchrony analyses and calculation of incidence rates. Metamizole and clozapine were analysed with the event "agranulocytosis" and related events, summarised as so called Standardized MedDRA Queries (SMQ). Additionally, statins were analysed with the SMQ "rhabdomyolysis".
Setting and Method: The study design was previously published at the German Clinical Trials Register (DRKS00011398). Dispensing data were provided by DAPI, pharmacovigilance data were bought from the BfArM. Data were arranged in monthly aggregated time series. A convolution filter spanning 3 months was applied to both time series. Dates of dispensing and AE reporting were offset by one month to reflect the delays introduced by time of ingestion, development of an AE, and subsequent reporting the AE to BfArM.
Main outcome measures: Synchrony was tested using the package 'synchrony' for R. The proportion of local minima/maxima common to both time series was calculated and its significance was computed via Monte Carlo randomisation ('peaks'). A p value less than 0.05 was considered significant. For explorative analysis, synchrony as described above and Spearman's rho as a measure for correlation were calculated for original and filtered data with different offsets.
Results: The primary hypothesis that dispensing of statins and occurrence of the AE rhabdomyolysis are in temporal synchrony could not be proven (peaks $= 0.3$, $p \sim 0.6$). Some other offsets and analysis modes provide higher values for synchrony peaks and lower p values. We present these results and discuss factors for the missing synchrony/correlation as well as new assumptions for further temporal synchrony analyses with medication data. There was neither temporal synchrony for metamizole and agranulocytosis (peaks $= 0.34$, $p \sim 0.4$) nor for clozapine and agranulocytosis (peaks $= 0.16$, $p \sim 1$).
Conclusion: Analysis of temporal synchrony seems not suitable with the settings and the data available for this study. A major problem is the variable delay between dispensing date and date of reporting the AE to BfArM. Hence, this method appears not suitable to detect the impact of dosage and/or duration of drug therapy on the development of ADRs. Further studies should explore different granularities for time series than months only and consider using the date of the onset of the AE, if available. Finally, a single dispensing of a large quantity of statins should be spread over weeks or months for any analysis.

PT003: Effects of a non-dispensing pharmacist integrated in a primary care practice in the Netherlands—outcomes of the POINT-study

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Background and Objective: Elderly patients with polypharmacy are at risk for adverse drug events and hospitalisations. In the Netherlands, 10.4% of acute hospitalisations in elderly patients are medication-related and almost half are potentially preventable. Pharmacists can improve the appropriate use of medications and consequently may reduce hospitalisations and improve patient health. However, pharmacists lack complete clinical information and the collaboration between pharmacists and general practitioners is often suboptimal. Integration of a non-dispensing pharmacist (NDP) in primary care practice may overcome these barriers. The aim of this study is to evaluate the effect of integration of NDPs in primary care on medication-related hospitalisations.
Setting and Method: We performed a Dutch non-randomized controlled intervention study with pre-post comparison (2013 vs. 2014/2015). Ten extensively trained NDPs worked full time in ten primary care practices during 15 months. The NDP took integral responsibility for the pharmaceutical care provided in the practice, mainly by performing clinical medication reviews and prescribing quality improvement projects. The number of medication-related hospitalisations in the intervention practices was compared with usual care and with community pharmacists who were trained in performing clinical medication reviews (usual care plus). All acute hospitalisations of high risk patients (age $\geq$ 65 years and polypharmacy) were assessed by an expert team of general practitioners and pharmacists to identify potentially medication-related hospitalisations. The outcome was analysed with a generalized linear mixed model including correction for the number of medication-related hospitalisations at baseline, clustering and possible confounders.
Main outcome measures: Medication-related hospitalisations.
Results: In total we found 1.536 (12.9%) potential medication-related hospitalisations within 11.928 high risk patients. The relative risk of medication-related hospitalisations was significantly lower in the intervention group compared to usual care (RR 0.68, 95% CI 0.57–0.82). We found no significant difference compared to the usual care plus group (RR 1.05, 95% CI 0.73–1.52).
Conclusion: NDPs in primary care practice reduce medication-related hospitalisations compared to usual care.

PT004: Do physicians follow the European guidelines in patients with ST-segment elevation myocardial infarction undergoing primary percutaneous coronary intervention ? A real life one year follow-up study

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Background and Objective: In the field of acute coronary syndrome (ACS), secondary prevention evidence-based medicine (EBM) therapies are a key pillar to reduce long-term rates of major adverse cardiovascular events. Current European Society of Cardiology guidelines recommend the long-term use of specific drugs, which showed a benefit for ACS patients. The aim of our study is to assess the rate of adherence to ESC guidelines in a real life cohort of patients presenting with a ST-segment elevation myocardial infarction (STEMI).
Setting and Method: The study is an observational single-centre study including consecutive patients with STEMI undergoing primary percutaneous coronary intervention (PCI) in a tertiary hospital in Switzerland over a 2 years period. Secondary prevention therapies were assessed at discharge and at one-year follow-up. Drugs currently recommended (IA) after primary PCI for STEMI are aspirin, $P2Y_{12}$ receptor inhibitor (preferably ticagrelor or prasugrel, clopidogrel only if concomitant oral anticoagulant or high bleeding risk) and high intensive statin (atorvastatin $\geq$ 40 mg or rosuvastatin $\geq$ 20 mg). Angiotensin Conversion Enzyme Inhibitor (ACEI)/Angiotensin Receptor Blocker (ARB) and beta-blocker (BB) are also recommended in specific conditions (Left Ventricular Ejection Fraction $<$ 40%, heart failure or diabetes for ACEI/ARB). At one year review a supplementary item related to the duration of dual antiplatelet therapy (EBM if equal or over 12 months) was assessed.
Main outcome measures: Proportion of patient receiving a prescription of each EBM drug (unless contraindicated) at discharge and after one year.
Results: At discharge (n = 358), EBM drug prescription was 98.6% for aspirin (n = 353), 93.9% for $P2Y_{12}$ receptor inhibitor (n = 336), 83.2% for statin (n = 298), 98.6% for ACEI/ARB (n = 353) and 97.2% for BB (n = 348).
At one-year follow-up (median 14.1 months, n = 303), aspirin, $P2Y_{12}$ inhibitor, statin, ACEI/ARB and beta-blocker prescription rates diminished to 91.7% (n = 278), 89.4% (n = 271), 67.3% (n = 204), 94.7% (n = 287) and 96.4% (n = 292) respectively.

The high reduction of statin prescription rate is due to drug discontinuation (7.5%) and drug dose reduction to a mid-intensive therapy (14.1%).

Among patients treated with a $P2Y_{12}$ inhibitor at discharge (n = 299), 51.8% stopped the drug after a one year period as recommended (n = 155), and 7.7% stopped the drug earlier (n = 23). When ticagrelor was prescribed at discharge (n = 258), 21 (8.1%) were switched to clopidogrel. Reasons for this switch are mainly unknown but 6 patients switched because of side effect.
Conclusion: This study demonstrates a high physician adherence to ESC secondary prevention guidelines. Prescription rate from discharge to one year is indeed very high. Nevertheless, further investigations should now focus on the reasons for misprescriptions to enhance the quality of prescription to a top-level.

PT005: Evaluation of medication use in elderly patients

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Background and Objective: Medication use in the elderly patients is often associated with development of drug therapy problems that may lead to additional medication(s), increased hospitalization, and increased morbidity and mortality. Several studies worldwide, particularly in developed countries, reported the prevalence of drug therapy problems and interventions to optimize pharmacotherapy for the elderly in a variety of clinical settings. To our knowledge, there are no published studies assessing medications use among the elderly

patients in Kuwait. Hence, this study was designed to determine the prevalence of (1) potentially inappropriate medications (PIMs) use according to Beers', STOPP, and MAI criteria, (2) potentially prescribing omissions (PPOs) according to START criteria, and (3) medication adherence among the elderly population.
Setting and Method: A descriptive, cross-sectional study was conducted by interviewing and accessing the medical files of 233 Kuwaiti elderly patients attending nine polyclinics that provide geriatric care. Systematic random sampling was used to determine the number of patients that should be approached at each polyclinic. Patients with cognitive impairment and/or psychiatric illness were excluded from the determination of medication adherence. Data analysis were performed using SPSS version 23.
Main outcome measures: Quality of medication use amongst elderly patients measured according to the percentage of patients prescribed at least one potentially inappropriate medication (PIM) according to Beers' and STOPP criteria.

- Percentage of patients with potential prescribing omission (PPO) according to START criteria.
- Percentage adherence to medications by elderly patients according to MMAS-8 scale.

Results: 255 patients were approached, of which 233 agreed to participate, giving a response rate of 91.4%. 43 patients (18.5%) and 52 (22.3%) were prescribed at least one PIM according to Beers' and STOPP criteria, respectively. 156 (67.0%) of the study population were prescribed one or more medications inappropriately (MAI score per patient ranged between 1 and 33). Based on START criteria, 39.1% of patients had at least one PPO. Low dose aspirin, statin, and metformin were the most common PPOs. Polypharmacy (taking ≥ 5 medications) was found to be a significant predictor for PIMs and PPOs ($p < 0.05$). Optimal adherence was defined as having a score of greater than 6 on the (MMAS-8). Using this cut-point, 61.3% (n = 138; 95% CI 54.6–67.7) of respondents had optimal adherence and 38.7% (n = 87; 95% CI 32.3–45.9) had poor adherence. Respondents with high education, polypharmacy, and those who had ≥ 3 diseases were found to be significantly more non-adherent than those with low-intermediate education, those taking 1–4 medications or had 1–2 diseases high ($p < 0.05$).
Conclusion: The present findings provide better understanding of the current medication use in the elderly as well as the factors that influence non-adherence in this population. The current results should be recognized by healthcare professionals and to be used in designing multifaceted interventions to improve the quality of prescribing and adherence amongst the elderly.

PH002: Validation of four clinical scores identifying elderly patients at risk of readmission

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Background and Objective: A potentially avoidable readmission is an unplanned readmission caused by known comorbidities and which occurs within 30 days after discharge. As 14% of people aged 65 and over who have been hospitalized are rehospitalized as an unplanned readmission, discharge interventions should be directed to elderly patients most at risk of rehospitalization. Thus, it is necessary to identify patients at risk of readmission. This identification can be made using a clinical score. The aim of this study was to externally validate four clinical scores identifying elderly patients at risk of avoidable readmission.
Design: We conducted a retrospective case–control study using a clinical data warehouse. The study included patients aged 75 and over hospitalized between September 1st, 2014 and October 31st, 2015 at the HEGP. Cases were patients readmitted to the hospital within 30 days after their initial discharge. Controls were patients not readmitted to the hospital after 30 days. After a random pairing, we excluded all pairs in which control was potentially dead after its initial hospitalization. Four clinical scores (80+ score, LACE index, HOSPITAL score, TRST) were analysed to assess their validity and performances. Discrimination of the scores was assessed by calculating c-statistic and AUC of the ROC curves. Calibration was assessed by a Hosmer–Lemeshow Chi 2 test.
Results: Among 6574 patients meeting the inclusion criteria, 456 were cases forming 456 pairs. 239 pairs were excluded due to the potential death of the control. Eventually, 219 pairs were included in the study. For the calibration the 80 + score, the LACE index, the HOSPITAL score and the TRST had a c-statistic of 0.479 (95% CI 0.413–0.546), 0.525 (95% CI 0.459–0.591), 0.532 (95% CI 0.466–0.598), and 0.589 (95% CI 0.524–0.654) respectively. The c-statistic > 0.05 implies a fair discrimination. Regarding the calibration the Hosmer–Lemeshow tests had p values of 0.44, 0.43, 0.11, and 0.49 respectively. The p value must be > 0.05 to validate the calibration.
Conclusion: The four analysed scores showed less performances to identify potentially avoidable readmission of elderly patients compared to results found in the literature. The TRST demonstrate better performances than the other scores and will be used for a prospective study.

Poster discussion forum I: Community pharmacy

CP-PC008: Improving medication administration skills of patients—a cluster-randomized controlled trial in German community pharmacies

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Background and Objective: Medication administration errors are common in patients who self-administer their drugs at home and lacking knowledge was identified as the main error cause. In addition, most patients overestimate their skills and are unaware of knowledge gaps resulting in poor motivation to seek professional advice. We investigated the impact of motivational interviewing as part of patient education on patient administration skills of error-prone dosage forms (i.e., eye drops, oral liquids, and transdermal patches).
Setting and Method: A total of 24 German community pharmacies were randomly allocated to the intervention or control group (cluster-randomization). In both groups, patient education included observation of the patient during medication administration to identify individual errors, pharmaceutical counseling including written information material, and teach-back evaluation of the teaching success. Intervention pharmacies additionally applied motivational communication techniques to increase patients' readiness for educational content. The patients were invited for follow-up visits after 1, 6, and 12 months.
Main outcome measures: Correct demonstration of medication administration.
Results: The pharmacy staff approached a total of 214 patients either using eye drops (N = 160), oral liquids with a measuring device (N = 18), oral solutions with a dropper (N = 22), or transdermal patches (N = 14). In the largest group of patients, i.e. eye drop users,

152 adult patients were eligible for the study and 91 patients (intervention group N = 46) agreed to participate in the follow-up visits. In this group of eye drop users, patient education significantly increased the proportion of patients correctly administering eye drops from 6% at baseline to 35% ($p < 0.001$) at the 1-month follow-up, and 64% ($p < 0.001$) at the 6-month follow-up irrespective of group allocation. Too few patients using oral liquids with a measuring device, oral solutions with a dropper, or transdermal patches prevented statistical analysis.

Conclusion: Patient education improved medication administration skills of patients in the long-term irrespective of the communication technique applied. However, motivational interviewing successfully increased patient willingness to participate in the follow-up visits.

CP-PC009: Post-discharge facilities' physicians are keen to apply the treatment plan suggested by the mobile geriatric multidisciplinary team for elderly hospitalized in an orthopaedic unit

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Background and Objective: Mobile geriatric multidisciplinary teams (MGMT) have been developed to address specific needs of elderly people hospitalized in non-geriatric units. Recently, we implemented medication reconciliation in the geriatric assessment in order to ensure the process of medication history and provide solid basis for medication review. Identification of inappropriate medication prescriptions (IMP) led to establish a personalized treatment plan, in order to prevent drug related events. This treatment plan integrated recommendations for both early postoperative medical care and modifications in chronic treatment after discharge.

Thus, the objective of this work was to evaluate the adherence to suggested treatment plans in post-discharge facilities.

Design: We conducted a prospective observational study on patients over 75 years hospitalized in the orthopaedic unit and discharged towards rehabilitation centres. Treatment plans were suggested combining the STOPP/START criteria and clinical assessment. 4-to-7 days after discharge, we phoned physicians in charge to assess adherence to suggested treatment plans.

Results: Over a period of 2 months, 26 patients were included. Medication reconciliation unveiled 123 unintentional discrepancies (UD), *i.e.* 4.7 ± 3.8 per patient. 25 prescriptions had at least one UD. The main identified UD were: treatment omissions (72%) and dosing errors (14%).After medication review, we suggested 137 treatment modifications, i.e. 5.3 ± 2.2 per treatment plan.

In rehabilitation facilities, physicians of 15 patients were aware of suggested treatment plans and applied 94 ± 0.1% of the recommendations. Physicians of 11 patients did not receive treatment plans but their therapeutic interventions covered 59 ± 35% of our suggestions ($p < 0.01$).

Conclusion: Adherence to treatment plan suggested during hospitalization is excellent in post-discharge facilities. We should focus on ensuring the transmission of treatment plans to improve MGMT's impact after discharge.

CP-PC010: Screening for potentially inappropriate prescribing in the community pharmacy: development, validation and implementation of the GheOP^{3}S-tool

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Background and Objective: Screening for potentially inappropriate prescribing (PIP) in primary care could lead to an improvement in health outcomes, and community pharmacists (CPs) may be ideally placed to engage in this process. In practice however, CPs often experience difficulties in using existing screening tools for PIP, e.g. because of the unavailability of clinical and laboratory information. We therefore developed and validated an explicit screening tool specifically adapted for PIP-screening in the community pharmacy, comprising rationales, alternative treatment plans and scientific background information. Subsequently, we determined PIP-prevalence by applying this tool in both community-dwelling and institutionalized older adults (≥ 70 years) with polypharmacy (chronically ≥ 5 drugs) in Belgium.

Setting and Method: A RAND/UCLA process (11 participants) including a round zero meeting, literature review, first written evaluation and second face-to-face evaluation, resulted in a list of PIP-items with high clinical relevance for primary care. An additional round on feasibility in the contemporary community pharmacy resulted in the Ghent Older People's Prescriptions community Pharmacy Screening (GheOP^{3}S-)tool, comprising 83 PIP-items. The clinical relevance of the tool was consequently validated in 60 patients. The observational studies included 1016 community-dwelling (CD) and 400 institutionalized (INS) older adults with polypharmacy, recruited from 204 community pharmacies and 10 nursing homes, respectively.

Main outcome measures: Potentially inappropriate prescribing

Results: In the community, a median of 3 PIP-items per person (IQR = 2–5) was detected, compared to a median of 4 (IQR = 2–6) for institutionalized patients. Most prevalent PIP-items were long-term use of benzodiazepines (CD: 50%; INS: 58%), no Ca/Vit.D suppletion with elevated osteoporosis risk (CD: 54%; INS: 54%) and long-term use of antidepressant agents (CD: 21%; INS: 42%). However, for only 77 of the 3721 PIP-items detected in the community-dwelling patients, the prescribing physician was contacted. For 30 items (39%) the proposed treatment plan was (partially) accepted.

Conclusion: The GheOP^{3}S-tool was developed to screen for PIPs in the community pharmacy and to support pharmacists initiating multidisciplinary medication review. The first observational studies with the GheOP^{3}S-tool detected a high PIP-prevalence in both community-dwelling and institutionalized older adults with polypharmacy. However, interdisciplinary communication remains a hurdle.

CP-PC011: Pharmacist-led medicine use review for patients on anticoagulation therapy

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Background and Objective: Patients on warfarin are ideal candidates for medicine use review (MUR) due to treatment complexity. The objectives were to develop and implement a pharmacist-led MUR for patients on warfarin, assess patient knowledge, adherence and INR control, address identified risks of treatment and evaluate patient perception of the service.
Setting and Method: Patients attended a structured MUR session with the clinical pharmacist researcher at a community pharmacy. A pre- and post-intervention questionnaire was administered as a semi-structured interview to assess patient knowledge, adherence and perception. INR testing was performed with the point-of-care (POC) CoaguChek®XS device. The Rosendaal linear interpolation method was used to calculate time in therapeutic range (TTR). Medication reconciliation was performed to identify DRPs and recommend clinical interventions. Follow-up was performed after 2 months to evaluate the impact of pharmacist intervention and degree of implementation of the clinical pharmacist researcher's recommendations by the physician, community pharmacist or patient.
Main outcome measures: Patient knowledge; adherence; INR control; DRPs; patient perception
Results: Hundred patients (56 male, 44 female; mean age 70.5 years; SD 10.30) were assessed. The mean knowledge score improved significantly post-intervention from 7 to 10, out of a maximum 12 points ($p < 0.05$). A significant improvement in adherence was observed post-intervention, where the number of patients non-adherent to warfarin decreased from 25 to 11 ($p < 0.05$). POC testing in the MUR session identified 40 patients with an INR outside the therapeutic range. TTR increased significantly from 69 to 80% post-intervention ($p < 0.05$). A total of 632 medications were reconciled (mean 6/patient; SD 2.76) and 481 DRPs (mean 5/patient; SD 1.83) were identified, out of which 40% were related to warfarin. Need for monitoring (30%), lack of compliance (20%) and need for education (19%) were the top DRPs identified. Eighty-four percent of the recommendations were accepted. Ninety patients would be willing to attend for pharmacist-led MUR if the service is implemented routinely.
Conclusion: Improvement in patient knowledge, adherence, INR control and the high percentage of implemented recommendations suggest that pharmacist-led MUR improves therapeutic outcomes and patient safety. Patient satisfaction with the pharmacist's intervention suggests that patients are in favour of expansion of the clinical activities of community pharmacists through MUR.

CP-PC012: Medication safety during transition from hospital to home care—a baseline study

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Background and Objective: Up to 54% of patients are affected by drug-related problems (DRPs) during transition from hospital to ambulatory care, a complex process fraught with communication-related challenges. While patients 64 years and older are specifically at risk of experiencing DRPs, little is known about medication safety of this patient population transitioning to home care, which will gain importance over the next decade due to the demographic development and an expected shift from inpatient to ambulatory care.
The aim of this study was to generate systematic baseline medication safety data at the interface of inpatient to home care for future patient safety initiatives.
Setting and Method: A non-for-profit home care organization offering 24/7 nursing care services to up to 1856 patients per year was used as a model organization.
Patients were included if they were discharged directly from hospital to home care between October 10, 2016 and April 10, 2017, were 64 years or older, had 4 or more medications on their discharge list, and the home care organization was tasked with the medication use process.

1. The current transfer process of every included patient was captured with a structured data collection sheet, completed by home care staff.
2. A systematic Type 2b medication analysis was executed in order to asses prescribing quality.

Main outcome measures: (1) Discrepancies were identified by systematically comparing the current to the agreed-upon process.
(2) Clearness of the prescription, potentially inappropriate medications and clinical pharmacy inputs were evaluated.
Results: Of 348 patients transferred during the study period, 76 patients were included. Mean age of the study population was 82 years (65–97 years); 47% were female. 56% of patients were previously cared for by the home care organization. Patients were taking an average of 8.5 (1–17, median 8) drugs per day plus 1.7 (0–11, median 3) PRN medications.

1. Process-issues:
   - 38% of previously cared for and 12% of new home care patients were registered too late.
   - 18% of patients were discharged with complete written discharge information; a medication list was transmitted in 82% of patients.
   - The medication list was evident to nurses in 61% of patients, resulting in complications in 27%.
   - Drugs were missing at home in 17% of patients.
2. Prescribing quality

30% of patients had clearly prescribed medications, with electronic prescriptions showing better quality (83 vs. 80% of drugs)

116 of 585 prescribed drugs were flagged by a clinical pharmacist: among them, 36 allowed simplification, 28 warranted dose reduction, 14 were categorized as PIMs (PRISCUS), 6 were duplicates and 2 were absolutely contra-indicated. An additional 109 drugs needed clarification.
Conclusion: Missing medication therapy information and prescriptions needing optimization were prevalent in patients transitioning from hospital to home care. Consequently, optimizing and standardizing communication is necessary to ensure patient safety. Clinical pharmacist adopting roles in home care could contribute significantly to the solution of those problems.

CP-PC013: Acceptance and perceived benefit of a standardized medication plan generated in an interdisciplinary medication management service—the patients' perspective

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Background and Objective: In the project PRIMA an interdisciplinary medication management (MM) service [1] is offered by physicians and community pharmacists. To exchange information on patients' medication and potential drug-related problems, a standardized medication plan (MP) is generated in the local software systems of both health care professionals, exchanged via a central server and subsequently printed for the patient. The aim of this study was to evaluate patients' expectations of the MM and the MP, the acceptance, the usage in daily routine, and the potential benefit.
Design: Eleven teams (each consisting of one GP practice and one community pharmacy) were involved and asked to recruit approx. 10 patients each. A questionnaire was developed to evaluate patients' views. Additionally, qualitative face-to-face patient interviews were conducted, recorded and transcribed.
Results: 103 questionnaires were available for evaluation. 10 patient interviews were conducted (30 ± 8 min).
In the survey patients specified as reasons to participate in the project the medication review by pharmacists and physicians (58.3%), the health care professionals overview of their medication (50.5%), and/or the complete and checked MP (39.8%). Experienced drug-related problems were of minor importance (1.9%).

69.9% of the patients stated to bring the MP along when visiting a specialist, 50.5% used it regularly when preparing their medication, and 26.2% used it sometimes as a reminder.

Patients considered that their main benefit from the MM service resulted from the closer cooperation between physicians and pharmacists (83.5%). They felt more confident in handling their medication (68.9%), and indicated an increase in knowledge on dosage and indication (64.1 and 71.8%, respectively). Only 14% of the patients believed the MP itself significantly contributed to this.

The interviews emphasize that patients recognize an increase in medication safety due to the closer cooperation as the major benefit. All patients stated that every patient taking several drugs regularly should get a MP.
Conclusion: The majority of patients strongly perceives a benefit from the MM service. Patients emphasize that the service with its close cooperation between physician and pharmacist rather than the MP itself is responsible for the potential benefit.

CP-PC014: Failure mode and effects analysis: a useful tool for prospective risk assessment in community pharmacies

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Background and Objective: Failure Mode and Effects Analysis (FMEA) represents the most commonly used approach for prospective risk assessment of healthcare processes, including medicine dispensing. However, the evidence of its applicability in the outpatient pharmacy setting remains scarce. This study aimed to apply FMEA to the medicine dispensing process in German community pharmacies so as to assess its potential to reduce patient safety risks by identifying and preventing them prospectively.
Setting and Method: The study was performed in two community pharmacies located in North Rhine-Westphalia, Germany, from October to November 2016. At the outset, a subject matter expert team, consisting of a leader and eight community pharmacists and pharmacy technicians, employed brainstorming to map the dispensing process and identify potential failure modes. Then, the attributed risks were quantified by calculating Risk Priority Numbers (RPNs) for each failure mode, based on its severity, occurrence and detectability. Finally, corrective actions were developed and their potential effects were evaluated for the failure modes with the highest RPNs by performing risk re-assessment.
Main outcome measures: Possible failure modes, attributable risk criticality scores (RPN values), and the potential for risk reduction.
Results: Out of thirty-nine potential failure modes identified, the highest criticality scores were assigned to the inadequate assessment of therapy appropriateness, particularly regarding dosage and drug interactions (RPN 45), reluctance to deviate from rebate contracts when necessary (36) and dispensing the wrong medicine, its dose or dosage form (30). Corrective actions proposed demonstrated a considerable potential for risk reduction in the majority of the identified failure modes (25.5% on average), the most effective of which were introduction of an obligatory continuous education system for pharmacists, organization of appropriate communication training courses, and electronic prescribing implementation.
Conclusion: This analysis has not only identified various safety issues concerning the medicine dispensing process in Germany, but also yielded a number of corrective actions estimated as highly effective in reducing the associated risks, thereby indicating that the FMEA approach holds a considerable potential for prospective patient safety risk reduction in community pharmacies.

CP-PC015: Attitudes of visually disabled people towards medication usage-primary research

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Background and Objective: Visually disabled people are experienced with problems related to medication usage and adherence depending on their level of vision in the field of healthcare. In this primary study, it was aim to determine attitudes of visually impaired patients towards medication utilization and also assess their expectation from pharmacists.
Setting and Method: This study was conducted in Altınokta Blind Union and Turkey Association of Visually Impaired People from February 20, 2017 to June 20, 2017 among patients ≥ 18 years old who used at least one medication. Demographic characteristics, medical history and prescription and non-prescription medication data of patients have been collected.
Main outcome measures: A questionnaire was developed to evaluate drug use and administered via face-to-face meetings.
Results: Fifty-one adult patients (34 male/17 female) were included in this study. Out of 51 participants, 66.7% were partially sighted and the rest of them were blind. While 62.7% were blind from birth, the rest of them lost their sight later on. Of them, 78.5% were had no chronic disease; 21.8% were have one and more chronic disease. 33.4% of them were taking at least one medication routinely. It was found that the most common challenges experienced by visually disabled people in use of medications were controlling the expiration date of medications (63.7%) and falling using dosage forms including breaking tablets or preparing medications in powder form (76.5%). The most common coping strategies suggested by individuals with challenges faced in medication use were putting touchable-differentiating mark on package (86.3%) and memorizing the shapes of drug boxes or storing them in different sized bottles (66.7%). The most common coping strategy used by subjects with challenges faced in medication use was Braille alphabet labelling (86.3%). The only 33.3% of them preferred drug information and patient education services from pharmacist. Most of them (96.1%) did not demand drug information in an audio format.

Conclusion: Pharmacists should take responsibility for identifying problems of visually disabled people in drug administration and evaluating drug use to provide easy access to medication and rational drug use. In the further studies, patient education programs to provide easy and accurately access to medication would be developed for visually impaired subjects based on results of this primary research.

CP-PC016: The priorities and concerns for patients with chronic obstructive pulmonary disease in the context of current and potential future service provision

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Background and Objective: The Department of Health, the National Health Service and other key stakeholders in the UK have been working together intensely to determine the best ways to improve care and outcomes for those with chronic obstructive pulmonary disease (COPD) and to minimise the overall prevalence of the disease. However, COPD is still the second most common cause of emergency admission to hospital and the fifth largest cause of readmission to hospital. Meeting patients' needs and expectations may enhance their recovery time, whereas failing to do so may cause delays in accessing healthcare services and therefore increase hospital readmission. Therefore, the aim of this study was to identify the priorities and concerns for patients in the context of current and potential future service provision.
Setting and Method: A cross-sectional study design using 46 semi-structured face-to-face interviews was conducted. Qualitative and quantitative analysis were conducted using Nvivo and SPSS programs, respectively. The study was approved by Newcastle & North Tyneside 2 Research Ethics Proportionate Review Sub-Committee.
Main outcome measures: Identifying the priorities and concerns for patients in the context of current and potential future service provision.
Results: Forty-six COPD patients (male (n = 24), female (n = 22), mean age 77 years), using multiple inhalation devices, were interviewed. All participants had accessed the healthcare services in the last year at least once in regards to their condition and/or medication. The data suggest that patients were initially managed in primary care, followed by emergency services from secondary care. The majority of patients were generally satisfied with the healthcare services (e.g. physicians or nursing consultations, annual review, in-patient stay or hospital admission, supply of medications, etc.). However, some other participants raised concerns regarding accessing the healthcare system and were relatively dissatisfied with their own healthcare arrangements. Participants' dissatisfaction with the healthcare services was influenced by different factors (e.g. accessing the service quickly and easily, quantity and quality of information provided, the amount of time they spend with their doctor in a consultation, seeing their regular doctor, faith in healthcare professionals, and being involved in the management process by sharing the decision-making).
Conclusion: Failure to meet patients' expectations caused dissatisfaction and delayed access to healthcare services, subsequently leading to lack of medical supervision, which may lead to treatment failures and hospital readmission.

CP-PC017: Scottish Adherence to Antihypertensive Medication in the Elderly (SAAME) study: promoting evidence-based community pharmacy services

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Background and Objective: Detection and treatment of hypertension continues to be a major public health challenge affecting between 30 and 45% of the general population, increasing steeply with age. Many studies have shown the benefit of antihypertensive agents in improving clinical outcomes. However, their effectiveness is dependent on persistent adherence to prescribed medication. Objectives (1) to assess adherence to antihypertensive medication; (2) to examine patient-specific factors associated with antihypertensive medication adherence among Scottish adults aged 65 years plus.
Design: Pre-registration pharmacy trainees (pre-regs) undertaking postgraduate placement-in-practice based in community pharmacies across Scotland were invited to take part. Each pre-reg invited and consented up to 15 patients (aged 65 plus; at least one prescribed medication) presenting with a prescription which indicated treatment for hypertension, to take part in a telephone interview. Pre-regs added pharmacy dispensing data to a paper-based structured data collection tool for later online data entry. The structured interview focused on patient's beliefs about medicines and medication adherence. The study had NHS ethical approval.
Results: Of the 130 pre-regs working in community pharmacy in Scotland 92% (n = 119) took part with a patient-participant response rate of 75% (n = 1332). 94% of respondents always-or-often strive to follow doctor's instructions and have a strict routine for use of their regular medicines. 87% rarely-or-never get confused about their medicines. 78% of respondents believed their medication prevented them becoming ill; unpleasant side effects were reported by 8%. 93% said taking medication did not disrupt their life. Respondents had visited a medical practice twice in previous 6 months. 69% reported normal blood pressure. 49% of respondents had previously smoked daily; 13% currently smoke.
Conclusion: The SAAME study provides strong evidence of patients adhering to antihypertensive medication, also a model for promoting evidenced-based community pharmacy services: public health data year-on-year; raise the profile of clinical research in community pharmacy services. Feedback suggests pharmacies have concerns about telephone interviews preventing calls coming in so would prefer the option of face-to-face interviews; also direct online entry of data, and; online consent forms for the pre-regs. Future research is planned around evaluating pre-reg engagement, training needs, impact on community pharmacy based tutors and staff.

DI003: Off-label use of medicines in paediatrics during the years 2015 and 2016 in Spain

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Background and Objective: Off-label use of drugs is very common among paediatric patients, mainly because the absence of suitable alternatives for a specific age group (1). The main objective of this study was to provide information on the prevalence of off-label uses in neonates and infants up to 1 year old and analyse how many were prescribed according to available evidence.
Setting and Method: A two-year cross-sectional study was carried out for the drugs prescribed in primary health care paediatric patients in Spain. All prescriptions made in paediatric patients in the years 2015 and 2016 in our country were analysed and classified according to its Summary of Product Characteristics (SmPC) in off-label and on-label. The drugs prescribed off-label were then analysed in order to know its evidence of use behind.
Main outcome measures: Age groups (by months of age); number of medicines off-label; number of medicines on-evidence; sections of the SmPC (indication, posology, or contraindication); requirement or not of a medical prescription; therapeutic subgroups; and dosage forms.
Results: During the 2 years of study, a total of 38,208,470 in 2015 and 39,790,067 in 2016 prescriptions for paediatrics were quantified. The total number of prescriptions studied for each age group were the following: 0 to 1 year (n2015 = 5,577,211 and n2016 = 5,792,875), 1 to 4 years (n2015 = 14,998,000 and n2016 = 14,963,839), 5 to 11 years (n2015 = 13,867,090 and n2016 = 14,721,272), and 12–19 years (n2015 = 3,766,168 and n2016 = 4,312,080). 53% of all drugs prescribed in neonates and infants were drugs used off-label, from which only 20% were used based on clinical evidence. The results by months (for each month from 0 to 12 months) were quite similar, 57 and 23%, respectively. The off-label use was showed in a 65% in the posology section of the SmPC. 20% of off-label drugs prescribed could be dispensed in daily practise without the need of a medical prescription. Topical corticosteroids and topical antifungals were among the most prescribed drugs off-label.
Conclusion: Off-label use of drugs remains as an important public health concern and especially for neonates and infants, which received the greatest proportion of off-label drugs. Many of these drugs could be used in daily practise by primary health care professionals or patients themselves (over-the-counter drugs), without any evidence of use. Therefore, more studies and literature reviews should be preceded for paediatric medications in order to incorporate new and harmonized information in their product information.

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PEC001: Cost estimation of redispensing unused medicines that are returned to the pharmacy: a micro-costing study

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Background and Objective: Redispensing of unused medicines returned to the pharmacy by patients may optimise the use of health care resources and reduce medication waste. Little is known about the costs associated with the pharmacy proceedings for redispensing, and which medicines might be eligible for redispensing from a cost-perspective. The objective of this study was to estimate the cost of the redispensing process in the pharmacy and the minimal economic value (MEV) of unused medicines that are eligible for redispensing.
Setting and Method: A micro-costing study was performed in four outpatient pharmacies in the Netherlands in 2016. First, all proceedings and resources needed for redispensing were identified from pharmacist reviews. Second, the time required to redispense unused medicines was measured by simulating the proceedings in each pharmacy. Third, time measurements were quantified into costs using salary scales and purchasing prices. Lastly, a model was made to calculate the MEV for medicines requiring room or cold storage. Influence of assumptions (market prices, proportion of dispensed medicines returned to the pharmacy and proportion of medicines eligible for redispensing) was assessed using sensitivity analysis.
Main outcome measures: Measured time and related costs associated with performing the proceedings of redispensing medicines in the pharmacy, and the MEV for medicines requiring room or cold storage.
Results: Redispensing medicines in the pharmacy require that an (electronic) system is dispensed with the medicines that assure proper home storage. This requires extra handling, which takes approximately 6.30 min for medicines requiring room temperature storage and 8.05 min for medicines requiring storage between 2 and 8 °C. Estimated costs amounted to respectively €5.95 and € 106.00 (due to additional resources needed for quality control like temperature chips). The MEV for room temperature stored medicines eligible for redispensing is €94 and for cooled stored medicines €201. Sensitivity analysis showed that the proportion of dispensed medicines returned to the pharmacy has the strongest influence on the MEV.
Conclusion: Redispensing unused medicines in the pharmacy is not time consuming, however, only expensive medicines are eligible for redispensing from a cost perspective. Most costs are made with medicines' dispensing as only a small proportion of dispensed medicines are returned to the pharmacy.

Poster discussion forum II: Hospital pharmacy

HP-PC006: Comparison of electronic information sources regarding dose adjustments in continuous renal replacement therapy

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Background and Objective: Continuous renal replacement therapy (CRRT) is commonly used in critically ill patients with acute kidney injury. Many of these patients need antimicrobials, which require careful consideration of drug exposure and efficacy in these circumstances.
Unfortunately, limited information is available to guide drug dosing in CRRT and clinicians often rely on tertiary sources, like electronic drug information resources, to determine safe and effective drug use in CRRT.
The aim of this study was to compare recommendations on dosage adjustment in CRRT provided by five commonly used electronic drug information sources.
Setting and Method: Electronic sources including the mobile application of the Sanford Guide and Micromedex, Kidney Disease Program (KDP), Medscape and UpToDate websites were used by clinical pharmacists to compare the CRRT-related recommendations for 25 selected antimicrobials (ampicillin, piperacillin/tazobactam, ceftriaxone, cefepime, cefotaxime, meropenem, trimethoprim/sulfamethoxazole, clarithromycin, tigecycline, ciprofloxacin,

moxifloxacin, amikacin, vancomycin, teicoplanin, colistin, metronidazole, amphotericin B, caspofungin, anidulafungin, fluconazole, voriconazole, posaconazole, acyclovir, ganciclovir and oseltamivir) in a medical intensive care unit of a university hospital.
Main outcome measures: Differences in dose recommendations between electronic sources were assessed.
Results: The Sanford Guide, UpToDate and KDP include more recommendations regarding general drug use in CRRT (24, 23, 21 drugs, respectively) versus Micromedex (11) and Medscape (4). Information regarding specific dose adjustments was included to a lesser extent (17 for Sanford Guide, 16 for UpToDate, 14 for KDP, 5 for Micromedex and 1 for Medscape). UpToDate, KDP, Micromedex, and the Sanford Guide contained references for some of the antimicrobial recommendations (23, 20, 11, and 3 respectively). Differences in recommendations among electronic sources were detected especially for piperacillin-tazobactam, trimethoprim/sulfamethoxazole, amikacin, vancomycin, colistin and voriconazole. Levels of evidence were listed only in KDP and recommendations based on CRRT type were listed in Micromedex and UpToDate.
Conclusion: Few studies have evaluated antimicrobial dosing in patients receiving CRRT, thus specific guidance is lacking across information sources. The recommended dose adjustments are also not consistent among drug information sources. Therefore, the CRRT recommendations should not be considered as "one size fits all" and a pharmacist should compile the information from different sources to develop an optimal drug regimen alongside other healthcare professionals.

HP-PC007: Using failure mode and effects analysis to increase patients' safety in chemotherapy

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Background and Objective: Ensuring the safety of patients in high-risk processes, e.g., chemotherapy, is a challenging task. Medication errors may occur during chemotherapy and could have fatal consequences. Healthcare Failure Mode and Effects Analysis (FMEA) is a method used to detect potential risks and prevent them before they can occur. This prospective, multidisciplinary team-based analysis offers also the possibility to check the interdisciplinary collaboration between physicians, pharmacists, and nurses, which could also pose a risk for system failures. The goal of this study was to evaluate the medication process of intravenous tumor therapy from prescription to administration in order to guarantee a high standard of patient safety.
Design: The study was performed at the University Hospital of Bonn, Germany, from December 2016 to June 2017. After assembling a multidisciplinary team consisting of oncologists, oncological pharmacists, pharmacy technicians, oncological nurses, and employees of risk management, the individual steps of prescription, compounding, transport and administration of chemotherapy were mapped in a flow-diagram. The possible failures were identified and analysed by calculating the risk priority numbers (RPNs) on the basis of the likelihood of occurrence, severity, and detectability. Finally, corrective actions were developed and after hypothetical implementation re-analysed to measure their effects on the process.
Results: The team identified a total of fifty-two potential failure modes. Relating to the RPNs the most critically steps in the process were associated with the prescription, namely,

- incorrect information of individual parameters of the patient (e.g., weight, body surface area),
- non-standardized chemotherapy protocols, and
- problems related to the supportive therapy (non-adherence, ignorance of necessity).

A significant risk reduction for most of the failure modes was assessed by implementing suitable corrective actions.
Conclusion: The implementation of this analysis has not only identified various safety gaps, but also shows how patient safety during chemotherapy can be enhanced. Moreover, it has sensitized the practitioners to failure modes that could occur in their work routine.

HP-PC008: Clinical criticality of pharmaceutical interventions: a multidisciplinary team scoring to improve clinical pharmacy activities efficiency

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Background and Objective: As clinical pharmacy development is facing financial constraints in France, the importance of focusing resources on relevant activities is being questioned. In our centre, we created monthly multidisciplinary pharmaceutical interventions' reviews. The objectives were to encourage and train pharmacists to medication review activity by determining clinical criticality of pharmaceutical interventions (PIs) and to develop a clinical pharmacy culture among pharmacists and physicians using multidisciplinary reviews of PIs.
Setting and Method: All PIs resulting from medication review formulated and recorded in a national online tool (ActIP®, Société Française de Pharmacie Clinique) between 2016-11-01 and 2017-04-30 were monthly extracted. PIs were communicated through our computerized prescription order system (DxCare®, Medasys) or through a phone call or direct transmission to prescribers. Most frequent or relevant PIs were selected for monthly analysis. PIs already analysed were not selected for further monthly review.
Main outcome measures: Clinical impact was determined by the multidisciplinary team (4-levels scale: vital, major, medium, minor). Clinical criticality (score from 0 to 16) was calculated by multiplying clinical impact of these PIs by their frequency (rarely, occasionally, frequently, very frequently). Clinical impact was considered on a medium-term horizon, to ensure optimal use of medications beyond hospital setting. Acceptable risk was defined as a score between 1 and 4, medium risk between 5 and 8 and unacceptable risk between 9 and 16.
Results: Medication review was performed during this period in 12 wards (300 beds). A total of 1,301 PIs were recorded in ActIP®. Monthly reviews were conducted with one or two specialists per review. Throughout the months, impact of PIs' reviews was reported with a constant increase in the number of weekly recorded PIs and acceptance rate by physicians: 76 PIs recorded in November (53% acceptance rate) compared with 274 PIs in April (63% acceptance rate). Clinical impact and criticality of PIs was performed for 88 selected PIs. Clinical impact was vital or major for 45 PIs (51%), medium for 30 (34%) and minor for 13 (15%). Clinical criticality showed an unacceptable risk for 22 (25%) PIs, medium risk for 39 (44%) and acceptable risk for 27 (31%).
Conclusion: Implying all pharmacists and physicians in a quality approach of clinical pharmacy activities allowed us to improve number of recorded PIs in our centre and to determine their clinical criticality to focus on more relevant PIs. Monthly review will allow us to build a criticality database of PIs which will be used to train junior physicians and pharmacists and ensure an optimal and secure use of drugs in our centre, and allow us to sensitize prescribers to this

activity. Sensitization was associated with an increase in acceptance rate of PIs.

HP-PC010: Implementation of a MedRec procedure reduces the number of medication discrepancies

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Background and Objective: Correct information about medication use may prevent medication errors and optimize therapy, which again can reduce health care expenditure, enhance quality of life and potentially save lives. Medication reconciliation (MedRec) is an important means to ensure correct medication information. At the Northern Norway University Hospital (UNN) in Tromsø, the implementation of a MedRec procedure started in 2014. Physicians and nurses are responsible for conducting MedRec. The aim of this study was to investigate whether application of the procedure reduces medication discrepancies (MDs) in medication charts.
Setting and Method: During 2014–2016, trained pharmacists were sent to 6 departments in UNN 3 times to perform unnoticed MedRecs as "control measurements". MedRecs were carried out in accordance with the Integrated Medicines Management (IMM) methodology. Pharmacists collected data on patient age and gender, medication discrepancies (MDs), type of discrepancy, outcome, number of medications, and whether the medication lists had already been reconciled. We performed binary logistic and Poisson regression to explore whether medication lists already reconciled by the department before "control measurements" differed from those not reconciled with regards to the number of MDs.
Main outcome measures: Number and types of MDs, Odds Ratio (OR) and Incidence Rate Ratio (IRR).
Results: We identified MDs in 110 out of 186 reconciled medication charts (59%). Mean number of MDs identified per chart was of 2.4 MDs (SD 1.8 Median 2, range 1–12).The most frequently identified type of MD was "omission of medication". The charts already reconciled by the department did not differ from those not reconciled in terms of MD identification (OR 0.77, 95% CI 0.22–2.61), but the number of MDs identified in charts already reconciled was significantly lower than those not reconciled (IRR 0.43, 95% CI 0.27–0.68).
Conclusion: A new MedRec procedure seems to reduce the number of MDs, but not the proportion of charts with MDs. The number of MDs are still far above what is appropriate. The reason for this may be insufficient training of personnel, limited resources to follow the procedure. The hospital should consider involving clinical pharmacists in the MedRec process.

HP-PC011: Faecal microbiota transplantation: pharmaceutical experience of a French university hospital

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Background and Objective: Faecal microbiota transplantation (FMT) is known as an effective treatment for recurrent clostridium difficile infection (rCDI).The French Academy of Pharmacy classifies the microbiota transplant as a drug which requires preparation under the responsibility of the hospital pharmacist. Our objective is to report our experience since October 2015 in implementation of a secure process from donor selection to administration.
Setting and Method: FMT performed from October 2015 to December 2016 for rCDI. Descriptive report in pharmacy and gastroenterology departments, on the organization of FMT preparation, ensuring rigorous traceability. Realization of a registry with donors and receivers data.
Main outcome measures: Evaluation of efficacy of FMT in our practice.
Results: 26 FMT were performed with transplants prepared by the pharmaceutical unit. The donors median age is 48 years. The stool is between 45 to 110 g diluted up to 300 mL for naso-duodenal (ND) route (n = 18) and 500 mL for enema (n = 8). The receivers median age is 68 years. The FMT succeeded in all rCDI patients with at least 8 weeks of follow-up, within 1 FMT for 22 patients, 4 patients had to undergo 2 FMT. For a secure process, the preparation is realized in two different steps. The donor is preselected after a questionnaire and a clinical examination. Blood and faecal testing are performed as recommended by the French Group of Faecal microbiota Transplantation on day 1. The pharmacist plans with medical team and the donor a preparation of transplant as soon as possible from day 2 to 21. This first step consists in preparing a suspension of faeces with a sterile cryoprotector frozen at −80 °C, placed in quarantine. The results of donors screening are transmitted to both physician and pharmacist. Once the indication is validated for the receiver and that donor screening complies, a second step of preparation is planned consisting after defrosting in a packaging depending on the route of administration (60 mL syringes for ND route, enema bag (500 mL) with an incorporated lubricated tube for delivery via enema). All the FMT process, from prescription to administration, is computerized.
Conclusion: In our hospital we have implemented a secure process of donor selection and preparation ensuring traceability and efficacy of FMT in rCDI, based on a multidisciplinary team.

HP-PC012: A patient perspective on discharge conversations about medicine by pharmacist technician

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Background and Objective: At North Zealand Hospital in Denmark pharmacist technicians (PT) carry out discharge conversations about medicine (DCAM) at the Department of Cardiology (DC) and at the Emergency Department (ED). The purpose of the conversation is to ensure the patients are given all essential information about their medicine including; indications, time of administration, duration of the treatment, new prescriptions, handling and interactions. Furthermore patients are always informed by effects and side effects of new medicines prescribed during hospitalization. The service has been evaluated on the basis of productivity, but at the moment not from a patient perspective.
The objective is to evaluate DCAM carried out by PTs from a patient perspective.
Design: Data were collected at the DC and at the ED from May 26. 2017 to June 23. 2017. The DCAM were carried out by the same PT. After the DCAM all patients were asked to participate in a survey consisting of five questions concerning patient satisfaction with the DCAM. The questions were answered using a rating scale with the following terms; to a very great extent, great extent, some extent, less extent and not relevant. The survey was handed out and conducted by an impartial colleague.
Results: In total 15 patients (13 patients from DC and 2 patients from ED) agreed to participate in the study. All the patients prefer to be offered a DCAM carried out by a PT, if they were hospitalized again.

93% felt they were well informed about their medicine, 73% achieved a better understanding of their medication and 75% are more aware of taking their medicine in an appropriate way. These are preliminary results, and more data will be collected during the next months. During the future collection of data several PTs will be involved, and the survey will be expanded with qualitative questions to understand patient needs in order to adjust the service.
Conclusion: The results show an overall satisfaction among the participants, why we conclude the DCAM provides value for the patients.

HP-PC013: Evaluation of two score systems predicting therapy-associated risks in elderly cancer patients

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Background and Objective: A benefit-risk assessment of systemic cancer treatment is particularly challenging in elderly cancer patients. Hence, two promising onco-geriatric score-systems have been developed for risk prediction of therapy-associated toxicity in the elderly: the CARG score (Cancer and Ageing Research Group) [1] and the CRASH score (Chemotherapy Risk Assessment Scale for High-Age Patients) [2]. However, in clinical routine, they have not yet been evaluated sufficiently.
Our aim was to evaluate and compare the CARG score and the CRASH score regarding their predictive performance.
Setting and Method: Both score systems combine different geriatric and oncological parameters, stratifying patients into specific risk categories of therapy-associated toxicity. We assessed both scores in cancer patients ≥ 70 years before start of inpatient treatment. Severe toxicity during therapy was captured from medical records. In an interim analysis, we assessed toxicity rates in the different risk categories and analysed differences using the Chi square test. Furthermore, we calculated the area under the receiver-operating characteristic curve (AUC ROC) for evaluating discrimination.
Main outcome measures: Classification in different risk categories according to the score systems, as well as severe toxicity (Common Terminology Criteria for Adverse Events Grade 3 and 4) during treatment course.
Results: Interim analysis comprised 51 patients (mean age: 77 years, stage IV: 55%, solid tumor: 63%). In both score systems, toxicity rates increased with higher risk categories. However, differences in toxicity rates were only significant for the CARG score (CARG: low 0%, mid 67.9%, high 85.7%, $p = 0.036$; combined CRASH: low 0%, mid-low 54.5%, mid-high 72.4%, high 90.9%, $p = 0.200$). AUC ROC denoted sufficient discrimination for both scores (CARG: 0.743, $p = 0.008$; CRASH: 0.773, $p = 0.003$).
Conclusion: Preliminary results in 51 patients suggest adequate calibration and discrimination of the CARG and the CRASH score. The score with higher predictive performance may be implemented in clinical routine for improving cancer treatment decisions in the elderly.
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HP-PC014: Anticoagulation management for post-operative atrial fibrillation after cardiac surgery

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Background and Objective: Oral anticoagulation is essential following post-operative atrial fibrillation (POAF). Although warfarin is commonly used, it's efficacy is dependent on time in therapeutic range (TTR) $> 65\%$. Direct oral anticoagulants (DOACs) are an alternative option, however the optimal time to initiate post-operatively is unknown, due to exclusion of 'recent surgery' within phase 3 clinical trials.
Design: To identify the number of patients that revert back to sinus rhythm (SR) 6 weeks following POAF following cardiac surgery and assess which class provides optimal stroke prevention for this period. A retrospective study was conducted at large tertiary centre analysing patients that developed POAF after cardiothoracic surgery from January 2016 to January 2017 reviewing both patient and surgical data.
Results: Sixty-four patients had developed POAF, of which 39 (60.9%) and 25 (39.1%) were prescribed warfarin and DOAC respectively. 13 (33.3%) patients had a confirmed TTR $< 65\%$, reflecting poor anticoagulant control with warfarin. DOACs were initiated on an average of 8.36 ± 3.74 days post-operatively. 21 (53.8%) patients in the warfarin group and 11 (44%) patients in the DOAC group were confirmed to be in sinus rhythm 6 weeks after discharge. Among these patients, 37.5% stopped the anticoagulation when in SR.
Conclusion: A TTR $< 65\%$ for warfarin shows that acute optimal anticoagulation management is difficult to achieve, especially for the short term patients that revert back into SR. DOACs may possibly be a more effective alternative, initiating 8 days post operatively. However further studies need to be conducted to ensure optimal dose of each DOACs in the acute post-operative phase.

TDMP001: How promising is model-informed precision dosing in tamoxifen therapy?

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Background and Objective: Tamoxifen is widely used in the treatment of oestrogen receptor (ER)-positive breast cancer. Tamoxifen is considered to be a prodrug bioactivated to its metabolite endoxifen. The formation of endoxifen is highly affected by a patient's CYP2D6 activity. A therapeutic target concentration for endoxifen was proposed (Madlensky et al. 2011). Potential approaches for the individualisation of tamoxifen treatment are focus of ongoing intense discussions. The aim of this study was to identify the dosing strategy which maximises clinical efficacy while reducing the risk of adverse events in the individual patient.
Design: A large clinical target population was simulated ($n = 10{,}000$; CYP2D6 poor (PM): intermediate (IM): normal/ultrarapid (NM) metaboliser: 5:15:80%). Using a population pharmacokinetic (PK)

model (Dahmane et al. 2013) three dosing strategies were investigated:

1. Standard dosing (20 mg/day)
2. Model-informed CYP2D6 phenotype dosing
3. Model-informed individual dosing (target concentration intervention)

For strategy (3) initial dosing was based on (2) and was revised after two weeks of daily dosing considering a "virtual" blood sample using Bayesian forecasting. The lowest dose needed to achieve target concentrations was used as dose decision criterion. The strategies were compared with respect to PK target attainment (%patients at risk) and remaining variability (%CV) in exposure at steady-state in the CYP2D6 subgroups and the population after daily dosing.
Results: 98% PM and 58% IM were at risk of subtherapeutic concentrations after standard treatment (strategy 1). Daily doses of 40 and 80 mg for IM and PM were appropriate to reduce the risk to $< 10\%$ and to obtain similar concentrations to those of NM (20 mg) (strategy 2). However, a large variability in concentrations within the subgroups was shown (NM/IM/PM: 51%/45%/36% CV). With strategy (3) the target concentration was met with doses from 5 to 120 mg/day showing a narrower concentration range within the sub/-population. For a considerable number of NM (31%)/IM (37%)/PM (78%) lower doses (10, 20, 60 mg, respectively) were sufficient to achieve target concentrations.
Conclusion: Strategy (3) has two advantages: (1) In the long-term therapy (adjuvant or palliative setting) it might be beneficial to avoid unnecessary high concentrations reducing the risk for adverse events. (2) By adapting the dose early in treatment the time to target attainment was reduced, which might be of importance in the neoadjuvant and metastatic setting. Prerequisites to perform strategy (3) comprise: CYP phenotype and plasma concentration determinations as well as an experienced interdisciplinary team of pharmacists/clinicians to predict individual doses. Model-based precision dosing might be the best strategy for the individual patient, however, for feasibility in practice a quick and easy-to-use tamoxifen dose decision tools ought to be available.

PEC002: Economic impact in the update of the weight of the patient undergoing chemotherapy treatment dosed by weight

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Background and Objective: To analyse the economic impact, measured as direct costs, of the update of the patient's weight per cycle of chemotherapy administered in drugs of high economic impact that are dosed per kg of weight in a private oncology hospital.
Setting and Method: Observational, descriptive study in which 20 patients diagnosed with different neoplasms were treated with monoclonal antibodies in protocols dosed by weight. To do this, each time the patient is given a treatment cycle, the dose is weighed and updated with the last weight. The drugs administered were bevacizumab in the protocol of 7.5 mg/kg every 14 days for 9 patients and in the protocol of 15 mg/kg every 21 days for 3 patients, trastuzumab emtasin at 3.6 mg/kg every 21 Day for 1 patient, nivolumab at 3 mg/kg every 14 days for 5 patients, panitumumab at 6 mg/kg every 14 days for 2 patients. The study time was 3 months. The prices of the medicines in which the study was measured have been in PVL + IVA
Main outcome measures: The variables studied were actual cost and the patient's weight
Results: The saving by reduction of 1 kg of weight per cycle of treatment is, according to the medicine and protocol. Bevacizumab 7.5 mg/kg every 14 days the saving per kg is 25.81 €, the average weight loss of the 8 patients was 5.5 kg so the saving was 1277.6 €. Bevacizumab 14 mg/kg every 21 days the saving per kg is 34.42 €, the mean weight decrease of the 3 patients was 3.1 kg, so the saving was 320.11 €. Trastuzumab emtasin at 3.6 mg/kg every 21 days the saving per kg is 79.26 €, the average weight loss of the patient was 2 kg so the saving was 158.52 €. Nivolumab 3 mg/kg every 14 days the saving per kg is 46.24 €, the mean weight decrease of the 5 patients was 3.8 kg so the saving was 878.56 €. Panitumumab at 6 mg/kg every 14 days, the saving per kg was 23.44 €, the average weight loss of the 2 patients was 2.5 kg, so the saving was 117.2 €. In 3 months, the saving was € 2751.96.
Conclusion: Weighing and updating the dose of patients given chemotherapy with monoclonal antibodies is a great economical saving for the hospital because, due to the type of pathology of patients, they usually lose weight as time passes, they have adverse effects, hospitalizations… There are studies that suggest that the doses that collect the clinical guidelines of the monoclonal antibodies are superior to those necessary so it is vital to optimize these treatments. The update of doses by weight is done in our hospital for all antineoplastic protocols in order to optimize doses and avoid greater adverse effects to the patient although this study only collects economic data.

RD001: Views and perceptions of key stakeholders in Qatar on pharmacist prescribing

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Background and Objective: Pharmacist prescribing has been implemented successfully in several countries around the world, with evidence of effectiveness, safety and acceptability. The Qatar Health Strategy provides the opportunity to advance further the clinical and prescribing role of the pharmacist. As part of considering this development, there was a need to gather the views and perceptions of key individuals in positions of strategic importance.
The aim of this project is to explore the views and perceptions of stakeholders on the development and implementation of pharmacist prescribing in Qatar.
Setting and Method: Qualitative, face-to-face interviews with individuals in key strategic positions with policy influence (medical/pharmacy/nursing directors, hospital administrators, health academics, experts in patient safety as well as regulators and decision makers). Participants were recruited through purposive and snowballing sampling from different settings of: Ministry of Public Health, primary/secondary/tertiary health settings, community pharmacies and academic health institutions in Qatar.
An interview schedule was drawn from an extensive search of the available literature, a systematic review being conducted by the investigators and the Consolidated Framework for Implementation Research (CFIR). The schedule was reviewed for credibility prior to piloting; interviews continued to the point of data saturation. Interviews were digitally recorded, transcribed verbatim and analysed thematically by two independent researchers using CFIR as a coding framework. Ethical approval was obtained prior to conducting fieldwork.
Main outcome measures: Awareness, experiences and views of: non-medical prescribing; clinical roles and prescribing by

pharmacists; facilitators, barriers and solutions to pharmacist prescribing development and implementation.
Results: Data saturation and representation of stakeholder groups was achieved following 36 interviews. Emerging CFIR themes were: intervention characteristics (evidence of pharmacist prescribing models internationally, advantages of pharmacist prescribing in Qatar, adaptability of international models to Qatar); outer setting (better meeting patient needs, degree of networking with external organisations); inner setting (quality of communication processes within an organisation, engagement of key leaders in development and implementation); ideal characteristics of pharmacist prescribers in Qatar; and process of designing, implementing and evaluating the intervention.
Conclusion: Stakeholders held positive views around the potential for pharmacist prescribing in Qatar. CFIR themes will facilitate the development of frameworks for pharmacist prescribing in Qatar.

Poster discussion forum III: Pharmacotherapy and pharmacoepidemiology

PE004: Patients' drug-use and their involvement in shared decision making in mental healthcare

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Background and Objective: Shared decision making is highly regarded in modern treatment, and due to political expectations, drug-free treatments should be implemented as an option in mental healthcare. There is lack of consensus amongst professionals with regards to drug-free treatments.
Aim was to gain knowledge on today's situation by assessing drug-use, patients' degree of satisfaction on their current treatment with or without drugs, and their involvement in shared decision making.
Setting and Method: 1 week cross-sectional study assessing patients who are in contact with Division of Mental Health, Sørlandet Hospital; Written consent for participation; Self-report questionnaires: CollaboRATE, a validated questionnaire concerning shared decision making, and self-designed questions regarding treatment satisfaction; SPSS analysis tool.
Main outcome measures: Patients were categorised into treatment with and without drugs for their mental health concerns; Measurement of shared decision making and treatment satisfaction; Relationship between treatment with or without drugs, treatment satisfaction and shared decision making.
Results: Of 992 patients (575 female, 16–82 years), 567 (57.2%) used at least one drug for their mental health concern. The average CollaboRATE score (scale 0-100, where 100 = top score) was 81.00 overall, 79.76 for the group using drugs and 82.64 for the group on a drug-free treatment. The group using drugs reported an average drug treatment satisfaction score of 3.63, and the group on a drug-free treatment reported an average drug-free satisfaction score of 4.19 (both single questions, scale 1-5, where 5 = very satisfied).
Conclusion: A small majority of the patients used drugs for their treatment. There was good involvement of patients when making treatment decisions. Both groups of patients were satisfied with their treatments. Still, many factors other than patient involvement are important for patient satisfaction.

PE005: 2016′s Prescription Pattern Monitoring Study (PPMS) regarding correct usage of Direct Oral AntiCoagulants (DOACs) since 2014

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Background and Objective: Direct oral anticoagulants (DOACs) are commercialized in France since 2008. Due to their mechanism of action, these high-risk drugs increase the risk of bleeding. Thus, they are known as a frequent cause of hospital admission, especially as there is no regular blood test nor antidote.
In 2014, to prevent errors related to DOACs, a Prescription Pattern Monitoring Study (PPMS) regarding correct usage of DOACs was conducted in Saumur' hospital. The purpose of the present study is to conduct a second PPMS to assess our experience and the impact of 2014′s suggested actions.
Design: Literature review. Both PPMS follow identic design and validation : retrospective audit of 40 clinical records for each PPMS, with at least one prescription of DOACs in patients hospitalized in cardiology and geriatrics services. Multidisciplinary meetings to discuss and compare the results.
Results: In 2016, of 40 patients, 31 DOACs were correctly initiated (78%), 40 patients had an accurate indication (100%), 30 an exact prescription of doses (75%), 39 an exact distribution of doses (98%) and 40 an appropriate duration of treatment (100%). On the 40 records examined, 37 DOACs were prescribed without contraindications (93%). Considering patient follow-up, 28 were monitored for renal function (70%) and 29 for liver function (73%) before the prescription.
Upon the 40 records, only 5 clearly mentioned the monitoring of renal function after prescription of DOACs (13%) and 9 evidenced a switch from parenteral anticoagulant to DOACs (23%). Furthermore, only 2 mentioned that written information about DOACs was handed to patients (5%).
Conclusion: Despite the good results concerning accurate prescription of DOACs since 2014, there is no improvement regarding the traceability in clinical records. This can mislead all health professionals including the general practitioner who's in charge of the patient after discharge. This is the main issue highlighted by this study. A simple doctors' awareness in 2014 was not enough. In 2017, a new prescription software, « Hospital Manager » , was implemented in Saumur's hospital. One of its benefit is well-established prescription patterns that will allow to insure the switch between anticoagulants and it's traceability. To maximise benefits over risks, patients selection for DOACs treatment and their management should be evidence based and secured with an appropriated software.

PT006: Impact of ignoring patient diagnoses when using 2015 Updated Beers Criteria

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Background and Objective: In many countries, community pharmacists have no access to patient medication records, and subsequently cannot identify patient diagnoses. We aimed to assess

the impact of ignoring patient diagnoses when applying 2015 Updated Beers Criteria to identify Potentially Inappropriate Medication (PIM).
Setting and Method: All the patients institutionalized in a charity nursing home in Central Portugal were included. Patient medical records were appraised in May 2015 to identify medication profile and medical conditions. To compare the number of PIM and criteria identified per patient, non-parametric paired tests were performed. Ethics approval was obtained from the University of Coimbra Medical School (106-CE-2015).
Main outcome measures: Number of PIMs, and number of Beers criteria.
Results: A total of 32 patients with a mean age of 86.3 years (SD = 8.9; range 64–99) with a majority of female (68.8%) were studied. The most prevalent medicines prescribed were hypnotics and sedatives (n = 14), drugs for peptic ulcer and gastro-oesophageal reflux disease (n = 14), and antithrombotic agents (n = 13). All patients except 1 presented at least one PIM. When assessing the patient with full access to the diagnoses, median number of PIMs was 2 (IQR: 1–3) and median number of Beers criteria complied was 3 (IQR 2–4.8). When evaluating only patient medication records, with no access to diagnoses, median number of PIMs was 2 (IQR: 1–3.8) and median number of Beers criteria complied was 2 (IQR 1–4). Statistical difference was identified in the number of Beers criteria identified with and without access to diagnoses (Wilcoxon signed-rank $p = 0.003$), while no statistical difference was found between number of PIMs with and without diagnoses (Wilcoxon signed-rank $p = 0.180$).
Conclusion: Although restricted access to patients' diagnoses may limit the identification of some Beers criteria, this limitation was not relevant to identify PIMs. The difference between Beers criteria complied and actual potentially inappropriate medicines has to be taken into account when presenting results of Beers lists.

PT007: Safety of drugs with psychotomimetic activity in established psychotic disorders

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Background and Objective: Patients with established psychotic disorders might experience worsening of their condition when using drugs with psychotomimetic activity. The aim of this work is to assess the safety of these drugs in patients with psychotic disorders.
Setting and Method: A review of the literature was performed and combined with assessment by a multidisciplinary expert panel. Drugs contra-indicated in psychotic disorders according to the Summary of Product Characteristics and psychotomimetic drugs included in Dutch clinical decision support guidelines for psychotic disorders were selected to review. After reviewing the literature, drugs were categorized by the expert panel as increased risk or no additional risk of psychotic effects in patients with psychotic disorders. For drugs categorized as increased risk, recommendations were formulated: (i) discussing the risks with the prescriber; (ii) consulting a psychiatrist before prescribing or dispensing the drug and/or (iii) complete avoidance.
Main outcome measures: Worsening of pre-existing psychotic disorder, increased risk of psychotic side effects in patients with psychotic disorders.
Results: Eleven (classes of) drugs were reviewed in depth. Antiepileptics will be reviewed later. Antivirals, chinolones, interferons, co-dergocrine mesilate and MAO inhibitors could not be linked to any clinically relevant increased risk of psychotic side effects. Even though corticosteroids—especially when high dosed—are believed to cause a phenomenon called "steroid psychosis", there is insufficient evidence of an increased risk in patients with established psychiatric disorders. Amphetamines, disulfiram, dopaminergic drugs and mefloquine were considered to cause an increased risk of psychotic experiences in patients with psychotic disorders. Alternative treatments for these drugs are preferred, unless the potential impact has been carefully considered by a psychiatrist [risk recommendations (i) and (ii)]. Given the strong link between cannabis-use and exacerbation of psychotic symptoms, cannabis should be avoided at all times [risk recommendation (iii)].
Conclusion: Risks of psychotic side effects of amphetamines, cannabis, disulfiram, dopaminergic drugs and mefloquine are increased in psychotic disorders requiring clinical decision support. The clinical decision rules will be implemented in general, hospital and pharmacy practice throughout the Netherlands.

PT008: Omalizumab in chronic spontaneous urticaria

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Background and Objective: Due to its high cost and the increase of its use in chronic spontaneous urticaria (CSU) in our hospital we decided to elaborate a clinical report to identify the prescription criteria and to assure the safety and the efficacy of Omalizumab.
The objectives are to evaluate the prescription adequacy and the follow up of Omalizumab in CSU according to the clinical report made by Pharmacy Service.
Design: Observational retrospective study including all the patients with CSU who initiated Omalizumab from July 2010 to July 2016.
Based on our clinical report, the next parameters were evaluated: previous high dose of H1-antihistamines, UAS7 $\geq$ 16 before the treatment, conducting follow-up visits at weeks 12 and 24 with measurement of UAS7 score, the end of the treatment of patients UAS7 score is < 2, onset of adverse effects and prescribing dosage unification.
Results: 15 patients were treated with omalizumab, 11(63%) were women. The average age was 56 $\pm$ 11 years. 5 (33%) patients had drug allergies. All were previously treated with high dose H1-antihistamines.
Before initiating the treatment, only 4 (27%) patients had reported the UAS7 score and 3 (75%) of them had an UAS7 > 16. 20% (3) of the patients conducted follow-up visits at week 12 and another 20% (3) at week 24. None of them had both follow-up visits. Only 1 (7%) patient discontinued the treatment for no response.

4 (27%) patients developed adverse effects and in 1 case it was necessary to end the treatment. The most frequent adverse effects were: joint and muscle pain and local reactions in the injection site.

About the prescribing dosage, 6 (40%) patients began with 300 mg every 4 weeks, 7 (47%) with 150 mg every 4 weeks and 2 (13%) with 150 mg every 2 weeks.
Conclusion: Our results showed that the prescription criteria established in the clinical report did not fit with clinical practice.
Based in the results, the Pharmacy Service has decided to elaborate a check-list for improving the prescription unification and the patients' monitoring.

PT009: Screening and treatment of microalbuminuria amongst patients with type 2 diabetes in a primary care setting: a clinical audit

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Background and Objective: Diabetes mellitus is a serious public health issue and a major source of morbidity, mortality, and economic cost to society. Patients with diabetes mellitus are at an increased risk of numerous complications, particularly, diabetic kidney disease which is proven to be the leading cause of end-stage renal disease. International diabetes guidelines recommend annual testing of the albumin-creatinine ratio in all patients with type 2 diabetes mellitus starting at diagnosis to rule out microalbuminuria and advise that all patients with confirmed microalbuminuria to be treated with either ACE inhibitors or angiotensin receptor blockers. Hence, this project aims to assess adherence to clinical practice guidelines in respect to screening and treatment of microalbuminuria among patients with type 2 diabetes mellitus attending one urban primary care clinic in Kuwait.
Setting and Method: A retrospective clinical audit was conducted on a sample of patients with type 2 diabetes mellitus, with or without hypertension, attending the diabetes clinic at one urban primary care clinic in Kuwait, over a period of 7 months. Current practice, regarding measurements of urinary albumin-creatinine ratio (UACR) and treatment of microalbuminuria, was assessed against international standard guidelines. This was followed by a 3-month multifaceted intervention that involved professional intervention, organisational intervention and patient-centred intervention. The audit was then repeated post-intervention. Adherence to standards was statistically analysed pre and post-intervention.
Main outcome measures: The main outcome measure was the percentage adherence to international guidelines pre- and post-multifaceted intervention in terms of screening and treatment of microalbuminuria. This was divided into:

- Percentage of patients with type 2 diabetes with a recorded urinary albumin concentration test at least once in last 12 months (estimate on a first pass urine sample or spot sample if necessary).
- Percentage of patients with type 2 diabetes with confirmed microalbuminuria with a recorded treatment with ACEIs/or ARBs.

Results: A total of 177 patients' medical records were assessed pre-intervention and 155 patients' medical records post-intervention. The proportion of urine albumin concentration (UAC) screening, pre-intervention was 71.3% compared to 81.3% post-intervention ($p = 0.004$). The use of angiotensin-converting enzyme inhibitors or angiotensin receptor blockers as a treatment for microalbuminuria was found to be 84.6% pre-intervention compared to 78.6% post-intervention ($p = 0.67$).
Conclusion: The use of multifaceted intervention could play a role in improving the quality of care regarding screening for microalbuminuria. However, our study shows no change in the percentage of patients receiving treatment. This emphasises the need for customised intervention to improve the adherence to diabetes guidelines and improve the management of complications among patients with type 2 diabetes.

PT010: Evidence and consensus-based DDI guidelines with Anticancer Drugs in the Netherlands

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Background and Objective: Drug–Drug Interactions (DDI's) with anticancer drugs can affect the efficacy and toxicity of the anticancer drugs and the interacting drugs. A Dutch multidisciplinary expert group assessed the clinical significance and provided recommendations for the management of these DDI's.
We describe the development of evidence and consensus-based practical guidelines on DDI's of anticancer drugs with non-anticancer drugs. For the clinically relevant DDI's the guidelines provide recommendations for management of the DDI, plus information on the mechanism and (potential) clinical consequences.
Design: Data on potential DDI's from PubMed searches and registration files such as SmPC's (Summary of Product Characteristics) are collected. Based on these data, a data sheet for risk analysis and concise advice is created for each potential DDI. The risk analysis and the advice are assessed by a multidisciplinary expert group. DDI's between two anticancer drugs are not considered. The results of the assessment are available for the healthcare professional.
The DDI guidelines are graded into three groups:

- DDI identified, effect clinically relevant → Intervention required, alert generated.
- DDI identified, effect not clinically relevant → No intervention required, no alert
- No evidence for a DDI → No intervention required, no alert

The expert group consists of hospital and community pharmacists, medical oncologists, haematologists, internists, and clinical pharmacologists. Members were selected by their professional organizations, such as the Dutch Society for Medical Oncology (NVMO), the Haemato Oncology Foundation for Adults in the Netherlands (HOVON), and the Dutch Society of Clinical Pharmacology and Biopharmacy (NVKF&B).
Results: A total of 75 DDI's are classified as clinically relevant, defined as necessitating an alert and intervention, such as dose adaptation, discontinuation of treatment, or additional monitoring of treatment.
For 150 DDI's no intervention is necessary and thus no alert. Of these 150 half are classified as not clinically relevant DDI's, and for the other half there was insufficient evidence for an interaction.

The DDI guidelines are integrated in the Dutch drug database, the G-Standaard ('G' for Geneesmiddel which means drug). This database contains decision support information and is incorporated in electronic prescribing systems and pharmacy information systems in the Netherlands. The G-Standaard is used for surveillance before prescribing and dispensing, clinically relevant DDI's interactions can be identified by doctors and pharmacists and prevented from occurrence.

The DDI guidelines with anticancer drugs are also available via the app OncoIA in App Store or Google Play.

Conclusion: The DDI guidelines and the accessibility during electronic medicine prescribing and dispensing are an important tool in evidence and consensus-based adjustment of therapy for patients with cancer and improving patient care.
Maintenance to keep DDI guidelines proper and up to date is important for both healthcare providers and patients.

PT011: A decision-support tool to estimate and reduce a patient's anticholinergic load—study protocol of an exploratory study

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Background and Objective: Up to now, no patient-individual decision-support tool has been available that would support health care providers in their assessment of a patient's anticholinergic load and its subsequent reduction, considering the German drug market. Hence, we designed a study to evaluate a novel decision-support tool in a setting of hospitalized geriatric patients and analyse its impact on anticholinergic drug prescriptions.
Design: The decision-support tool assists to identify anticholinergic drugs and to suggest patient-individual alternatives with smaller anticholinergic effects. Potential drug–drug interactions and contraindications will be checked and additional information will be delivered for each recommendation to facilitate the selection process for the physician. The exploratory study will be conducted in a geriatric rehabilitation hospital in Germany from June 2017 onwards. The practicability of the decision-support tool will be evaluated via feedback questionnaires provided by physicians who apply the tool in their routine work. In addition, a retrospective data analysis will be performed to evaluate how frequently anticholinergic drugs are routinely stopped in the absence of the tool. Prospectively, at admission and 2 weeks after the application of the tool, symptoms potentially induced by anticholinergic drugs will be documented using the Neuropsychological Assessment Battery, side effect questionnaires, a practical test for measuring the saliva flow rate, and blood samples for determining individual serum anticholinergic activity. Geriatric inpatients taking at least one strong anticholinergic drug and who are in a stable cognitive and physical status will be invited to participate. Based on the initial assessment, a clinical pharmacist will estimate the patient's anticholinergic load and offer individualized recommendations to the physician. The study will be continued until at least 20 patients will be recruited whose anticholinergic load has been completely reduced by their physician.
Results: So far, physicians were trained in the handling of the decision-support tool and the study started in June 2017.
Conclusion: This study protocol will allow the initial evaluation of a decision-support tool for reducing anticholinergic load. Based on the study results, the tool should be further developed taking into account patient characteristics that might lead to a more reasonable estimation and reduction of anticholinergic load than reported in previously published studies.

PT012: Evidence-based recommendations for the safe use of diltiazem and verapamil in patients with liver cirrhosis

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Background and Objective: Calcium-channel blockers have a high hepatic clearance, hence changes in pharmacokinetics can be expected in patients with liver cirrhosis. Currently, a guideline on prescribing in liver cirrhosis is missing. We aim to develop evidence-based recommendations for the safe use of diltiazem and verapamil in patients with liver cirrhosis.
Design: Evidence about the safety and the pharmacokinetics of diltiazem and verapamil in patients with liver cirrhosis was retrieved from literature and the product information. This was reviewed by a panel of ten experts. The panel gave a recommendation about the safety (i.e. drug can be used in liver cirrhosis; preferably use a safer drug; or avoid using this drug) and optimal dosage per drug. If applicable, advices were sorted by severity of liver cirrhosis (Child-Turcotte-Pugh (CTP) classification).
Results: A total of three studies were retrieved about diltiazem and nine about verapamil. The bioavailability of diltiazem increased by 70% in patients with liver cirrhosis compared to controls and the half-life was prolonged. The expert panel recommended that diltiazem can be used in liver cirrhosis if the initial dose is one-half the usual starting dose (all CTP-classes). For verapamil the maximum plasma concentrations were threefold higher in patients with liver cirrhosis compared to controls. The half-life was prolonged from around 4 h in controls to 14 h in patients. There were multiple case-reports of cardiogenic shocks occurring in cirrhotic patients using verapamil. For CTP A and B, the expert panel advised to start with one-third to one-fourth the normal dose. Due to the highly altered pharmacokinetics and the risk of adverse events, verapamil is considered unsafe in CTP C and usage is not recommended.
Conclusion: Diltiazem and verapamil can be used in CTP A and B liver cirrhosis if the dose is being adjusted. In CTP C, use of verapamil is not recommended, while diltiazem may be used in a reduced dose.

PT013: Use of inhaled colistimethate sodium in clinical practice

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Background and Objective: To identify the criteria of use, off-label, of inhaled colistimethate sodium (IC) in patients with Non-Cystic fibrosis bronchiectasis (NCFB) and colonized by Pseudomonas aeruginosa (PA) and to analyse whether the available scientific evidence is suited and to evaluate the effectiveness and safety of the treatment.
Setting and Method: Retrospective observational study. Medical records of all patients diagnosed with NCFB and colonized by PA and treated with IC from 2013 to present were reviewed.
A bibliographic research was performed and were adopted as criteria for correct use the ones defined in the SEPAR (Spanish Society of

Pneumology and Thoracic Surgery) guide consensus: 3 positive sputum cultures for PA during the 6 months prior to treatment separated at least 1 month between them and at least one previous eradication attempt with antibiotic treatment.
Main outcome measures: Demographics data, primary diagnosis, antibiotic treatment before, during and after IC treatment, length of treatment, dosage, microbiological data, adverse effects and parameters that allowed identify exacerbations were collected.
Effectiveness of treatment is determined based on 3negative consecutive sputum samples and exacerbations reduction and safety on the appearance of adverse effects.
Results: 129 patients were included (90 M and 39 W), average age 58 ± 29 years (29–87). 5 patients met the recommended criteria by the SEPAR, 26% not received prior eradication therapy and 96% were not performed 3 consecutive sputum cultures. The eradication antibiotic treatment for PA before the IC was ineffective in all patients.
Median IC treatment was 6.5 (1–52) months. 51 of the 73 patients in which the bacterium was eradicated continued treatment despite having negative cultures. In all cases the dosage used was adequate. A significant reduction of exacerbations was observed in all patients, 74% had no relapses once started treatment and 26% had fewer relapses. One patient discontinued treatment because of bronchospasm and another continued despite an episode of haemoptysis.
Conclusion: The adequacy of the SEPAR is low, only 4% of patients met the criteria for use, treatment duration is excessive and not suspended despite the negative cultures.
Given it is an off-label indication, it would be necessary to develop a protocol for use in the centre that allows us to closely monitor patients who are candidates to treatment.

PT014: Is antibiotic prophylaxis in elective orthopaedic surgery without implant necessary? Results of a meta-analysis

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Background and Objective: According to guidelines, antibiotic prophylaxis in orthopaedic surgery without implant is not recommended for the reduction of the incidence of surgical site infections (SSI), however the evidence level is low. Surveys have shown that preoperative antibiotics for orthopaedic procedures without implant are administered routinely by surgeons due to medico-legal concerns. Such practice may have an important impact on costs, side effects and emergence of antibiotic resistance. Therefore, the objective of the review is to evaluate existing clinical evidence.
Setting and Method: A systematic review was performed with the use of Pubmed, EMBASE/MEDLINE, CENTRAL, SBBL-CILEA/METACRAWLER, ISRCTN Registry, ICTRP and ClinicalTrials.gov databases. Trials were initially screened by the title and abstract; secondly full papers were analysed. The meta-analysis included randomized controlled trials (RCT) with patients undergoing surgery as treatment for any orthopaedic impairment that did not need implantation. Heterogeneity analysis of the studies was conducted with Chi square; the statistical analysis of the infection rate was performed using the meta package with the R software. The effect estimate was expressed in risk ratio (RR) and pooled using a random effects model. Study quality assessment was undertaken using the Jadad scale.
Main outcome measures: Incidence of SSI.
Results: Of the 184 identified papers, 129 were excluded since they did not meet inclusion criteria and 45 were discarded because considered duplicate publications. After analysing the 10 potentially relevant studies, only 2 were included. The study population consisted of 1152 patients. No heterogeneity was observed, however the studies were outdated and associated with a high risk of bias. According to the pooled RR, the incidence of infection in the intervention group was lower than the control group favouring prophylaxis (RR = 0.39; 95% CI 0.16–0.96, $p = 0.040$).
Conclusion: The meta-analysis demonstrated, in contrast to the guidelines, that antibiotic prophylaxis can reduce the incidence of SSI in elective orthopaedic surgeries without implant; however, the low number of available studies and the high risk of bias show that the effect estimate is non-statistically significant. Considering that antibiotic prophylaxis usually is administered in clinical practice, RCTs are required to establish whether antibiotic prophylaxis in orthopaedic procedures without implant is recommended or if this practice could cause more harm.

PT015: Impact of rivaroxaban in cardiovascular disease

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Background and Objective: Compared to warfarin, the novel oral anticoagulant rivaroxaban has uncomplicated dosing with no need for INR monitoring and fewer drug and food interactions, which have been reported to improve adherence to treatment. The objectives were to determine INR control for patients on warfarin and compare warfarin and rivaroxaban with respect to treatment adherence, incidence and severity of bleeding and drug–drug interactions (DDIs).
Setting and Method: Following ethics approval, 100 patients (50 warfarin, 50 rivaroxaban) were recruited by convenience sampling from hospital outpatient clinics and community pharmacies. Time in therapeutic range (TTR) was calculated using the Rosendaal Linear Interpolation Method. The validated treatment adherence questionnaire by Anastasi et al[1] was adapted to assess therapy adherence. The Bleeding Academic Research Consortium (BARC) criteria were used to classify severity of bleeding complications. Micromedex Complete Drug Interactions and Medscape Multi-Drug Interaction Checker tools were used to assess DDIs.
Main outcome measures: TTR; treatment adherence; bleeding complications; DDIs.
Results: Patients in both groups were comparable ($p > 0.05$) for age (mean 65 years, SD 12.91), gender (53 female, 47 male), indication for anticoagulation (59 atrial fibrillation, 30 deep vein thrombosis) and mean duration of anticoagulation use (10 months, SD 5.97). Over a 6-month period, 768 INR tests were processed (mean 2.56 tests/patient/month, SD 1.58), of which 37% were not in TTR. Patients on rivaroxaban obtained a significantly higher mean adherence score (44 out of 45, SD 1.41) compared to patients on warfarin (41 out of 45, SD 3.92) ($U = 719.5$, $p < 0.001$). Twenty-four patients reported BARC Type 1 bleeding (18 warfarin, 6 rivaroxaban) and 10 patients reported Type 2 bleeding (6 warfarin, 4 rivaroxaban) ($X^2(4) = 10.17$, $p < 0.001$). A total of 91 (mean 1.8/patient, SD 1.03) and 19 (mean 0.4/patient, SD 0.52) potential DDIs were identified in

patients on warfarin and rivaroxaban respectively ($X^2(4) = 47.81$, $p < 0.001$). Simvastatin (23), amiodarone (12) and omeprazole (11) were the drugs involved in the highest number of potential DDIs with warfarin. Amiodarone (7), paroxetine (3) and verapamil (3) were the drugs involved in the highest number of potential DDIs with rivaroxaban.

Conclusion: Patients on warfarin were less adherent to treatment, had a higher incidence of BARC Type 1 and 2 bleeding and a greater potential for DDIs compared to rivaroxaban.

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Posters

CP-PC018: Evidence-based evaluation and information system for OTC drugs

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Background and Objective: Methods of evidence-based medicine and pharmacy are becoming increasingly important. In particular, the field of self-medication has so far been neglected in terms of evidence-based principles. In community pharmacies, there is often not enough time to perform literature research on over-the-counter (OTC) drugs during daily practice. Until now, a system that provides transparent, fast and evidence-based evaluations of OTC drugs to support counselling and scientifically-based information on self-medication is not available.

The aim of this project is to develop an evaluation and information system for OTC drugs by using the indication migraine. This system has to provide a clear structure and easy orientation. Moreover, it has to present detailed data that are necessary to practice evidence-based and individual counselling.

Design: A software-supported tool was used to increase practical relevance and applicability in community pharmacies.

Results: In order to structure the evaluation system aspects of the "Analytic Hierarchy Process" (AHP) have been applied. This method developed by Thomas L. Saaty is used to support decision problems by defining the problem or goal (e.g. an effective and safe migraine therapy) and by structuring the problem in a hierarchy (e.g. the single efficacy and safety criteria for different drugs used in this indication). Furthermore, the AHP provides the possibility to include individual patient preferences.

A systematic procedure including systematic literature searches has been used in order to evaluate efficacy and safety criteria. Moreover, parts of the "Grading of Recommendation, Assessment, Development and Evaluation (GRADE)-system" have been integrated into the evaluation system. Thus, it is possible to incorporate quality ratings of the included studies and to provide a transparent and reproducible presentation of the data.

Results of the evaluations for the different drugs are shown in structured and easily accessible "Summary-of-Findings-(SoF)-tables".

Conclusion: The system provides evidence-based data as well as transparent and reproducible results of the efficacy and safety evaluations of different drugs used in the self-medication of acute migraine headaches. This way it can support pharmacists to provide evidence-based counselling on OTC drugs.

CP-PC020: Pharmacists' Opinions and Attitudes Regarding the Ongoing SMART Pharmacy Program Guiding the Nationwide Implementation of Pharmaceutical Care Practices

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Background and Objective: "SMART Pharmacy Program" is a program run by the Turkish Pharmacists' Association (TPA) which is the public professional organization representing all of the community pharmacists in Turkey. This program aims the nationwide implementation of pharmaceutical care practices through Continuing Professional Development (CPD). This report describes the opinions and attitudes of the pharmacists participating in the program regarding the ongoing asthma/chronic obstructive pulmonary disease (COPD) module of the SMART Pharmacy Program.

Setting and Method: TPA assigned trainer pharmacists from 52 Regional Chambers of Pharmacy. Professional staff trained the trainer pharmacists (n = 254) during a 3-day (train the trainer course) on CPD and asthma/COPD management. The trainer pharmacists then trained the community pharmacists (n = 3400) participating in the program as coordinated by regional chambers. During the pharmaceutical care practices, at the first visit, the pharmacist collected demographic, disease-related and medication data. At the first and every visit, the pharmacist measured disease-control status of the patients and assessed the inhalation technique and medication knowledge of the patients. At every visit the pharmacist identified the pharmaceutical care needs of the patients and addressed them accordingly; and also provided education on inhalation technique. Opinions and attitudes of the pharmacists regarding the program were evaluated by an online survey sent to all pharmacists participating in the program.

Main outcome measures: The opinions, attitudes and satisfaction level of the pharmacists regarding the SMART Pharmacy Program.

Results: Only 774 pharmacists responded to the survey; response rate was 23%. Majority (35%) of the pharmacist were between 31 and 40 years and female (68%). Vast majority of the pharmacists (94.3%) certainly agreed or agreed that the SMART Pharmacy Program was beneficial in terms of development of the pharmacy profession; 84% reported that they would continue to be involved in new modules of the SMART Pharmacy Program; 94% told that they would support their colleagues to participate in this program too. Mean satisfaction level scored over 5 points was 4.2 for the CPD courses and 4.3 for the asthma/COPD courses.

Conclusion: Vast majority of the pharmacists who responded to the survey had positive attitudes, opinions and a high satisfaction level regarding the SMART Pharmacy Program. The low response rate to the survey is addressing a problem that the program has not adequately adopted by the pharmacists. This was an expected challenge as some amount of "resistance to change" is inevitable for such novel implementation efforts. Strategies to overcome this challenge have been developed.

CP-PC021: Pharmacists' activities to reduce medication waste: an international survey

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Background and Objective: Pharmacists are key players for reducing the undesirable economic and environmental burden of medication waste. Previously, we identified 14 activities that individual pharmacists undertake to reduce medication waste, divided over different stages of the pharmaceutical supply chain (prescribing, dispensing [pharmacy- and patient-related] and leftover stage). However, to what extent these activities are implemented in clinical practice across Western countries is unknown. The objective was to assess the frequency that activities to reduce medication waste are implemented by community and hospital pharmacists of Western countries, the importance of the activities for reducing waste and the feasibility for implementing the activities in clinical practice.
Setting and Method: The 14 pre-defined activities were used to construct a questionnaire that was distributed among community and hospital pharmacists working in Western countries who participated in the 45th ESCP congress in 2016. Pharmacists were asked to report if the activity was implemented in their country (yes/no), to rank the importance of the activity to reduce waste and the feasibility to implement in practice (from 1 [not] to 5 [very important/feasible]). Data was descriptively analysed using STATA13.
Main outcome measures: The proportion of countries that has implemented the different waste reducing activities, and the importance and feasibility of these activities ranked by the pharmacists.
Results: 89 pharmacists from 22 countries participated. On average 5.7 of the pre-defined activities (standard deviation 2.4) were implemented per country. Most activities were implemented in less than half of the countries. Reducing the amount of medicines in stock at the pharmacy (dispensing stage-pharmacy related) was most frequently implemented, (n = 19, 86%), followed by collecting unused medicines (77%, leftover stage) and performing medication review (68%, dispensing stage-patient related). Waste reducing activities in the dispensing stage were both considered most important to reduce waste and most feasible activities to implement in practice (ranked '4′). Overall, the activities scored higher on importance than on feasibility.
Conclusion: Pharmacists have various opportunities to reduce medication waste throughout the pharmaceutical supply chain. However, not all activities are implemented. Although pharmacists consider medication waste reducing activities important, they doubt the feasibility for implementation in clinical practice.

CP-PC022: Amount and economic value of unused oral oncolytics and bDMARDs among patients who discontinued these therapies

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Background and Objective: Oral oncolytics and biological disease-modifying antirheumatic drugs (bDMARDs) are costly therapies. Patients sometimes stop their therapy early, which may lead to medication waste if amounts dispensed from the pharmacy are left unused. The objective of this study was to examine the proportion of patients who have medicines left unused after discontinuation of oral oncolytics or bDMARDs therapy, the reasons thereof, and the amount and economic value of the oral oncolytics and bDMARDs left unused by these patients.
Setting and Method: Pharmacy refill data from a Dutch outpatient pharmacy was used to identify patients who discontinued an oral oncolytic or bDMARD between November 2015 and February 2016. Patients were contacted by phone and asked if they had indeed discontinued oral oncolytic/bDMARD use, if so, the reason thereof and which amount was left unused. The economic value was calculated using Dutch medicines' prices. Data was descriptively analysed using STATA13.
Main outcome measures: The proportion of patients with unused oral oncolytics/bDMARDs after discontinuation and reasons thereof, and the proportion of packages left unused and unopened by patients, with the economic value.
Results: 605 patients (mean age 57.3 [± 15.6] years, 43.6% female) received oral oncolytics and 568 patients (mean age 50.6 [± 16.4] years, 54.1% female) received bDMARDs from the outpatient pharmacy. 49 patients were contacted by phone who indicated to discontinued an oral oncolytic, mainly due to adverse effects (50.0%), of which 22 patients (44.9%) had unused medicines. 23 patients discontinued a bDMARD, mainly due to insufficient effect (64.7%), of which 17 patients (72.0%) had unused medicines.
36 oral oncolytic packages were left unused, with a median value of €137 (IQR €10-2126), amounting to a total of €38,384. 24 oral oncolytic packages (66.7%) were unopened. 28 bDMARD packages were left unused, with a median value of €1042 (IQR €521-1042) and in total €24,787. 23 packages (78.1%) were unopened.
Conclusion: Few patients discontinue oral oncolytics or bDMARDs therapy, however, the majority has costly medicines left unused. These findings emphasizes that large amounts of costs are wasted when expensive medicines are left unused and emerges the need for waste reducing interventions.

CP-PC023: Medication errors: What's the share of responsibility of pharmaceutical companies?

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Background and Objective: Medication errors (MEs) are rarely the fault of a single person. Indeed, they are usually multi-factorial stemming from the complexity of the medication use process which includes: prescribing, dispensing, administering and monitoring. This study aims to describe and quantify the most common characteristics of MEs encountered with medicines of a pharmaceutical company and determine their causes of MEs.
Design: Data was collected from internal database of pharmacovigilance and reports from French National Agency of Medicines and Health Products Safety (ANSM) over a period of 6 months. MEs were characterized according the classification of French Society of Clinical Pharmacy (SFPC). Causal analysis is realised using Ishikawa diagram also called cause-and-effect diagram.
Results: A total of 260 cases have been treated from 1st June 2016 to 31st December 2016. Among them, 240 (93%) cases were patent medication errors, 11(4%) cases were risks of medication errors and 9 (3%) were near misses. Most of errors occurred during administration n = 167(64%), followed by prescription n = 28, (11%), dispensation n = 8 (3%), monitoring n = 6 (2%) and others/unspecified n = 20 (8%).
133 (51%) cases are attributed to healthcare professional, 57 (21%) were due to patient, 21 (8%) to medicines and 18 (7%) to equipment. The Factors identified in this study associated to medicines are

confusing packaging, labelling and naming of medicines, administration devices and complex reconstitution.
Conclusion: This analysis was used to propose corrective actions (CA) to errors due to medicines and preventive actions (PA) to avoid the same errors from occurring in the future. But an assessment should be made later to check if this CAPA have been achieved.

CP-PC024: Effective interventions for diabetes patients by community pharmacists—a meta-analysis of pharmaceutical care components

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Background and Objective: Background
The global prevalence of diabetes mellitus patients has increased over the past few decades. The number and severity of diabetes complications can considerably increase the hazard ratio of mortality and hospitalisations. Diabetes mellitus has grave implications on patients and health systems around the globe.
Objective
The aim of the meta-analysis was the evaluation of randomised controlled trials (RCTs) that included interventions provided by community pharmacists inpatients with diabetes, the analysis of each component of the intervention(s) and the description of the training that the pharmacists received.
Setting and Method: The literature research was conducted in PubMed and in the Cochrane Central Register of Controlled Trials (January 2000 to April 2016) for RCTs with interventions provided by community pharmacists for patients with diabetes. RCTs containing pharmaceutical care or medication therapy management conducted by community pharmacists with real diabetes patients that were published in English or German were included. Corresponding authors were contacted to obtain detailed information about missing data, intervention and training design. Relevant basic information, intervention and training design data were extracted and analysed. The meta-analysis for continuous outcomes was conducted using the random effect model. According to the publications of the analysed studies, missing data and incomplete data were excluded. All statistical analyses were done with R using R studio version 0.99.484.
Main outcome measures: Evaluation of the meta-analytical effect of RCTs that included interventions provided by community pharmacists in patients with diabetes and the effectiveness of each component of these intervention(s).
Results: The literature research resulted in eleven eligible studies for further analysis. The corresponding authors of six studies responded to our request and sent their raw data. The calculated meta-analytical effect of 640 analysed patients was a HbA_{1c}-difference of −0.66% with a 95% confidence interval of −0.86 to −0.45%. The analysis of the data revealed that most intervention elements had a significant positive meta-analytical effect on the HbA_{1c}-values of the diabetes patients.
Conclusion: Our meta-analysis suggests that the "community pharmacists' led interventions can improve glycaemic control in patients with diabetes mellitus type 1 and 2. Patient-centred, interdisciplinary interventions were most effective intervention components. Pharmaceutical care interventions should therefore include the following components: setting individual goals, communicating with other health care professionals, reviewing medication and assessing patients' health beliefs and medication knowledge.

CP-PC025: Management of drug related problems in pharmacies in the Czech Republic

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Background and Objective: Drug-related problems (DRPs) occur in clinical practice quite often and can arise in all activities when using drugs. DRPs can worsen patient health and/or increase the health care costs. Medication review can be performed also by pharmacists when providing individual counselling in the pharmacy. Therefore, the aim of the study was to obtain and analyse data on the possibilities of identifying and solving DRPs within individual consultations provided to patients in pharmacies in the Czech Republic.
Setting and Method: Pharmacists who have attended the professional course focused on DRPs and counselling were addressed to participate in the study. After, they were trained to use interactive databases. All patients who requested consultation of DRPs during the study period were included.
Data were collected from June to December 2016 using an interactive web database. Date included information about the patient, medication history, and results of basic examinations if available. Identified DRPs were classified according to Pharmaceutical Care Network Europe V5.1. After entering the data, a double data revision was performed (pharmacist + clinical pharmacist). Data was evaluated by descriptive statistics using MS Excel.
Main outcome measures: Frequency and type of DRPs.
Results: 23 pharmacies participated in the study, of which 15 completed at least one entire consultation (all requisites + approval of study board). A total of 101 consultations were performed (6.7 per pharmacy, min. 1; max. 13). The mean age of patients was 69 years and 72% were women. On average, patients used 9.4 drugs.
The consultation comprised 278 DRPs, i.e. 2.7 DRPs per patient (min. 1; max. 10). The most frequent DRPs were problems with choice of drug, adverse effects, problems with dosing, and drug interactions.

Half of identified DRPs were assessed as moderately significant and 20% as very significant or critical.
Conclusion: Types of DRPs identified in the study has shown which DRPs can be captured in a pharmacy when providing individual counselling (adverse effects, drug interactions, problems in drug administration). It has also been shown that pharmacists can play an important role in improving of patient safety and his/her pharmacotherapy. Further, larger projects are needed to confirm these pilot results for the Czech Republic.
Acknowledgement
The "Pharmacist as a Professional Advisor" Project has been launched and introduced with the financial support of the General Health Insurance Company (VZP) and the Czech Chamber of Pharmacists.

CP-PC026: Implementation of a standardized medication list for older homecare patients: a pilot study

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Background and Objective: An accurate medication list, shared between patients and their healthcare providers, may be a useful tool to improve medication safety in primary care. This pilot study aimed to explore the implementation of an electronically shared standardized medication list for older patients with polypharmacy who receive home health care.
Setting and Method: Observational pilot study of the implementation of a standardized medication list for community dwelling older patients (aged $\geq$ 70 years) with polypharmacy (using $\geq$ 5 chronic drugs) receiving home health care. Home care nurses provided the community pharmacist with the original medication list, who consequently generated a standardized medication list and uploaded it (after GP's validation) on Vitalink (a recently introduced eHealth platform by the Flemish Government). The researcher recorded all alterations to the medication list made by the pharmacists, and looked for possible additional improvements to the medication list. Moreover, medication complexity and safety were examined.
Main outcome measures: Classification of alterations made to the original medication lists; medication complexity quantified by the Medication Regimen Complexity Index (MRCI), the number of medications and the number of administrations per day; medication safety including drug–drug interactions, potentially incorrect moments of intake and completeness of medication lists.
Results: Thirty-one patients participated, with a mean age (SD) of 83.9 (6.0) years and 23% was female. Pharmacists' medication lists contained a total of 317 drugs with a mean of 10 drugs per patient (range 6–16). Pharmacists added net 3 prescription drugs and 18 OTC drugs to the original medication lists. Most important alterations to the original medication lists included adding: indication (61%), generic or brand name (18%), moment of intake (9%) and, instructions for usage/dosage (7%). Pharmacists significantly increased the number of administrations per day ($p = 0.000$). MRCI scores (median, IQR) of nurses' (32, 11), pharmacists' (38, 15) and researcher's (40, 15) medication lists significantly differed between pharmacists' and nurses' ($p = 0.000$) and between nurses' and researcher's medication lists ($p = 0.000$).
Conclusion: This pilot study showed potential improvements in terms of medication complexity and medication safety through the use of a shared, standardized and up-to-date medication list.

CP-PC027: Patients' and pharmacists' preferences for drug–drug interaction management

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Background and Objective: Management of drug–drug interactions (DDI) is a complex process, in which risk–benefit assessments should be combined with the patient's perspective. The aim of this study was to determine patients' and pharmacists' preferences with regard to DDI management.
Setting and Method: We assessed preferences on DDI management by an online choice-based conjoint survey (discrete choice experiment) about a fictitious DDI, concerning combination of a chronically used cardiovascular drug and an antibiotic for pneumonia. Participating patients and pharmacists had to choose twelve times between two management options. The options were described by five attributes, including risk, benefit and practical consequences. Each attribute could have two different levels, which were varied over the twelve choice tasks. Latent class analysis was used to identify potential classes of patients and pharmacists with distinct patterns of similar preferences.
Main outcome measures: Utility and importance (reflecting preference) of attributes of the DDI management options, separately for all identified classes of patients and pharmacists. Size of the classes expressed as class probability.
Results: 298 patients using cardiovascular medication and 178 pharmacists completed the questionnaire. The latent class model for both patients and pharmacists resulted in three classes. For patients, in one class most importance was attached to avoiding switch of medication (class probability 20%), in a second class to a lower risk of adverse events (41%), and in a third class to blood sampling (39%). For pharmacists, again one class attached highest importance to avoiding switch of medication (31%). The other classes gave priority to curing pneumonia (31%) and avoiding blood sampling (38%).
Conclusion: The results showed diverging preferences regarding DDI management both among patients and pharmacists. Different groups attached different value to risk and benefit versus practical considerations. Awareness of existing variability of preferences and possible incongruence between pharmacists and patients is a step forward towards shared decision making in DDI management.

CP-PC028: Medication non-adherence and its predictive factors among asthma patients in Slovenia

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Background and Objective: Non-adherence among asthma patients has been shown to range between 30 and 70% and is associated with poor health outcomes. The aim of the study was to assess the extent of medication non-adherence in asthma patients in Slovenia and to explore the factors influencing non-adherence.
Setting and Method: We conducted a cross-sectional study in community pharmacies across Slovenia. Patients above 12 years old with asthma were recruited at the time of dispensing of their asthma medications. The association between potential predictors and medication non-adherence was evaluated using multiple logistic regression in IBM SPSS Statistics version 23.
Main outcome measures: Medication adherence was evaluated using 8-item Morisky Medication Adherence Scale. Patients who scored 6 points or less were considered non-adherent. We also evaluated patients' socio-demographic data: sex, age, educational level, smoking status, living/not living alone, information regarding asthma pharmacotherapy, number of medicines for treatment of comorbidities, and information events indicating asthma exacerbations during the past year (emergency room visit, hospitalisation, or oral glucocorticoids therapy).

Results: We included 208 patients with the following characteristics: mean age 56 (± 20) years, 59% were females, the majority (96%) were prescribed inhalation glucocorticoids, and almost all received therapy for other diseases (mean number of medicines 2.7, range 0–10). At least one exacerbation in the past year was experienced by 22% of the patients. High, medium and low adherence was found in 53, 23 and 24% of the patients, respectively. Smoking status and age were found to have a statistically significant influence on medication adherence. Age was positively associated with adherence (OR 1.42 per 10 additional years, $p = 0.003$). Current smokers had almost 4 times higher odds for being non-adherent (OR 3.71, $p = 0.02$).
Conclusion: Approximately a quarter of patients have poor adherence to their asthma medications. Smokers and younger patients are at higher risk for non-adherence and therefore require special attention of healthcare providers, who should identify non-adherence and perform interventions to improve medication adherence in order to avoid poor asthma control.

CP-PC029: Considerations of prescribers and pharmacists for the use of non-selective β-blockers in asthma and COPD patients: an explorative study

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Background and Objective: Despite recommendations in prevailing guidelines to avoid the use of non-selective (NS) β-blockers in patients with asthma or COPD, on average 10 patients per community pharmacy receive NS-β-blockers monthly. The aim of our study was to identify the reasons of prescribers and pharmacists to treat asthma and COPD patients with NS-β-blockers.
Design: 53 community pharmacists in the Netherlands selected patients with actual concurrent use of inhalation medication and NS-β-blockers. For at least five patients each pharmacist screened all medication surveillance signals and actions taken at first dispensing. Each pharmacist selected three different initial prescribers for a short interview to explore their awareness of the comorbidity and reasons to apply NS-β-blockers.
Results: Pharmacists identified 827 asthma/COPD patients with actual use of NS-β-blockers. From these, 153 NS-β-blocker prescribers were selected and interviewed (64 general practitioners (GPs), 45 ophthalmologists, 24 cardiologists and 20 other prescribers). 107 prescribers were aware of the drug-disease interaction of the asthma or COPD comorbidity when initiating the NS-β-blocker and 46 were not. From these, 40 prescribers did not consider the contra-indication to be relevant.
For 299 patients, medication surveillance signals and actions at first dispensing were retrieved. Patients used predominantly ocular timolol (39.8%), and the oral preparations propranolol (30.8%) and carvedilol (15.1%). In 154 cases the pharmacy system generated a warning alert.
Conclusion: A substantial number of prescribers was unaware of the comorbidity or did not regard NS-β-blockers contraindicated, despite prevailing clinical guidelines. Improvement programs should target prescribers' awareness and knowledge of NS-β-blockers in patients with asthma or COPD.

CP-PC030: Community pharmacist access to aspects of patients' primary and secondary care electronic health records: exploring the general public's views in NHS Tayside

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Background and Objective: Community pharmacist access to aspects of patients' primary and secondary care electronic healthcare records (EHR) was piloted in NHS Tayside, Scotland. While policy makers and pharmacists are largely in favour of community pharmacist access, and there is an unmet service need based on GP workforce-workload evidence, the general public's perspectives of pharmacist EHR access had yet to be explored in Scotland.
Objective: to determine the general public's perspectives of community pharmacist EHR access in NHS Tayside.
Design: A survey methodology using paper-based questionnaires posted to a random sample of the general public in NHS Tayside (March–May 2017). Quantitative data were analysed using descriptive statistics (IBM SPSS version_21_). The study was approved by university Ethical Review Committee.
Results: Of 1000 surveys distributed, 205 returned, (27 undeliverable), providing a response rate of 21%. Although some were unsure (23%; n = 47/203), most indicated their community pharmacist would be better able to recognise problems with medicines/healthcare given access to patients' EHR (63%; n = 127/203), knew why each medicine was prescribed (74%; n = 150/203), and thought that a long-term condition would make access to patient records essential (73%; n = 148/203). Few respondents were against/were non-committal on community pharmacists having read or read-and-write access to EHR. For example, the Emergency Care Summary (ECS) (13%; n = 27/201) where, if access were permitted, respondents preferred that consent should not be required on each and every occasion: ECS (73%; n = 148/203). Many felt access to patients' EHR would mean the pharmacist was better informed so could provide better care (68%; n = 136/200) and that mistakes were less likely to happen (71%; n = 142/200).
Conclusion: Findings from this survey recognised community pharmacists could contribute more to improving patient care and safety, as part of the wider healthcare team, if they were better informed through access to patients' EHR. Enabling treatment of common clinical conditions in community pharmacy brings benefits to patients while reducing pressure on GP appointments. While there remain areas of uncertainty, and this is a small albeit representative sample from one area in Scotland, this study demonstrates support for community pharmacist access to patients' EHR with a preference for a simplified consent process.

CP-PC031: Eye drop technique and patient-reported problems in a real-world population of eye drop users

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Background and Objective: To assess eye drop technique and patient-reported problems with eye drop instillation in a primary care sample of eye drop users.
Setting and Method: Cross-sectional observational study in 136 community pharmacies in Belgium. Patient inclusion criteria were: being age 18 years or older, using eye drops for at least one month (to ensure that patients were already familiar with eye drop instillation), and having sufficient knowledge of Dutch language. Participants demonstrated their eye drop technique and completed a self-administered questionnaire.
Main outcome measures: Eye drop technique (scored using a checklist); patient-reported problems with eye drop instillation.
Results: Participants (n = 678) had a mean age of 68.9 (SD 12.4) years. Antiglaucoma preparations (used by 88.2% of patients) and anti-inflammatory agents (9.6%) were the most frequently used eye medications. During the demonstration, almost everyone (n = 635; 98.0%) successfully instilled at least one drop in the eye, although 14% (n = 95) required multiple attempts to achieve this. Only 3% of the sample (n = 20) exhibited perfect drop technique, meaning that they performed correctly all the steps. Most common deviations were: touching the bottle to the eye or eyelid (n = 276; 40.7%), and failing to close the eye (n = 460; 67.8%) and perform nasolacrimal occlusion for at least 1 min (n = 642; 94.7%) after drop instillation. Forty percent reported at least one problem with eye drop instillation. Most common problems were: difficulties with getting a drop in the eye (n = 124; 18.3%), too many drops coming out of the bottle (n = 99; 14.6%), and difficulty squeezing the bottle (n = 83; 12.2%). About half of the sample (n = 346) recalled having had education in eye drop instillation technique; most of these (282/346; 82.0%) received education from their ophthalmologist. Our survey also revealed that 20% of ophthalmic suspensions were not shaken before use.
Conclusion: This study showed suboptimal eye drop technique in real-world clinical practice. A proactive role of community pharmacists in detecting and resolving these problems could be helpful.

CP-PC032: Patients' experiences with multidose drug dispensing; a cross sectional study

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Background and Objective: Compliance aids can be used to support community dwelling older patients with their medication use. In the Netherlands most patients receive multidose drug dispensing (MDD) systems. MDD is a sophisticated dosing aid that provides patients with robot-dispensed disposable sachets where all drugs intended for one dosing moment are gathered. Around 3% of the Dutch population receives their drugs via MDD, but little is known about the patients' experiences with MDD in the Netherlands.
Setting and Method: A cross sectional study among users of MDD systems from three community pharmacies. A semi-structured interview was designed based on existing literature and questions covering themes identified in a small pilot.
Main outcome measures: Patients' experiences on shared decision to a MDD system. The patient general satisfaction and reported advantages and disadvantages with MDD systems.
Results: A total of 147 users of MDD systems were invited from which 62 (42%) gave informed consent. The transition from regular dispensing to the start of MDD was discussed with 76% of the patients. 90% of the patients were of the opinion that the MDD system supported them with their medication use. Patients addressed medication management (74%), convenience (48%) and adherence (32%) as advantages of MDD. 69% of the patients addressed no disadvantages, 13% had problems reading the printed text on the sachets and 11% had problems opening the sachets. MDD systems were rated with a mean of 8.4 and none of the patients requested to return to regular dispensing of their medication instead of a MDD system.
Conclusion: This study describes that in the Netherlands compliance aids are mostly initiated after agreement of the patient. Patients are satisfied with the use and report multiple advantages from MDD systems. Simplification of manual opening of the sachets and improving readability of the text on the sachets may further improve MDD systems.

CP-PC034: Pharmacovigilance in Latvia: Community pharmacists' perspective. A pilot study

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Background and Objective: Statistics of adverse drug reaction (ADR) reporting in Latvia in 2014–2015 reflects overall low rates of reporting among pharmacists. Objective: To investigate pharmacists' knowledge about pharmacovigilance (PV) and to identify main challenges in reporting ADR in routine practice in Latvia in a community pharmacy setting.
Setting and Method: A prospective study was conducted by clinical pharmacy student from February to April 2017 using validated but adapted questionnaire with 18 questions; it was distributed electronically to pharmacists and pharmacy students working in community pharmacies in Latvia. Data were subjected to frequency analysis and Pearson's Chi square tests by SPSS.
Main outcome measures: Knowledge of PV practice, ADR reporting compliance rates, reasons for not reporting ADR.
Results: In 74 respondents (92% female, 54% pharmacists) no differences between student and pharmacist group were observed concerning age or sex. Only 43 and 86% of respondents could correctly define terms PV and ADR, respectively. 55% of respondents had observed at least one ADR in patients during previous year, however only 5% of observed ADR had been reported. Respondents showed overall low awareness of the *special situation reporting obligation* [e.g. pregnancy (45%), drug abuse (54%), lactation (30%)], 11% of respondents did not think that those situations should be reported at all to health authorities. Although 87% of respondents claimed that pharmacist reporting is an important part of PV system, 7% did not agree that pharmacists are responsible for ADR reporting. The most common reasons for not reporting ADRs were: "Lack of time" (39%); "Reporting is complicated" (20%); "I don't see causality between event and drug" (20%). Finally, 92% of respondents expressed an interest in obtaining more knowledge about PV.
Conclusion: Respondents showed low awareness and compliance rates of ADR and *special situation* reporting, which might be consequence of poor knowledge of PV reporting process and requirements. Pharmacists should be encouraged to take higher responsibility in ARD reporting, and should be better trained. Clinical pharmacist in a community pharmacy setting might increase compliance in ADR reporting.

CP-PC035: Living with Medicines Questionnaire: first insights from Slovenia

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Background and Objective: Long-term medicines use can be burdensome, lead to negative attitudes towards medicines and impacts adherence. To be able to measure medicines-related burden, tools like Living with Medicines Questionnaire (LMQ) are needed. The questionnaire was developed from patients' perspective to seek views and opinions about prescribed medicines and its influences on a day-to-day life. The aim of our study was to assess the burden of long-term medicines use among patients in Maribor region, Slovenia. The aim of our study was to assess the burden of long-term medicines use among patients in Maribor region, Slovenia.
Setting and Method: We performed a cross-sectional study with the use of Living with Medicines Questionnaire (LMQ). The questionnaire was back-translated in Slovenian language and tested for face validity. Afterwards, the study was performed in community pharmacies, which are part of public pharmaceutical institution Lekarne Maribor (a public chain of 20 community pharmacies in eastern Slovenia). Pharmacists distributed 130 questionnaires to randomly selected patients if they were using at least one medicine for a chronic condition for at least one year. Total LMQ score was calculated, data was analysed with the use of descriptive and inferential statistics (t test, ANOVA; $\alpha = 0.05$). The study was approved by the Republic of Slovenia National Medical Ethics Committee.
Main outcome measures: Total LMQ score, VAS score.
Results: We received 113 questionnaires, 103 were eligible for final analysis (79.2% response rate). Sixty percent of patients were above 65 years old (55% female, 43% male), 40.9% prescribed 5 or more different medications, which they usually take 2 times a day (44.7%). Most of them mark their current health status as median (57%) or good (27%). The median total LMQ score was 88 points (range: 49-155) out of maximal 205 points. Medicines use does not represent any burden for 20 included patients, 63 patients fall in the category of minimal burden, 19 moderate and only one to high. The average degree of burden marked on the visual analogue scale was 3.16 ($\pm$ 2.69), with 72 patients in the category of no/minimal burden. Total LMQ score is related to age ($p = 0.02$), current health status ($p = 0.011$) and how often a day a person has to take their medication ($p < 0.001$).
Conclusion: Results of our study indicate that medicines-related burden in Maribor region is relatively low.

CP-PC036: Assessment of Self-care and Fear of Self-injecting and Self-testing in Diabetic Patients Utilized Insulin

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Background and Objective: The reasons such as increasing numbers of diabetes mellitus, complications resulting in serious morbidity and mortality, adherence problems due to inadequacy of education and monitoring of patients with diabetes suggest the necessity of taking more comprehensive and systematic care of these patients. Self-care support should be the complementary part of this care plan, which is critical to prevent acute complications and reduce the risk of long-term complications. In this study, it is aimed to evaluate the self-care activities and fear of self-injecting and self-testing among individuals with diabetes utilized insulin pen.
Setting and Method: This study was conducted in a community pharmacy from April 20, 2017 to June 20, 2017 among adult patients (> 18 years old) with diabetes and having insulin treatment for at least 6 months, came to community pharmacy for any purpose and accepted to participate this study.
Main outcome measures: The diabetes self-care activities of patients were assessed by the Summary of Diabetes Self-Care Activities Measure (SDSCA). The fear of self-injecting and self-testing was estimated with Turkish version of Diabetes Fear of Self Injecting and Self-testing Questionnaire (D-FISQ).
Results: Fifty-three patients (mean of age: 59.7 $\pm$ 15.3 years old; male/female 27/26) were included the present study. When evaluating patients' recent haemoglobin A1C level, which was gathered in eighteen patients, only four patients' haemoglobin A1C levels were equal and less than 7%. Duration of diabetes was more than five years in 88.7% of them. The common utilized medication regimen for treatment of diabetes were combination of insulin and oral antidiabetic agents (56.6%). The median scores (interquartile 25–75) of the self-care activities in the patients were calculated as 5.0 (3.0–7.0) for general diet, 3.7 (2.3–4.3) for specific diet, 3.5 (0.0–4.5) for exercises, 5.5 (3.0–7.0) for blood glucose testing, 4.8 (4.1–5.6) for foot care and 7.0 (7.0–7.0) for insulin utilization. The median for fear of self-injection was 6.0 (0.0-8.0) and the median for fear of self-testing was 0.0 (0.0–10.5). The median overall scores for fear perceptions questionnaire was 6.0 (0.0–17.5).
Conclusion: The patients' self-care practices were found to be satisfactory in almost all aspects except for specific diet and exercises. Also it was found that all diabetic patients were felt comfortable regardless of fear in self-injecting and self-testing. However, further studies is needed to determine the relationship between the self-care activities and the fear of injecting and self-testing and the factors affecting the self-care activities of diabetic patients utilized insulin pen.

CP-PC037: Community pharmacists' training, experiences and behaviours in managing homeless patients

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Background and Objective: Community pharmacists are well situated to offer proactive and opportunistic support and advice to the homeless. The aim of this research was to investigate pharmacists' training, experiences and behaviours in managing homeless patients.
Setting and Method: A questionnaire was developed based on existing literature, researcher expertise and the Theoretical Domains Framework (TDF) (1). The TDF, a synthesis of behaviour change theory, outlines 14 individual domains perceived to influence behaviour (including knowledge, skills, beliefs about capabilities and social influences). Both open and closed questions were used. The questionnaire was reviewed for face and content validity and piloted with 50 pharmacists. The questionnaire was sent to a random sample of 1951 community pharmacies in England and Scotland addressed to the 'responsible pharmacist'. Two reminders were sent. Data were analysed using descriptive statistics. NHS RandD approvals were obtained.

Main outcome measures: Pharmacists' training, experiences and behaviours in managing homeless patients.
Results: Three-hundred-and-twenty-one responses (response rate 16.5%) were received. The mean (SD) age of respondents was 39 (12) years with a third (n = 94, 29.3%) qualified as a pharmacist < 5 years. Many respondents (n = 187) reported having managed a homeless patient in their pharmacy with approximately 17% (n = 53) daily. The majority (n = 242, 75.4%) of participants disclosed that homelessness was not included in their under/postgraduate or continuous professional development (CPD) pharmacy training (n = 225, 70.1%). Only a third (n = 100, 31.1%) strongly agreed/agreed that they knew where to refer a homeless patient to for social support. Approximately 42% (n = 137) indicated they would only discuss homelessness if raised by patients. Only a fifth (n = 71, 22.1%) felt comfortable advising homeless patients on how to minimise the impact of homelessness on their medication use, reporting a lack of clear guidelines (n = 294, 94.2%).
Conclusion: The results of this study suggest lack of appropriate training opportunities, on managing homeless patients, for pharmacists at under/postgraduate and CPD level. There is a need to develop guidelines in enabling community pharmacists to support homeless patients in alleviating the impact of homelessness, including pharmacist's role in supporting medicines management and signposting to social services.

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CP-PC038: Evaluation of the impact of medication reviews provided by community pharmacies in Germany on medication safety in patients with type 2 diabetes

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Background and Objective: The influence of medication reviews performed by community pharmacies on medication safety is still rarely examined in Germany. Medication reviews are at present not comprehensively implemented in German community pharmacies and there are only few programs where they are remunerated for this service. Most patients suffering from type 2 diabetes are multimorbid receiving a high number of drugs. Therefore, they are supposed to benefit greatly from a medication review. The aim of the study was to evaluate the impact of medication reviews in community pharmacies on medication safety and on the frequency of drug related problems (DRPs) in patients with type 2 diabetes.
Setting and Method: 121 patients (52.1% female) with a median age of 76.6 years were provided with a medication review (PCNE type 2a) in the period between February 2016 an April 2017 in the area of Munich, Germany. Inclusion criteria were age ≥ 65 years, treatment with five or more drugs and diagnosis type 2 diabetes. The medication reviews for all patients were conducted uniformly by the same trained pharmacist. The detected DRPs were intended to solve in cooperation with the responsible prescriber in each case, whereas the physicians were not informed in advance about this new pharmaceutical service.
Main outcome measures: Identification of the most common DRPs related to the antidiabetic medication; Evaluation of the type and frequency of DRPs that could be totally, partly or not at solved by the medication review.
Results: A total of 586 DPRs were detected in 121 patients (4.8 DRPs/patient). 185 DRPs (31.6%) were related to oral or injectable antidiabetics or insulin. Of the 185 DRPs regarding the antidiabetic drugs, most DRPs were related to the drug dose (27.0%), followed by drug selection (21.6%) and drug–drug interactions (15.7%). More than half (53.0%) of all DRPs related to the antidiabetic medication could be totally or partially solved: 37.3% were totally and 15.7% partially solved. From the DRPs concerning oral or injectable antidiabetics or insulin only 28.1% could not be solved. For 18.9% of these DRPs the status of the problem is unknown, many times due to lack of cooperation of the prescriber.
Conclusion: Medication reviews performed by community pharmacies in cooperation with the treating physician are a feasible instrument to reduce the frequency of DRPs and improve medication safety. Since type 2 diabetic patients represent elderly, multimorbid patients with polypharmacy, we believe that these results can be transferred to elderly patients with multiple diseases in general. The service of interprofessional medication review should be largely extended and appropriate remunerated in the German community setting.

CP-PC039: Effects of flurbiprofen 8.75 mg spray and lozenge on patient-reported qualities of throat pain

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Background and Objective: As a result of pharyngeal inflammation, patients present with a variety of features beyond the single complaint of a 'sore throat' with a spectrum varying in severity. To benefit patients, treatments should therefore provide relief across the range of patient-reported articulations of 'sore throat'. We investigated the effects of a single dose of flurbiprofen 8.75 mg delivered as a spray or lozenge on 10 symptoms that comprise the Qualities of Sore Throat Index (QuaSTI).
Setting and Method: This randomised, multicentre, double-blind, non-inferiority study conducted in Russia enrolled adults with recent onset of sore throat due to upper respiratory tract infection. Patients rated their discomfort for sensory descriptors—'burning', 'raw', 'like a lump in the throat', 'dry', 'tight', 'swollen', 'irritated/scratchy'; functional descriptors—'difficult to swallow', 'husky/hoarse'; and the affective descriptor—'agonising' using the QuaSTI, which is based on 0–10 Likert scales at baseline and at 2 h post-dose.
Main outcome measures: In this analysis, the mean change from baseline for individual qualities of sore throat, the sum of scores for each category and all items, were assessed.
Results: 439 patients were randomised to flurbiprofen spray (n = 217) or lozenge (n = 222). The mean change from baseline for individual items and the sum of scores in each category were statistically significant for both spray and lozenge at 2 h post-dose (all $p < 0.0001$). Patients reported similar improvements for the total QuaSTI score at 2 h post-dose with spray and lozenge ($p < 0.0001$).
Conclusion: Flurbiprofen spray or lozenge provide relief from a range of patient-reported qualities of the broad term 'sore throat', including sensory, functional and affective descriptors.

CP-PC040: Effect of flurbiprofen 8.75 mg spray and lozenge on coughing in patients with upper respiratory tract infection

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Background and Objective: Symptoms associated with upper respiratory tract infection (URTI) commonly include sore throat and coughing. URTI-related cough may occur due to the action of inflammatory mediators on sensory nerve endings in the oropharynx and therefore could benefit from locally applied anti-inflammatory drugs. We investigated the effects of flurbiprofen 8.75 mg spray or lozenge on coughing in adults with recent onset of sore throat due to URTI.
Setting and Method: This randomised, multicentre, double-blind, non-inferiority study conducted in Russia evaluated the efficacy of a single dose of flurbiprofen 8.75 mg delivered as spray or lozenge. In this analysis, patients with moderate-to-severe sore throat and at least one symptom of URTI completed a URTI questionnaire at baseline and at 2 h post-dose, reporting the presence or absence of cough and other URTI symptoms.
Main outcome measures: Percentage of patients reporting the presence of cough before and at 2 h after treatment with flurbiprofen 8.75 mg spray or lozenge.
Results: Patients were randomised to flurbiprofen spray (n = 216) or lozenge (n = 221). 26 patients in each group reported the presence of cough at baseline. At 2 h post-dose, patients reported a significant reduction compared with baseline in cough across both groups ($p < 0.01$). After flurbiprofen treatment, cough was absent in 85% of patients in the spray group and 54% of patients in the lozenge group. There was no significant difference between the two treatments ($p = 0.07$). No serious adverse events were reported.
Conclusion: Flurbiprofen 8.75 mg appears to relieve cough associated with sore throat when delivered locally to the throat with a lozenge or spray, likely attributable to local analgesic and anti-inflammatory activity in the pharynx. Flurbiprofen 8.75 mg spray and lozenge can provide significant relief from URTI-related cough in patients with sore throat.

CP-PC041: Assessment of knowledge and attitude of women utilized oral contraception

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Background and Objective: The aim of present study was to assess knowledge and attitude of women utilized oral contraceptives utilization.
Setting and Method: The research was held between 15 January 2017–15 April 2017 in community pharmacies at Istanbul. This study was conducted in healthy women older than 18 years old who had been used oral contraception. The study was performed by face to face interview.
Main outcome measures: 19-item self-structured questionnaire was used for data collection.
Results: Among a total of 59 participants, the mean of age was 31.61 ± 8.15 (19–51). Eighteen participants (30.5%) were older than 35 years old. Of them, 63.0% was married. Of them, 25.4% pointed out that they had an unplanned pregnancy. Of them, 44.1% smoked cigarette. There is no statistically difference between smoker (55.0%) and non-smoker (39.0%) among participants older than 35 years old ($p > 0.05$). During contraception pill usage, 34.0% of them declared that they missed one pills per each cycle, 42.4% of them missed two or more pills per each cycle. Only 23.7% of them stated that they have never forgotten taking their pills. Only half of them (52.5%) were noticed that they should took an extra pill when they experienced vomiting within 2 h. Participants gathered information regarding contraception pills from their physicians (52.5%), pharmacist (8.5%) or internet (6.8%). Only a few of them (18.7%) knew that the certain medications could decrease the effect of oral contraceptive pills and, they should have applied extra contraception methods within 7 days where this situation occurred. There is no statistically difference in their contraceptive pill knowledge when considered their education level and married status ($p > 0.05$). Of them, 62.7% declared that they did not informed their physicians during visit and pharmacist while they took dietary supplements from pharmacy about their utilization of contraceptive pills.
Conclusion: Although the study sample was small, it was determined that participants had inadequate knowledge regarding contraceptive pills and they were not adherent to their contraceptive pills. Despite accepted as risk factor, it was observed that women older than 35 years old still smoked while the took contraceptive pills. Based on the results of this study, it was concluded that the pharmacist should be driven patient education program for the women utilized oral contraceptive pills.

CP-PC042: Evaluation of antihypertensive medication adherence at community pharmacy setting

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Background and Objective: Hypertension is a chronic disease which requires adherence to medication regimens to reduce the risks of cardiovascular disease, stroke and other end organ damages. The aim of this study is to evaluate the medication adherence of patients towards antihypertensive medications at community pharmacies located in different socio-economic district.
Setting and Method: Hypertensive patients, who received at least one medication for hypertension at least one year, were included in this study. The study was conducted at three community pharmacies located in Bursa and Istanbul, Turkey between December 2016 and April 2017.
Main outcome measures: Short-Form of Medication Adherence Self-Efficacy Scale was revised and validated in Turkish by Hacıhasanoglu et al. was used to evaluate medication adherence of hypertensive patients in this study.
Results: A total of 135 hypertensive patients with the mean age of 62.6 ± 11.9 (36–89) took part in this study. Of them, 53% was female. Hypertensive patients' last graduate school was listed as primary school (26.0%), secondary school (15.0%), high school (29.0%), and university (24.0%). Of them, 74.8% were married and 35.0% was very low level of income. Of them, 89.0% had history of hypertension in their family. Of them, 40.0% had hypertension disorder more than 10 years and 13.0% mostly used beta blockers. Mean score of medication adherence was calculated as 2.87 ± 0.51 (min–max: 1.43 - 4.0). None of the socio-demographic factor was statistically associated with patients' antihypertensive adherence ($p > 0.05$).
Conclusion: In this study, it was obtained that hypertensive patient' medication adherence was moderate. In the further studies, the factors associated with antihypertensive medication non-adherence would be determine in the further studies conducted with large study sample.

CP-PC043: Evaluation of potentially drug-related patient-reported common symptoms assessed during clinical medication reviews, a cross-sectional observational study

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Background and Objective: Healthcare professionals tend to consider common non-alarming symptoms to be less clinically relevant. However, such symptoms can be of substantial impact for the individual patient. Insight in patient reported symptoms could aid pharmacists to identify improvements in medication treatment, for instance in the patient interview at the start of a clinical medication review (CMR).
The aim of this study was to describe the numbers and types of patient-reported symptoms assessed during a CMR and to elucidate their potential association with the drugs in use.
Setting and Method: This observational study was performed with data of a clinical trial on patient-reported outcomes of CMRs in community pharmacies in the Netherlands. Patients with at least five or more drugs and eligible for a CMR were selected by fifteen community pharmacies. Patients were asked to fill in a structured instrument, the Patient Reported Outcome Measure, Inquiry into Side Effects (PROMISE). Among other, this instrument offers a list of 22 symptom categories to report symptoms and their relationship with drugs in use. The results of the PROMISE instrument together with information on patients' actual drug use were available for analysis. Beside descriptive analysis, associations with side effects as listed in the Summary of Product Characteristics (SPC) of the drugs in use were assessed with logistic regression analysis.
Main outcome measures: the number of patients reporting a predefined symptom, the number of patients reporting this as a drug-associated symptom, and the number of patients reporting a symptom that was a 'very common' side effect in at least one of their drugs in use.
Results: From the 180 patients included, 168 patients (93.3%) reported with the PROMISE instrument at least one symptom, which could be discussed with the pharmacist during the patient interview. In total the patients reported 1102 symptoms for 22 symptom categories. 101 (56.1%) patients assumed at least one or more symptoms experienced with their drugs in use. 107 (59.4%) of the patients reported at least one symptom that corresponded to a 'very common' side effect listed in the SPC of a drug in use. Each additional drug in use with a specific symptom listed as a 'very common' side effect in its SPC, increased statistically significant the probability of a patient to report this symptom for 'dry mouth/thirst, mouth complaints', 'constipation', 'diarrhoea', and 'sweating'.
Conclusion: Many patient-reported symptoms and symptoms potentially related to drugs in use were identified by administering the PROMISE instrument to users of at least five drugs in chronic use. This information can be used in CMRs to improve patients' drug therapy.

CP-PC044: Patient reported common symptoms as an overture for interventions in medication reviews: the randomised controlled PROMISE trial

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Background and Objective: The 'Patient Reported Outcome Measure, Inquiry into Side Effects' (PROMISE) instrument was newly developed to facilitate patients in reporting drug-related symptoms during Clinical Medication Reviews (CMRs). It contains a list of 22 common symptoms among other relevant topics for a CMR.
The aim of this study was to determine the effects of community pharmacist-led CMRs, which involved PROMISE, on patient-reported drug-related symptoms compared to usual care.
Setting and Method: This randomized controlled trial was performed in community pharmacies in the Netherlands. Patients with informed consent were randomised into an intervention group (IG) and a control group (CG). Symptoms experienced during the previous month and any suspicion of those being drug-associated symptoms (DAS) were collected with PROMISE from the IG and CG at study start and at follow up after three months. IG patients received a CMR and CG received usual care.
Main outcome measures: Mean number of DAS measured with the PROMISE instrument at follow up.
Results: Complete data of 78 IG and 67 CG patients from 15 community pharmacists were available. The mean numbers of DAS per patient at follow up were 4.0 for the IG and 5.0 for the CG, with an incident rate ratio of 0.90 (95% CI 0.62–1.33). For persisting DAS the incident rate ratio was 0.85 (95% CI 0.43–1.42). The persisting percentage of DAS was lowest for 'palpitations' and 'stomach pain, dyspepsia' in the IG and for 'stomach pain, dyspepsia' and 'trembling, shivering' in the CG.
Conclusion: CMRs with the use of PROMISE showed a light tendency to reduce the number of DAS compared to usual care.

CP-PC045: Adherence to tamoxifen in breast cancer patients—which role does the pharmacist play?

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Background and Objective: Breast cancer is the most common cancer in women. Tamoxifen is often used for the treatment of oestrogen receptor-positive breast cancer. The recommended duration of the adjuvant therapy is > 5 years. Adherence in tamoxifen patients is crucial, yet low. The aim of this study was to assess the impact of health care providers on patient's adherence and particularly, the role

of pharmacists within the interdisciplinary team guiding patients' tamoxifen therapy.
Setting and Method: We conducted a cross-sectional pilot study to analyse patients', physicians' and pharmacists' views on patients' tamoxifen adherence. Thus, we developed 3 population-specific questionnaires. We addressed women via practices, pharmacies, online forums and support groups who were on tamoxifen at the time or had been treated previously. They were eligible if they were ≥ 18 years and gave their informed consent. Additionally, we included physicians and pharmacists via personal contact, stating to be involved in patients' tamoxifen therapy. The surveys included questions regarding the patient-physician-relationship, patient-pharmacist-relationship, patients' experiences and adherence behaviour, reasons for motivation and demotivation in adhering and demographic data.
Main outcome measures: Responses (multiple choice, 5-point-likert scales, free text) to questions regarding patient-physician/-pharmacist-relationship.
Results: The study included 198 patients, 4 physicians and 16 pharmacists. Most patients stated, the physician to be their first contact person regarding their tamoxifen therapy (81%, n = 160). The pharmacist was consulted second to fourth. 62% of the patients (n = 123) specified that adherence is seldom or never a topic of counselling in the pharmacy. 67% of the pharmacists (n = 10) confirmed this. 71% of the patients (n = 137) expressed that pharmacists offered no consultation with respect to their tamoxifen therapy. However, 43% of the patients (n = 110) stated that regular follow-ups and consultations would help to remain adherent. In general, all physicians and 2/3 of pharmacists stated to be in contact with each other seldom to never.
Conclusion: The survey revealed that the pharmacist does not have an active part in the support of patients' tamoxifen adherence in Germany yet. For the future, it is desirable that the pharmacist actively offers consultation and takes responsibility in patients' medication management to improve adherence -and is recognised as a valuable partner within the interdisciplinary health care team.

HP-PC127: Clinical Pharmacy Practices in Medical Intensive Care Unit in a University Hospital

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Background and Objective: Changes in the treatment of the patients in intensive care units (ICU) required frequently due to the large number of medications and the lack of stability of the patients. Therefore the risk of drug-induced problems are higher in these patients. The ability of clinical pharmacists to identify, solve, and prevent drug related problems can lead to reduced complications and reduced duration of hospitalization.
In this study, it was aimed to evaluate the contribution of the clinical pharmacist in determining and managing drug related problems in the medical ICU.
Design: In this prospective cross-sectional observational study, clinical pharmacy services were presented on a daily basis with physicians in Medical ICU of Cukurova University between July 4 and September 1, 2016. Proposals for drug related problems identified by the clinical pharmacist have been communicated to physicians and interventions have been carried out by the physicians. The recommendations were evaluated according to the European Care Network classification (PCNE V7.0).
Results: A total of 61 proposals were made to 40 out of 51 patients during the study. Majority (85.2%) of the recommendations were accepted by the physicians. Among the most frequent causes of drug-related problems were the lack of therapeutic drug monitoring (44.3%), too low drug dose (19.2%), inappropriate drug selection (13.5%) and too high drug dose (9.6%). The lack of the therapeutic drug monitoring was found to be caused mostly by vancomycin (82.6%). In addition, physicians were informed by clinical pharmacist about medication related questions upon request.
Conclusion: The lack of therapeutic drug monitoring was detected as the most frequent drug related problem in medical ICU. When the workload of clinicians is considered in the ICUs, clinical pharmacists play an important role in the optimization and management of the drug related problems in the ICU team.

CP-PC046: Medication adherence and medication regimen complexity of patients with polypharmacy at community pharmacy setting

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Background and Objective: Possible drug-related problems are likely to increase in patients with polypharmacy. The evaluation of patients receiving multiple chronic drug therapy to reduce drug-related problems would be benefit in order to increase patient quality of life. Therefore, it is aim to evaluate medication adherence and medication regimen complexity of patients with polypharmacy in the present study.
Setting and Method: Our descriptive study was conducted in community pharmacies located in Istanbul from February 20, 2017 to June 20, 2017. The patients were included if they were older than 18 years old who used at least five medication routinely, came to community pharmacy for any purpose and accepted to participate this study. Demographic characteristics, medical history and prescription and non-prescription medication data of patients have been collected.
Main outcome measures: Treatment complexities were estimated using the Turkish version of the 'Medication Regimen Complexity Index'. The treatment adherence of patients was assessed using the Turkish version of the four items Morisky Green Levine Medication Adherence Scale.
Results: A hundred and four adult patients (67.7 ± 11.5; 43 male) were included in this study. Of them, 61.5% were had ≥ 8 years education and 81.7% were married. It has been obtained that all of the patients had ≥ 2 chronic diseases; besides 52.8% of them had ≥ 4 chronic diseases among them. The mean of medication regimen complexity index was 23.4 ± 9.1. The mean of the number of drugs used was 8.7 ± 2.6. It is observed that 61.5% of the patients were non-adherent to medication regimen. There was no statistically significant difference between medication adherence neither gender nor number of drugs used. A significant correlation existed between the number of drugs used and medication regimen complexity index ($p < 0.001$).
Conclusion: In conclusion, it is determined that medication adherence was decreased in more than half of patients with polypharmacy. It has been demonstrated that that pharmacists should be involved in pharmaceutical care of patients with polypharmacy to increase patient medication adherence and reduce medication regimen complexity.

CP-PC048: Potential drug interactions with cigarette smoking at community pharmacy setting

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Background and Objective: The aim of this study is to evaluate interactions between potential drugs and cigarette smoking as well as to compare various software programs in detecting these interactions.
Setting and Method: The study was conducted at a community pharmacy located in Malatya between March and June 2017 among adult smokers (> 18 years old) using at least one medication that came to community pharmacy for any purpose and accepted to participate this study.
Main outcome measures: The following software programs, '*Micromedex 2.0® Software Drug Interactions' and 'Medscape Drug Interaction Checker®*', were utilized to detect potential drug-smoking interactions.
Results: The mean age of 84 patients (28 female, 56 male) was 50.5 ± 14.5. 22.6% of them has respiratory system disorder, including asthma or chronic obstructive pulmonary disease. According to the rates of total drugs-tobacco interactions, the software programme Medscape Drug Interaction Checker®' detected 8.3% while Micromedex 2.0® Software Drug Interactions' detected 31.0%. Moreover, according to 'Medscape Drug Interaction Checker®', all the interactions were classified as requiring 'monitor closely' while according to Micromedex 2.0® Software Drug Interactions, all interactions were classified as major (21.4%) and moderate (9.5%). Olanzapine, clopidogrel and theophylline detected most drugs interacted with cigarette smoking. The rate of prescriptions concurrently detected in all programs was %8.3. When evaluating the two pair concordances in programs, it was found 77.3% (kappa: 0.337; $p < 0{,}001$).
Conclusion: Dose adjustment should be required for smokers due to induced hepatic enzyme CYP1A2. These interactions play an important role on medication, especially in case of drugs that have narrow therapeutic index, such as theophylline. However, in terms of interactions, the sources provide controversial founding since although both programs detect interactions with olanzapine and theophylline, one program classified the interaction as major while according to the other a close monitoring is required. What is more, clopidogrel is only detected by the program called Micromedex while the other program does not detect it. Consequently, more studies are needed to minimize these differences. detected by the programme called Micromedex while the other programme does not detect it. Consequently, more studies are needed to minimize these differences.

CP-PC049: What do parents want to know about the meningitis B vaccine? Development of an easily understandable leaflet for parent empowerment

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Background and Objective: There are many important concerns that parents raise daily in community pharmacies about the meningitis B vaccine (1). The aim of the study was to develop an easily understandable leaflet that meets parents' needs as well as promotes their empowerment.
Setting and Method: A representative sample of 47 parents were selected from parents whose children received the vaccine at a community pharmacy. A list of 10 frequently asked questions was created through a consensus between parents and pharmacists. The leaflet proceeded to answer all questions through a literature review. Using the results, an easy-to-use information leaflet was prepared in a question–answer format. Readability was verified using the formula established by Szigriszt Pazos (2).
Main outcome measures: To check if the leaflet had an easily understandable format.
Results: The 10 most frequently asked questions were related to the following: efficacy/effectiveness (What is the meningitis B vaccine? Is it an important vaccine? When should I vaccinate my child and when is the second dose? Does the vaccine really work?), safety (Is meningitis B dangerous? Is the vaccine safe and/or does it have side effects? Is it true that there are no studies in children? How should I transport the vaccine to the physician's office? Do I need to keep it cold?), shortages (Why is it difficult to obtain the meningitis B vaccine?), and financing/reimbursement (Why does the public health insurance not pay for the vaccine if all paediatricians advise us to vaccinate our children?). The Szigriszt index of perspicuity was 53.1, which indicates that the text analysed had a normal quality with respect to its comprehension, taking into account the readability ranges established by the author of the formula.
Conclusion: An easily understandable leaflet directed to parent was created. This will empower parents to obtain appropriate care for their children. It is important to place the patients/families/caregivers at the centre of the healthcare system and provide a quality response for information about medicines within community pharmacies.
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CP-PC050: The compliance with drug storage recommendations of elderly patients

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Background and Objective: Use of multiple drugs simultaneously is prevalent in patients above 65 years of age. It is largely unknown if patients store drugs at home according to storage recommendations. Inadequate storage may contribute to accelerated drug degradation and subsequently may reduce effectiveness and induce toxicity. The aim is to investigate how elderly patients store their prescription drugs at home and to what extent they do not comply with drug storage recommendations.
Setting and Method: Cross-sectional study performed between October 2015 and March 2016. Each of the 44 participating Dutch community pharmacies randomly selected four home-dwelling patients aged 65 years or older who used at least one prescription drug. A complete drug inventory was performed by a pharmacist at consenting patient's homes and drugs were considered properly stored if: 1) storage was according to drug product label storage recommendations for temperature (measured with a temperature chip), light, humidity; 2) expiry date had not passed; 3) stored in the original and

intact package (identifiability); 4) drug package insert or information leaflet was present.
Main outcome measures: The primary outcome of this study was the proportion of patients that were not compliant with all four storage criteria.
Results: 170 patients [53.5% female, mean age 74.9 (SD 7.3) years] were included in the study and 1133 prescription drugs stored at home were inventoried. More than half of the patients (51.2%) did not comply with all storage criteria. Assessment of the individual criteria showed that 78.1% did not comply with criteria 1 while 98.2, 86.4 and 74.6% of patients did not comply with criteria 2, 3 and 4. 53.2% of drugs that should be kept refrigerated were not stored between 2 and 8 °C.
Conclusion: This study illustrates that more than half of elderly patients do not store their drugs according to storage recommendations.

CP-PC051: Potential benchmarks for successful interdisciplinary collaboration projects in Germany—a systematic review

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Background and Objective: Several studies indicate that collaboration between general practitioners (GP) and community pharmacists (CP) contributes to safer and more efficient patient care. Extent and nature of the GP-CP collaboration varies throughout different countries and often, best-practice strategies from one country cannot be easily transferred to another e.g. due to different educational and health care systems. For Germany, we therefore identified and analysed projects on GP-CP collaboration in order to elaborate encouraging approaches and potential benchmarks that should be considered in future projects.
Design: Based on the PRISMA guidelines a systematic literature search was performed to identify projects focusing on collaboration between GP and CPs in the ambulatory care setting in Germany.
Results: A total of 542 articles were identified, comprising a range of different publications involving short and often political reports and statements on interprofessional collaboration, large multicentre studies, small local or regional cooperation projects, and articles addressing the development of theoretical collaboration models and supportive tools. Generally, only few studies were published in scientific journals. There was no standardized assessment how the participants perceived their collaboration and how it contributes to or facilitates their daily work, even when the study aimed to evaluate GP-CP collaboration. Few projects established implementation into routine care while other projects were discontinued after the study period. Successful cooperation between GP and CP in daily routine care was often characterized by personal contact and longtime relationships. In total, six potential benchmarks for cooperation projects were identified: Collaboration generally might be easier, if GP and CP know each other (I), moreover both health care providers should be included into project planning (II), the participants may share their experience or concerns during regularly held joint meetings allowing a continuing evaluation and adaption (III), feasibility should be ensured (IV), particularly by providing incentives (V), and by integrating these projects into existing health care structures (VI).
Conclusion: Future studies on GP-CP collaboration should consistently evaluate context factors for successful collaboration. Therefore, internationally available tools to evaluate interprofessional collaboration should be adapted to the German health care structures.

CP-PC052: Employing the Delphi technique to formulate a checklist that assists community pharmacists to identify children that need to be referred to a doctor

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Background and Objective: Most developing countries do not have a separation between prescribing and dispensing. Thailand is one of these countries which has a prescribing pharmacist. Often an unwell-child, a vulnerable patient, is brought to seek primary treatment in a pharmacy. Community pharmacists, therefore, should be able to differentiate between a mild common illness and an illness that needs to be referred to a doctor. The World Health Organization has developed a program called 'Integrated Management of Childhood Illness' (IMCI) to aid primary care givers to decide whether to provide a service or to refer a child to see a doctor. This study formulated questions, based on the IMCI concept, as a simple screening checklist to identify when a child needs to be referred.
Setting and Method: The WHO-IMCI guidelines for children aged 2 months to 5 years were modified into checklist questions and verified using the Delphi technique by a panel of 21 paediatricians selected using a snowball sampling technique. Five common complaints were chosen for the study; fever, cough, runny nose, vomiting and diarrhoea. The study was conducted during January to April 2017 using a five-point Likert scale questionnaire sent by surface mail together with a smartphone Line application.
Main outcome measures: Data were analysed into median, mode and interquartile range to determine agreement between the experts. An interquartile range of 0-1 was interpreted as agreement.
Results: Agreement amongst the panel was achieved within the 2nd round of employing the Delphi technique. Eight questions were identified for a child presenting with a fever, ten questions for a child with a cough, seven for a runny nose, nine for a vomiting child and six questions were identified for a child presenting with diarrhoea. Several signs and symptoms that indicate when cases should be referred were also identified.
Conclusion: Here we present a patient interview checklist for determining when a child coming to a pharmacy with a fever, cough, runny nose, vomiting or diarrhoea needs to be referred to a doctor. This checklist is currently awaiting a field test.

CP-CE001: Exploring the experiences of early career pharmacists

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Background and Objective: In 2014, the Royal Pharmaceutical Society launched a Foundation Programme designed to support pharmacists in their first thousand days in practice. This support for pharmacists at the initial stages of their careers is vital given that early career pharmacists have expressed a sense of frustration and disillusionment. One reason articulated in the literature for this sense of disillusionment is the expectation of undertaking routine supply focused tasks at the expense of providing pharmaceutical care, and for some this resulted in them leaving the profession. The aim of this research was to explore the experiences of early career pharmacists practising in Scotland.
Setting and Method: Early career pharmacists were defined in this study as those who had first registered with the General Pharmaceutical Council in the last 5 years. Potential participants were identified

and purposively sampled through existing professional networks of contacts to gather a wide range of experiences. A snowballing technique was used with interviewees to identify further potential participants. A semi-structured interview schedule was developed from published literature and existing policy documents. Interviews of 20-30 min in duration were conducted via telephone and all interviews were audio-recorded and transcribed verbatim for analysis.
Main outcome measures: Experiences of early career pharmacists.
Results: Ten pharmacists were interviewed. A variety of early career experiences were described by participants, classified into a number of themes, each composed of sub-themes. The first 6 months after registration were considered to be very stressful, with there being a 'big step up' in responsibility. Assuming the role of a qualified pharmacist was deemed a daunting task. While the transition from pharmacy graduate to qualified pharmacist was viewed by some as a major challenge, others considered that previous experiences in pharmacy settings eased this transition and viewed it as less burdensome. For some participants, their first post on qualification was that of a 'relief manager', which often required them to assume this role in different pharmacies within the same week. While this was viewed as a great opportunity to gain vast experience, it was also considered as stressful, often leading to tiredness. Those participants who acted as locum pharmacists on registration described issues of being isolated from the support which could be gleaned from working alongside regular and experienced pharmacy staff.
Conclusion: The findings of this study suggest that the experiences of early year pharmacists are complex and varied. While there may be some commonality between these experiences, they may also be highly individual. The variation between experiences that was identified appears to be independent of which sector the pharmacist worked in. Furthermore, participants expressed a sense of positivity about their projected career path and adopting increasing responsibilities. While this qualitative study does not seek to be generalizable, the results may be limited by the lack of transferability and also the sample size studied.

CP-CE002: Evaluation of a pharmacist-led hypertension-based education program for stroke patients

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Background and Objective: Hypertension is a global public health issue with severe complications. Despite their effectiveness, pharmacological treatments benefits are limited by an insufficient patient compliance. Several studies reported education program in hypertension, but only few were designed to be performed after an acute context of hypertensive complication. In our centre, an education program was developed for hypertensive patients few days after an acute episode of stroke. Our aim was to evaluate its effect on patients' knowledge and behaviour.
Setting and Method: This is a retrospective cohort study. Subjects whose knowledge was not assessed after education were excluded. Few days after admission at the neurovascular department, the pharmacist fixed learning objectives with each patient and provided him an individual customized session using an illustration folder. Illustrations concerned hypertension, self-measurement of blood pressure (SMBP) and lifestyle modification. An auto-completed questionnaire was filled by patients before and few months after education to evaluate their knowledge about hypertension. For each question, they had to answer "yes", "no" or "I don't know" and to judge their answer self-confidence (absolutely sure, pretty sure, not really sure, absolutely unsure). Besides, two questions aimed to assess their compliance and their practice of SMBP.
Main outcome measures: Effect on patient knowledge was measured based on the evolution of response correctness and self-confidence. Benefits on behaviour were assessed based on the percentage of totally compliant patients and of those practicing SMBP.
Results: 64 patients were enrolled in the cohort. Correct response rate increased from 78 to 94% after education whereas incorrect responses and "I don't know" responses decreased. Patient self-confidence was also improved after education mainly for correct responses. In fact, among all responses pooled together, correct and absolutely sure answers raised from 44% of all answers to 77%. Besides, percentage of excellent patients (i.e. all responses correct and absolutely sure) increased from 3 to 38%. Percentage of totally compliant patients raised from 59 to 73% and those practicing SMBP from 38 to 59%. A strong negative correlation was found between knowledge evolution after education and baseline knowledge with a correlation coefficient of −0.8.
Conclusion: Our program had positive effects on knowledge, medication adherence and SMBP of patients. These benefits could lead to an enhanced blood pressure control and a reduced stroke recurrence risk. Hypertension education should be an integral part of stroke patient care with a possible screening of patients based on the baseline knowledge.

CP-CE003: Optimizing link between community and hospital: implementation of an e-learning program for community pharmacists to follow-up liver transplant patients

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Background and Objective: Many changes appeared for patients after liver transplantation, involving new treatments with biological monitoring and a strict adherence to hygiene and dietetic rules. An educational program (EP) associating nurse, dietary and clinical pharmacist has been set-up to accompany the patients in the post-transplant period. After discharge, the community pharmacist (CP) becomes the most accessible healthcare professional. In order to standardize the instructions delivery from hospital to community, to optimize the patient's care and to perpetuate EP, an e-learning program intended to CP was created.
Design: An analysis of the needs of the CP was carried out by sending an anonymous questionnaire to 77 CPs. The questionnaire was composed of 10 questions on the attractiveness of CP for on-line training and their interests in liver transplantation, treatment and follow-up. Once analysed, an e-learning was developed on the Topaze® software of the Scenari® platform. After content validation by the physicians of the liver transplantation unit, the questionnaire was sent to 4 CP as beta-tester.
Results: Among the 77 CP requested, 45 responded (58%) and 56% knew a liver transplant patient in their pharmacy; 80% wanted an e-learning training on accompanying the liver transplant at the pharmacy. The treatment and follow-up procedures, the side-effects of immunosuppressant drugs (ID), the associated hygiene-diet rules, the treatment management and adherence were the most popular topics. The different types of transplant rejection were also a topic of interest for CPs. Therefore, five modules were created: liver transplantation, psychological approach of the transplant patient, ID, treatment management and the expected role of CP and the hygiene-dietetic rules. Two quizzes were added: ID and the hygiene-diet rules. Once reviewed by the beta-tester CPs, quizzes have been improved. Since April, 23 CPs have been used this e-learning, available at the following address: http://193.52.214.118/elearning/transplant1/.

Conclusion: In order to strengthen the hospital-community link and the management of the liver transplant patients, an e-learning program for the CP was created. Three e-learning are being created, one for general practitioners (GP) in liver transplant and two for GP and CP in heart and kidney transplantation.

CP-CE004: A novel teaching type to elevate the academic level of pharmacists

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Background and Objective: The opportunity to study a pharmacy advanced knowledge systematically for licensed pharmacists in Taiwan is few. The pharmacists had limited time learning so that they need an effective instructional strategy to up to date. Both online lecture (like flipped classroom) and traditional direct instruction have its advantages and disadvantages. Therefore, we combine the online and classroom teaching method to create a new learning environment. Taiwan pharmacists learn mostly traditional classroom courses for continuing education. Through this program, we will know the acceptance of different types of teaching.
Setting and Method: Two chapters from pharmacotherapy textbook, the acid–base disorder and fluid and electrolyte, were delivered to investigate the academic achievement of busy pharmacists. The 4 h lecture was divided into nine sections. Each 30-min section includes online and classroom course. The course is followed by online (YouTube) course, quizzes, the collaborative discussion in the classroom, quizzes, and homework. After finishing one section, students were asked to fill a satisfaction survey using 5 points Likert scale during March to May 2017. Students are licensed pharmacists in teaching hospital in Taiwan. This survey was designed by two clinical pharmacists (teachers).
Main outcome measures: Satisfaction survey data were collected. Compare the teaching effectiveness of online and on-site courses.
Results: A total of 28 licensed pharmacists were served as the subjects. With 135 person-time, the questionnaire received 98 times valid reply. 10.23% of replies prefer classroom lecture. 21.59% of students prefer online course. 65.91% students enjoy both classes equally. About the assessment for teachers: the question "teachers utilized class time efficiently", 48.86% strongly agree, 39.77% agree and 11.36% remain neutral or disagree. About the academic level of pharmacists: Before lecturing, students' self-evaluation level, 22.45% were excellent or very good; 24.49% were good; so–so or poor was 42.86%. Among those so–so or poor students, after nine sections of learning, students self-assessment level became excellent (21.43%), very good (23.81%), good (33.33%) and so–so (21.43%).
Conclusion: Participators preferred online courses. More than 60% of students strongly agreed with this teaching method utilizing time efficiently. More than 45% pharmacists made progress from poor or so–so to good or very good. Findings support that this cross online and face to face classroom lecture could greatly improve pharmacists' academic achievement. We found that this teaching type has the advantages of online and face to face lecture. Students could study at their own pace and interact with each other in both ways. This online course and interactive teaching methods can greatly enhance the effectiveness of pharmacists learning. However, there was something we need to tweak such as the rate of students' attendance. The novel teaching type can be used as a reference for future curriculum planning, so it is now ready to prepare the next chapters of antibiotic courses.

CP-CE005: Efficient pharmaceutical care interventions to enhance drug adherence: How to train community pharmacists (PharmAdhere study)

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Background and Objective: Non-communicable diseases lead to nearly two-thirds of deaths worldwide. Polymedication contributes to poor adherence and drug-related problems. Well trained community pharmacists can enhance responsible use, increase adherence and provide excellent pharmaceutical care. The aim of the PharmAdhere study was to assess the effectiveness of a structured training for community pharmacists that consisted of e-learning, face-to-face training and OSCEs that were designed to conduct short interventions for either emergency, initiation, implementation of therapy or early detection of frequent chronic diseases such as hypertension, diabetes, depression or conditions that require anticoagulation.
Setting and Method: PharmAdhere was a prospective, non-blinded, non-randomized, quasi-experimental trial. E-learning was combined with formative and pseudo-summative Objective Standardised Clinical Examinations (OSCEs). A global analytical checklist was developed.
Main outcome measures: Primary outcomes were (a) the difference of the test results before and after the e-learning and (b) the difference in the scores of the pseudo-summative OSCEs before and after the training. Secondary outcomes were the analytical checklists per topic, the results of the global rating scale and of the results of the self-evaluation process. Feedback was analysed with qualitative methods.
Results: 22 out of 26 enrolled pharmacists completed the study. Every consultation was conducted in a maximum of 10 min. The sums of the analytical checklist points and the number of correctly answered questions after the e-learning increased significantly ($p < 0.01$). Participants' self-evaluation revealed a major increase in competency after the face-to-face training and their feedback was positive, whereas the differences of the results of the global rating scale were not significant.
Conclusion: The OSCEs with standardised patients were highly effective and well received. They should be included in the German curriculum and in continuing education courses for pharmacists. By combining the methods described above with effective feedback methods, we showed that sustainable pharmaceutical care can be delivered in real time situations. Implementation would require scaling up this innovative training in a systematic way.

CP-CE006: Increasing the role of pharmacists in smoking cessation in Romania: Preparation and perceptions of community pharmacists (PRESeNCE)

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Background and Objective: Romania has one of the highest smoking rates in Europe, particularly among youth and pregnant women. Studies show that assistance from healthcare providers, by behavioural modification and drug therapy, is one of the best methods to increase a smokers' chance of quitting. This study aimed to investigate current smoking cessation practices of pharmacists employed at Ducfarm, Sensiblu, and Dona community pharmacy chains in Cluj-Napoca, Romania. Findings were used to develop a toolkit to assist Romanian community pharmacists provide patients with effective and thorough smoking cessation education.
Design: Cross sectional, self-administered survey was conducted for the three major pharmacy chains) in Cluj-Napoca from May 2017 to July 2017. Surveys were disseminated to all pharmacists at every location. Chi square (χ^2) tests were used in comparisons of categorical variables. Categorical variables were expressed as numbers and percentages. Calculations were performed SPSS v.24.
Results: Data collection is ongoing. Initial results presented represent 35 respondents from 12 pharmacy stores. A majority of respondents, 57.1%, were between 20 and 29 years of age and were female (91.4%). Approximately 40% of respondents have been licensed pharmacists for approximately 1–5 years. When asked about personal tobacco use, 60% reported having tried or experimented with cigarette smoking. On average, the pharmacists "rarely" dispense prescription smoking cessation medications (82.4%) or nicotine replacement treatments (NRTs) (41.2%), despite indicating comfort talking about these products with patients. A significant association (χ^2 (1, $n = 32$) $= 4.750$, $p < 0.029$) was found between pharmacists who feel confident (63.6%) using behavioural approaches and would utilize (33.3%) these approaches with their patients. Most pharmacists believed that Romanian pharmacists were prepared (67.6%) and have the skills (70.6%) to provide smoking cessation education to patients. However, these pharmacists believed the Romanian healthcare system does not allow pharmacists to assist with smoking cessation (61.8%).
Conclusion: Romanian pharmacists are educated on major topics regarding smoking cessation. Practical use of these skills appears a barrier to role expansion. The smoking cessation toolkit will highlight behavioural approaches to motivate pharmacists to utilize these strategies in practice. Pharmacological interventions may provide guidance on proper treatment counseling.

CP-CE007: An innovative learning approach in clinical pharmacy and pharmaceutical care for pharmacy students

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Background and Objective: Clinical Pharmacy and Pharmaceutical Care is a growing field for pharmacists. According to the European Higher Education Area, pharmacy school curricula were required to offer learning opportunities to acquire these competencies. The aim of this work was to evaluate the acquisition of specific competencies of clinical pharmacy and pharmaceutical care by students through an innovative learning project as well as to facilitate improvement of teaching methodologies.
Setting and Method: In a 4-h practice session, students were divided into groups (4 students/group) and worked on managing different devices (inhalers and inhalation chambers, insulin pens, and others), with the corresponding instructions of use. Two new tools were introduced in the learning methodology (1): (1) presentation of short videos (2–3 min) related to patient education and counseling, and (2) assessment through a 10-question quiz (10-point scale) about different methodological, and educational aspects on the use of medicines and medical devices. All students enrolled in a "clinical pharmacy and pharmaceutical care" mandatory subject were randomly distributed into two groups. The Intervention Groups (IG) included students who took the 10-question assessment before and after the practice session. This group also had to watch the short videos during the practice session. However, the Control Groups (CG) only took the 10-question assessment at the end of the practice session. The participants were told that all study data would be treated confidentially. A statistical analysis of the results was performed using Deducer program.
Main outcome measures: The competencies are mainly related to the management of medicines and medical devices in chronic diseases (asthma, COPD, and diabetes), and patient education requirements.
Results: The final number of participant students was 324 (IG = 177 and CG = 147). Significant differences ($p < 0.05$) in the application of the 10-question assessment were observed between the global means of IG (6.96 ± 1.32) and the CG (6.57 ± 1.32). Scores improved in 6 out of 10 questions in the IG (mean = 0.88, 0.89, 0.85, 0.74, 0.82, and 0.79) compared to the CG group (mean = 0.83, 0.81, 0.76, 0.65, 0.75, and 0.69). Improvement was statistically significant ($p < 0.05$) in 4 out of these 6 questions. Moreover, it was found that in 3 out of the 10 questions, the score was low in both groups (IG: mean = 0.37, 0.53, and 0.40; CG: mean = 0.38, 0.53, and 0.43), with no statistically significant differences between the groups ($p > 0.05$).
Conclusion: The intervention demonstrated an increase in the acquisition of specific competencies in clinical pharmacy and pharmaceutical care. In addition, students' learning was quantified objectively and the instruments applied were found to be adequate. Finally, the project made it possible to identify the weaknesses of the learning methodology so as to improve future learning tools to optimize the acquisition of student competencies.

Reference

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CP-CE008: Advancement in pharmacy education—professional practice in university curricula in Serbia

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Background and Objective: Experiential education (student professional practice (SPP)/clinical practice) is defined as supervised, structured or semi-structured teaching and learning activities that take place in a practice setting involving real-life situations. The minimum requirements for SPP for health professionals are defined in EU Directive 2013/55 and are partially fulfilled by the programmes in Serbia. The Erasmus + ReFEEHS project is EU funded to reinforce and modernise the experiential education of healthcare professions-medicine, dentistry, pharmacy and nursing.
Design: In 2016, the ReFEEHS consortium conducted a comprehensive survey on the attitudes of healthcare sciences students, academic staff and practitioners related to experiential education, interprofessional education and teaching competencies development at the Universities of Belgrade, Kragujevac, Niš and of Novi Sad, with the support of the professional chambers, the professional associations and the healthcare institutions. In addition, activities

were undertaken to harmonize the criteria for the organization of SPP at the national level.
Results: The total number of respondents was 1508 (comprising 27% academic staff, 58% students and 15% healthcare practitioners). The majority of academic staff and health practitioners recognized the principles of SSP (83 and 86%, respectively), but the importance of structured teaching activities with defined learning outcomes was not appreciated to the same extent (only 57 and 47% of respondents, respectively). Respondents selected the three most important roles of clinical practitioners: "educator", "model for competent professional conduct" and "supervisor".
SPP within the pharmacy undergraduate curricula is integrated in the study programmes at all Serbian public universities, but as a result of the project each of the respective Deans from these universities has signed a National framework document that defines the common criteria for students, teacher practitioners, and practical placement sites, as well as the duties and responsibilities of all participants in the SPP process.
Conclusion: From the survey the situation analysis showed the need for change (1) and although the National framework does not limit individual Faculties from defining additional requirements for experiential education, this approach provides for a more consistent implementation of SPP for pharmacy students in Serbia and will contribute to overall advancement and harmonisation of pharmacy education.

Reference

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CP-CE009: Evaluation of Pharmacists' Role Related to Corticosteroid Usage: Corticophobia

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Background and Objective: The aim of our study is to evaluate the attitudes of community pharmacists towards corticosteroid use.
Setting and Method: The study took place between February and April 2017, 52 community pharmacists were included. The questionnaire consisting of twelve questions "assessing attitudes towards the use of corticosteroids" was administered to pharmacists. The data was analysed by SPSS 15.0 statistical program and the results were expressed as "%".
Main outcome measures: Assessing attitudes of community pharmacists towards the use of corticosteroids using a standardized questionnaire.
Results: Mean age of the participants was 44.5 ± 1.0 (min–max: 23-67), 59.6% (n = 31) of the participants were female pharmacists. On a question of concerning the differences between cortisol and cortisone, 51.9% of the participants (n = 27) stated that they are the same; while the question concerning "Do you recommend any non-prescribed corticosteroids to your patients?" 59.6% (n = 31) of participants answered that they could not recommend any drug which contains corticosteroids. When the participants are asked if they would have any hesitations while dispensing corticosteroids to patients, 90.4% (n = 47) of them reported that they would have hesitations while giving corticosteroid medication due to its side effects. On the other question concerning "which form of corticosteroids you warn the patients about side effects?", most of participants reported that they warn the patient about side effect of inhaler (20.2%) and topical (20.2%) form of corticosteroids.
Conclusion: Corticophobia develops in patients and healthcare personnel due to side effects. For this reason, pharmacists should update their knowledge about corticosteroid, in this way they would have positive effects on patients' treatment by patient education and follow-up, which is beneficial to increase the patient adherence and therefore the treatment success.

CP-CE010: Introduction of a Swiss E-learning Tool on Oral Anticoagulants to Pharmacy Students

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Background and Objective: Community pharmacists often show uncertainty in counselling patients about various aspects of oral anticoagulation therapy. The information that is needed to provide correct patient counselling is even more complex since the introduction of the direct oral anticoagulants (DOAC). Education of pharmacists in oral anticoagulation might address this problem. An e-learning tool is convenient, easy to use, can reach many persons and is able to improve knowledge. We adapted and further developed a French e-learning tool on oral anticoagulants (OAC) and tested its effectiveness and feasibility with Swiss 5th year Pharmacy students, during their internship in community pharmacies.
Design: We translated a French e-learning tool on anticoagulation used for pharmacy residents in hospitals and adapted it to Swiss guidelines. The tool is available on a Learning Management System (LMS) platform and consists of 3 parts: part 1 with general information about OAC, part 2 with specific information on DOAC, and part 3 on vitamin K antagonists (VKA). Each part includes slides with focus on a patient counseling interview. The content is delivered through slides and a voice-over with additional information. Pharmacy students in Basel were provided with the tool together with a questionnaire evaluating the tool's feasibility. Knowledge tests before and after running the tool evaluate the change in user's knowledge and give direct feedback. Final evaluation of the tool will use the model of Kirkpatrick (adapted for medical education) on level 1—participation, 2a—modification of attitudes/perceptions, and 2b—modification of knowledge/skills.
Results: Preliminary results are available, final results are expected per congress date. Translation and Swiss adaption of the e-learning tool were completed and reviewed by 4 experts. Face validity was performed with 4 pharmacists. Knowledge before using the tool and before attending university lectures on OAC was assessed with 131 students. On average 50% of the 16 questions on OAC were answered correctly with a range from 2 to 14 correct answers. These students are currently using the e-learning tool and will evaluate it.
Conclusion: Our tool may help pharmacy students and pharmacists in gaining and updating knowledge on anticoagulation.

CP-CE011: Evaluation of the different patient education methods given by the clinical pharmacist

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Background and Objective: The purpose of this study was to compare face to face and audiovisual education techniques in hypertensive patients.
Setting and Method: The survey was conducted to 120 hypertension patients. Patients were randomly assigned to two groups, each consisting 60 individuals, which constituted control and study groups in the study. Control group (n = 60) took verbal education face to face from a pharmacist, whereas study group (n = 60) took oral and visual education on internet. Patients in both groups were surveyed before the education, 1-month after the education and 4-months after the education. For each patient surveys were collected and two groups were compared in order to analyse the effect of the education type.
Main outcome measures: Medication adherence and the illness perception questionnaire were assessed.
Results: When comparing before education and after education data of hypertensive patients in both groups, a statistically significant increase in medication adherence was found. There was no statistically significant difference between the study and control groups when comparing within both before and after education data. In control group where patients took face-to-face education, an increase in medication adherence was 39.08%; whereas in the study group where patients took education on internet, an increase in medication adherence was 57.01% which was much more than increase in the control group. When before and after education data are compared, in both face-to-face (control group) and internet-trained patients (study group) statistically significant increase was found in the 7 subscales of the illness perception questionnaire. When compared face-to-face and internet-trained patients, it was found that increase in timeline (acute/chronic), consequences, personal control, timeline (cyclical) and emotional representation subscales is higher in internet-trained patients.
Conclusion: In the study, it was found that face-to-face education and internet education given by the pharmacist had both similar positive effects. We believe that the clinical pharmacists should take part in providing medicine information and medicine related health information and patient education on internet. By this way, the pharmacists could reach more patients with less costs in a shorter time period and more effective results can be obtained.

HP-PC015: Analysis of the use of heparin and the related incidence of heparin-induced thrombocytopenia in a Turkish Hospital

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Background and Objective: Heparin-induced thrombocytopenia (HIT) is a transient immune-mediated adverse drug reaction associated with the use of heparins. Heparins are commonly used in hospitalized patients for many indications include but not limited to treat or prevent venous thromboembolism and pulmonary embolism. The aim of this study is to calculate the incidence of heparin-induced thrombocytopenia in patients hospitalized at Dr. Sadi Konuk Education and Research Hospital between 2015 and 2016.
Setting and Method: Ethical approval was obtained from Marmara University Medicine Faculty Ethics Committee. All the patients received heparin during the study period were analysed for the incidence of heparin-induced thrombocytopenia by checking their platelet counts.
Main outcome measures: Platelet counts on day 0, day 3 and days 5–10 were reviewed. 4T test score were used to determine the probability of having heparin-induced thrombocytopenia in these patients.
Results: During the study period 19257 patients were received heparin preparation during their admission. Heparin preparation include unfractionated heparin 16%, low molecular weight heparin 60% or both 24%. The patients' mean age was 58.1 ± 21.3 years, 57% were male and 43% were female. One hundred patients suspected to have HIT. However, 71% had a low risk, 27% had an intermediate risk and 2% had a high risk with 4T test score between 0–3, 4–5 and 6–8 respectively. Female patients and patients stayed for longer than 7 days in the hospital fell more into the intermediate risk. The incidence risk of heparin-induced thrombocytopenia was calculated to be 0.15% in patients admitted to the hospital by taking only the intermediate-risk and high-risk patients into consideration.
Conclusion: Findings in this study showed that the incidence of HIT in Dr. Sadi Konuk Education and Research Hospital is consistent with that of other hospitals in other researches. Although the use of LMWH is being favoured in the hospital, health care practitioners should still remain vigilant about the occurrence of HIT, most especially within the first few weeks following heparin administration.
Keywords: Heparin induced thrombocytopenia, 4t Test score, Anticoagulants, Low molecular weight heparin, Unfractioned heparin

HP-PC016: Drug related problems identified by clinical pharmacist at the internal medicine ward

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Background and Objective: Drug related problems (DRPs) are common to occur amongst hospitalized patients. DRPs interfere with patient's optimal therapeutic outcome and may associated with higher morbidity, mortality and healthcare expenditures. However, there is a lack of studies about DRPs in Turkey. This study aims to identify DRPs and their causes in one of the Turkish hospitals.
Setting and Method: A total of one hundred patients from the internal medicine ward at Bakirkoy Dr Sadi Konuk Education and Research Hospital were included in this cross-sectional study directly after gained ethical approval from Marmara University Medicine Faculty Ethics Committee. Patients demographics variables, medications, medical and social history were evaluated. Data regarding to the recent medications were collected from both patients' profiles and nursing documentation notes and analysed by a team of two clinical pharmacists and internal medicine physician.
Main outcome measures: DRPs were identified using the V7.0 PCNE classification. Lexicomp® were used to assess the drug–drug interactions. UpToDate® recommendations and national guidelines were used to assess the consistency with guidelines, correct dose and administration, duration and indications. The results were evaluated at 95% confidence interval with $p < 0.005$. For all statistical analyses, SPSS 20.0 statistical software was utilised.
Results: Eighty percent of the patients had at least one potential DRP. A total of 163 potential DRPs were identified amongst the 100 patients with an average of 1.6 DRPs per patient. The most common causes of DRPs were errors in drug selection (44.78%), dose selection (27.61%) and drug use process (21.47%). The key findings of this study were the significant correlations between DRPs and each of age (r = 0.4), number of drugs (r = 0.56), hospitalization days (r = 0.3), renal impairment (r = -0.45) and inflammation (r = 0.48) with ($p < 0.005$).
Conclusion: The majority of the patients in this study had DRPs. Patients with renal impairment, inflammation, polypharmacy and increased length of hospitalization days had a much higher chance of

developing DRPs. Those patients should receive a special attention and precise pharmaceutical care by the healthcare professionals especially clinical pharmacists.

HP-PC017: Evaluation of hyperemesis gravidarum pharmacotherapy management in obstetrics and gynaecology ward

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Background and Objective: Hyperemesis Gravidarum (HG) is defined as severe nausea and vomiting in pregnancy which sometimes requires hospitalization. HG can cause loss of more than 5% of body weight, dehydration, muscle wasting, electrolyte imbalance and ketonuria which negatively affect pregnancy outcomes. The study aims to determine the incidence of hyperemesis gravidum in the last 6 years and evaluate the protocols use to control nausea and vomiting.
Setting and Method: A retrospective study was created in Bakirkoy Dr. Sadi Konuk Education and Research Hospital. Ethical approval was obtained from Marmara University Medicine Faculty Ethics Committee. Patients who admitted to the Obstetrics and Gynaecology department with a diagnosis of HG between 2010 and 2016 were enrolled to the study. Data related to patients' demographic variables, medical, medication history and laboratory tests were gathered.
Main outcome measures: The protocols that used to treat HG were assessed and compared with the international guidelines at the time of the study. The impact of the use of different protocols on hospitalization days were also evaluated. The results were evaluated at 95% confidence interval with $p < 0.05$. For all statistical analyses, SPSS 20.0 statistical software was utilised.
Results: One hundred twenty pregnant women admitted with the diagnosis of HG in the period between years 2010-2016. Mean age was 28.7 ± 5.3 years and the mean gestational week was 10.4 ± 4.6. Ondansetron, dimenhydrinate, metoclopramide and combination therapy were given to 35, 15.8, 10 and 16.6% of the patients respectively. Significant differences were seen among antiemetic drugs regarding to the hospital length of stay ($p < 0.0001$). IV Ondansetron was associated with the shortest length of stay, 83.3% of the patients received IV Ondansetron stay in the hospital for less than 3 days.
Conclusion: Different protocols were used to treat HG in the hospital. Among these protocols patients that were exposed to ondansetron have less hospitalization days with less impact on health outcome and economic. However, further studies with larger number of patients must be done to confirmed this result.

HP-PC018: Potential drug interactions in kidney transplant patients in the early postoperative period

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Background and Objective: Due to polypharmacotherapy, kidney transplant patients face an increased risk of experiencing drug–drug interactions (DDIs). The objective of the current study was to analyse prevalence and nature of potential DDIs (pDDIs) in kidney transplant patients in the first seven days after transplant.
Setting and Method: Single-centre retrospective observational study conducted in the internal medicine intensive care unit (ICU) of the University Hospital RWTH Aachen. Data was originally obtained from medical charts. Patients aged 18 years and older who were prescribed at least two drugs were included. Patients with missing medication data were excluded. PDDIs were identified in the first seven days after transplant from 1999-2010. For pDDI identification and severity rating, two Clinical Decision Support Systems (CDSSs) in German language were used, mediQ and Meona.
Main outcome measures: PDDIs in severity levels major and contraindicated in Meona and clinically relevant and strong in mediQ per 100 patient days.
Results: A total of 252 patients with 37,577 prescriptions were analysed. Meona identified 99 pDDIs from severity levels major and contraindicated per 100 patient days. At least one pDDI from respective severity levels in Meona was identified in 66.7% of patients. MediQ identified 299 pDDIs from severity levels clinically relevant and strong per 100 patient days. At least one pDDI from respective severity levels in mediQ was identified in 94.4% of patients. Potential consequences of most prevalent pDDIs in respective severity levels of both CDSSs were changes in immunosuppressant drug and potassium levels, nephrotoxicity and cardiac adverse events.
Conclusion: PDDIs which are likely to be clinically relevant occur frequently in ICU kidney transplant patients in the first seven days after transplant. Prevalence of pDDIs differ depending on CDSSs used for pDDI identification. It is strongly advisable to check kidney transplant patients' medication for pDDIs using multiple CDSSs and to carefully monitor clinical and laboratory parameters to avoid patient harm and increase patient safety.

HP-PC019: Polypharmacy, risk of falls in older people and deprescribing: a literature review

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Background and Objective: Ageing is marked by progressive physiological changes. They reduce the adaptability of the elderly to functional activities, affecting balance and posture maintenance, which causes a greater risk of falling. Falls in elderly patients are a common cause of morbidity and an increasing reason for presentation to hospital. There are numerous factors associated with an increased risk of falls in elderly, including polypharmacy. Medications can contribute to the risk of falls due to several mechanisms, such as sedation, cognitive impairment and orthostatic hypotension. This work aims to review the relationship between polypharmacy and risk of falls in the elderly and the influence of deprescribing.
Design: A literature review was performed. Data were searched in PubMed from June/2007 from June/2017, using the terms "polypharmacy and falls", "falls in elderly" and "deprescribing". Randomized clinical trials (RCTs), cross-sectional studies and case control studies, in patients over 65 years of age submitted to polypharmacy and in danger of falling, were included in the analysis.
Results: Ten studies met de inclusion criteria. Six studies had an experimental design, one was a matched case–control study and the remainder were cross-sectional. Most studies were conducted in the hospital setting (n = 4) or in facilities for older people (n = 4). In all studies polypharmacy was associated with an increased risk of falls. In the matched case–control study, the use of ten or more medications was associated with almost a two-fold increase in risk (adjusted OR 1.76, 95% CI 1.66–1.88). The risk of falls increases with the number

and dose of anticholinergic and sedative medications. In four interventional studies, a deprescribing process led to a significant reduction in the risk of falls ($p < 0.01$).
Conclusion: This review reinforces the need of raising awareness amidst pharmacists about polypharmacy and the risk of falling in older people. Tools such as Beers criteria and STOPP/START can aid pharmacists conducting medication reviews in this group to flag up drugs which are candidates for gradual withdrawal. Deprescribing these drugs may have additional benefits on the cognitive function of older people.

HP-PC020: Medication errors facing the hospitalized cardiovascular disease patients

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Background and Objective: Cardiovascular diseases rank the first cause of death globally. Co-existence of other diseases in cardiovascular disease patients requires the use of other medicines. The combined use of these drugs increases the risk of medication errors. The aim of this study is to assess the medication profile and identify any medication errors during the hospitalization period of the patients at the cardiology ward.
Setting and Method: The study was conducted on 65 consecutive patients admitted to the cardiology department of a state's hospital. All data were obtained from electronic patient records and patient files. The interactions were checked using 'Micromedex' drug interaction tool.
Main outcome measures: The rate of prescriptions with various types of medication errors.
Results: The mean (SD) age of the patients was 60.22 (15.24) years; 68% were male. Mean length of hospital stay was 3.1 days. Mean number of drugs prescribed on each order was 7.49. Majority (69%) of the patients had atherosclerotic cardiovascular disease. Half of the patients had hypertension and 23% had diabetes. Almost all (97%) of the patients received medical treatment, 63% underwent coronary angiography and 45% underwent percutaneous coronary intervention with stent implantation. Forty-three percent of the prescriptions contained high-risk medications. When the discharge prescriptions of the patients with atherosclerotic cardiovascular diseases were examined, it was seen that aspirin was prescribed in 96%, clopidogrel in 61%, beta-blockers in 85%, ACEIs/ARBs in 78% and statins in 83%. A total of 267 prescriptions were reviewed and 1427 drug–drug interactions were identified: 61% were moderate; 39% were major and 0.21% was contraindicated. There were 26 elderly (> 65 years) patients. The prescriptions of 10 elderly patients had 19 inconsistencies with the STOPP/START criteria (32% for STOPP and 68% for START criteria). The physicians were informed about the medication errors; however, a follow-up of the suggestions was not done.
Conclusion: Medication errors identified for the cardiovascular disease patients were mainly about drug–drug interactions; rate of inconsistencies with the secondary-prevention guidelines and the STOPP/START criteria was not quite high. Our results show that the clinical pharmacist has an important role in identification of medication errors at the cardiology service.

HP-PC021: Drug-related problems identified in hospitalized cancer patients

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Background and Objective: Cancer is one of the major life threatening conditions, which requires aggressive use of highly toxic drugs. Cancer patients are disposed to drug-related problems as they are exposed to many drugs to manage the malignancy and comorbidities, and also supportive care medications. The objective of this study was to identify any drug-related problems in these patients and assess the outcomes of interventions made by a clinical pharmacist.
Setting and Method: This prospective study was carried out on 137 cancer patients aged > 18 years, who were hospitalized at the oncology ward of a university-affiliated state hospital. A comprehensive medication review program was carried out from admission to discharge or demise. Identified drug-related problems were recorded based on the PCNE classification of drug-related problems. The recommendations for the resolution of the problems were communicated to the physician.
Main outcome measures: The rate and type of drug-related problems and the acceptance rate of the recommendations of the pharmacist by the physician.
Results: Of the 481 drug-related problems 24.7% were manifest problems. The most prevalent drug-related problems were "(non-allergic) adverse drug events (n = 376)", followed by "untreated indications (n = 59)" and "unnecessary drug-treatment (n = 25)". "Inappropriate combination of drugs" was the cause of 73.2% of the total problems. In cases of contraindicated drug interactions interventions were made to stop one of the causative drugs rationally, while prescribers were mostly informed about major drug interactions. Forty-six interventions were made to stop drugs and 95.6% of them were approved by prescribers. New drugs were started in 55 patients but prescribers did not accept 11 recommendations while one patient rejected a recommended medication. Prescribers approved 93% of the total interventions. Vast majority (90.9%) of problems were totally solved.
Conclusion: Integration of clinical pharmacy services in oncology will help reduce drug-related problems in patients and improve therapeutic outcomes.

HP-PC022: Drug-drug interactions among hospitalized cancer patients

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Background and Objective: Drug interactions have the consequences of changing drug effects, increasing side effects, decreasing or increasing drug effects. Many drugs including chemotherapy medications, supportive care medications and medications for comorbidities are commonly used in cancer patients. As different classes of medications are used concurrently, drug–drug interactions are thus expected. The objective of this study was to identify possible interactions among medications used by cancer patients.
Setting and Method: This study was carried out on 137 adult cancer patients, who were hospitalized at the oncology ward of a university-affiliated state hospital. Medications of the patients were checked first on admission and subsequently with every change in the medication order. Drug interactions were checked using the online Micromedex drug interaction checker.

Main outcome measures: Rate and type of possible drug–drug interactions.
Results: Medication orders (n = 441) were checked for drug interactions. A total of 1247 interactions were found in 338 patient orders entailing 22 (1.9%) contraindications, 750 (60.1%) major, 436 (35%) moderate and 38 (3%) minor interactions. There was an average of 3.69 interactions per order. Antiemetics and analgesics were the drug groups most frequently involved in drug interactions. Metoclopramide was involved in 6 different contraindicated interactions in 13 medication orders. The most common major interactions were recorded between metoclopramide-tramadol (n = 132), granisetron-tramadol (n = 98), fentanyl-tramadol (n = 50), morphine-tramadol (n = 34) and fentanyl-granisetron (n = 30).
Conclusion: Drug interactions are frequent among medications commonly used in cancer patients. Clinical pharmacist would have a positive input in assessment and prevention of drug interactions for the cancer patients receiving complex treatment for cancer, comorbidities and supportive care.

HP-PC023: Evaluation of G-CSF (granulocyte colony stimulating factor) use in oncology outpatient clinic by the PRS (patient risk score) assessment

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Background and Objective: Febrile neutropenia (FN) is a life-threatening complication of myelosuppressive treatment which may require hospitalisation and result in cessation of planned chemotherapy in patients with cancer. The use of granulocyte colony-stimulating factor (G-CSF) can reduce the severity and duration of febrile neutropenia; therefore, G-CSF initiation for primary prophylaxis is recommended in patients receiving chemotherapy protocols that have ≥ 20% risk of developing FN. The risk factors should be assessed individually in patients receiving chemotherapy protocols where the risk is between 10 and 20%. Aim of this study was to evaluate the G-CSF use by the PRS assessment in patients receiving chemotherapy protocols that have 10–20% risk of development of FN.
Setting and Method: The study was a cross-sectional and conducted in the Hacettepe University Oncology Hospital outpatient clinics during April-June 2017. The patients aged ≥ 18 years, receive chemotherapy protocols which has the risk of developing FN is 10–20% and planning to be initiated the use of G-CSF were included. The patients were also evaluated by a pharmacist using PRS (score ranges 0–11; PRS ≥ 3 indicates high risk of developing FN)[1].
Main outcome measures: To evaluate G-CSF use in patients according to the risk factors by using PRS.
Results: During the study period, 40 patients (40% female) were evaluated by a clinical pharmacist. The mean (± standard deviation) age was 56.85 (± 12.96) years, 14 (35%) patients received FOLFIRINOX and 8 (20%) patients received FOLFIRINOX-Bevacizumab protocols. Filgrastim and lenograstim were initiated in 27 (57.5%) and 17 (42.5%) patients, respectively. Among those, 26 (65%) patients used G-CSF for primary prophylaxis and 14 (35%) for secondary prophylaxis. The mean (± standard deviation) duration of G-CSF use was 4.35 (± 0.92) days. Although a low risk of development of FN (PRS < 3) was evaluated for 15 (37.5%) patients who received chemotherapy protocols are considered as 10–20%, G-CSF treatment is also initiated.
Conclusion: Cancer treatment requires individual assessment and multidisciplinary approach for monitoring of patients. Although the risk of febrile neutropenia can be estimated before initiation of chemotherapies, risks for complications should be assessed on each treatment cycles. Therefore, an evaluation of risk factors in cancer patients by an involvement of pharmacist may provide individualised monitoring for patients and create collaborative care opportunities in cancer treatment.

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HP-PC024: Drug related problems in patients on oncology wards

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Background and Objective: Clinical pharmacy aims to improve patient's treatment outcomes and quality of life by informing patients and identifying drug related problems during drug therapy. Studies regarding the role of clinical pharmacist are limited in Turkey. Therefore, aim of this study was to emphasize the role of clinical pharmacist in determination and prevention of drug related problems (DRPs) in a university hospital oncology services.
Setting and Method: In this prospective and cross-sectional study, the patients who are aged over 18 years and hospitalized in the Hacettepe University Oncology Hospital during October-December 2016 were included. The clinical pharmacist evaluated patients' orders by attending weekly visits with doctors. DRPs, recommendations for the problems and the acceptance rate of recommendations were recorded. Drug related problems were classified according to the Pharmaceutical Care Network Europe (PCNE) version-8.
Main outcome measures: To evaluate the contribution of the clinical pharmacist by identifying drug-related problems in oncology services.
Results: A total of 44 patients and 299 drugs were assessed by the clinical pharmacist in this study. Twenty patients (45.5%) were female, the mean age (± standard deviation) was 58.3 ± 12.03 years, the number of drugs used per patient was 6.79 and the number of identified problems per patient was 0.68. The mean (± standard deviation) duration of hospitalization was 12 ± 2.7 days. A total of 30 DRPs were identified by the clinical pharmacist and these (n; %) were untreated indications/symptoms (13; 43.4%), effect of drug treatment not optimal (10; 33.3%) adverse drug event occurring (6; 20%) and drug interaction (1; 3.3%). Majority of the recommendations (28; 93.3%) were accepted by the doctors and necessary changes were made during the treatment of patients.
Conclusion: Emerged supportive care issues (pain, nausea and vomiting, nutrition) along with antineoplastic drug treatment result in polypharmacy which also increases the likelihood of developing DRPs in cancer patients. This study showed that the clinical pharmacist's involvement in a multidisciplinary healthcare team create opportunities for pharmacists in detection and management of DRPs and maintain collaborative care in cancer treatment.

HP-PC025: Management of lipid-lowering therapy in PCSK9 inhibitors-treated patients

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Background and Objective: Medication review is an ongoing process to avoid polypharmacy and drug-related problems.
Recently approved PCSKi have been shown to be highly effective in reducing LDL-C levels in patients who did not achieve therapeutic goals with their optimized lipid-lowering therapy. There are not recommendations about how to manage lipid-lowering therapy (statins or ezetimibe) when optimum LDL-C levels have been reached with PCSK9i treatment.

The objective of this study is to examine the management of lipid-lowering therapy in our patients from the beginning of the PCSK9i treatment.
Design: We included all adult patients on PCSK9i treatment from 01/03/2016 to 15/03/2017, who had been treated with at least one hypolipaemiant drug before PCSK9i. We excluded those patients who were statin intolerants or on whom information was not available. We retrospectively recorded demographic data, LDL-C levels and concomitant therapy on weeks 0, 12 and 24.
Results:

- 15 patients were included.
- 6/15 patients modified their lipid-lowering therapy during the 24 first weeks of treatment with PCSK9i: 3/6 reduced statin dose, 2/6 stopped treatment with ezetimibe and one patient stopped treatment with statin and ezetimibe although clinician wanted to maintain both (this patient is not further analysed).
- Regarding statin therapy modifications,
- One patient reduced his dose of rosuvastatin to 20 mg once he achieved LDL-C levels under 70 mg/dL (65% reduction) on week 24.
- One patient reduced his dose of rosuvastatin to 20 mg once he achieved LDL-C levels under 70 mg/dL (52% reduction) on week 12.
- One patient reached LDL-C under 20 mg/dL levels (92% reduction) on week 24 so his dose of rosuvastatin was decreased to 20 mg and alirocumab's dose was reduced to 75 mg/2 weeks.
- Regarding ezetimibe deprescriptions, it was stopped in two patients who underwent a reduction in LDL-C of 91% (LDL-C levels < 20 mg/dL) and 63% (LDL-C levels < 70 mg/dL) on week 12.
- Concomitant lipid-lowering therapy was not modified in 9/15 patients. On week 12, 2/9 patients had LDL-C levels > 100 mg/dL, 3/9 had LDL-C levels between 70 and 100 mg/dL and 4/9 had LDL-C levels between 20 and 70 mg/dL. 7/9 patients were on high intensity statins and ezetimibe treatment.

Conclusion: Conventional lipid-lowering therapy was modified in 6/15 patients. No common pattern was found in the management of concomitant medication, being different in similar clinical situations and being dependent on the prescriber criteria. Recommendations about management of conventional lipid-lowering therapy when starting PCSK9i treatment are needed.

HP-PC026: Evaluation of oral anticancer prescriptions into computerized physician order entry system

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Background and Objective: Computerized physician order entry (CPOE) improves medication safety for inpatients. Two software need to be used in our institution : Chimio® (anticancer agents exclusively) and Pharma® (all other medications). Pharma® allows an automatically drug–drug interactions (DDI) analysis with Theriaque® database. Sometimes, oral anticancer agents (OAA) are exclusively recorded on the electronic medical record (EMR) and not in CPOE. This high-risk situation did not allow the detection of DDI between OAA and other medications. The purpose of this retrospective study is to quantify missing prescriptions of OAA.
Design: Between January 1 and July 31, 2016, we collected OAA medication from EMR of multidisciplinary oncology and therapeutic innovations (MOTI) inpatients. Then, we search for prescription in Pharma®- or Chimio®-CPOE. If OAA were not prescribed or if they were prescribed on Chimio® only (because the two software are not connected) we performed a DDI analysis using Theriaque® database and the summary of product characteristics (SPC) of OAA. The DDI were classified in four divisions : to take into account (TTIA), precautions for use (PU), disadvised associations (DA), contraindications to use (CIU).
Results: For the 490 EMR consulted, we identified 78 patients treated with OAA. Treatment was concomitant with hospitalization for 36 inpatients with 49 Pharma®-prescription. Targeted cancer therapies were the most common. Only 1 Pharma®-CPOE (2.0%) and 16 Chimio®-CPOE (32.7%) included OAA. The retrospective DDI analysis performed for the 48 Pharma® prescriptions with missing OAA found 12 known DDI (2 DA, 10 TTIA) and 15 potential DDI which were not been detected with Theriaque® database. Finally, 51% of prescriptions contained at least one DDI.
Conclusion: This study exposes the wide prevalence of OAA in cancer therapy nowadays (15.9% of inpatients) and their significant implication in interactions with other medications. Moreover, we notified 65.3% cases where the OAA was not part of CPOE : these situations made us miss 27 DDI among the 48 CPOE. With 55.6% of undetected interactions, the Theriaque® database appears to be an insufficient knowledge. Pharmacists can contribute substantially to risk minimization by adding specific drug-related knowledge, but improvement action requires a strong mobilization of all actors for patient care.

HP-PC027: Relevance of temocillin use in a French University Hospital

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Background and Objective: Temocillin remains active against enterobacteriaceae producing an extended-spectrum beta-lactamase (ESBL), which avoids the use of carbapenem. Considered by French authorities as a "critical" antibiotic, generating bacterial resistance, temocillin is under specific measures of prescription and dispensation. The aim of this study is to determine if the use of temocillin for inpatients is relevant.
Design: All patients treated with temocillin during 2016 have been included. The data collected from medical records have been compared to the legal notices and the local recommendations.
Results: 25 patients (19 male, 6 female, mean age 66), received 27 courses of temocillin in departments of Infectious Diseases, Nephrology and Internal Medicine. All indications were conform with the Marketing Authorization, while only 56% respected the more restricted local recommendations that place temocillin for the treatment of urinary tract infections (96% of treatments), documented with multiresistant enterobacteria (100% of treatments, including E.coli, K.pneumoniae and E.cloacae, all producing ESBL) and in contraindication or resistance to cotrimoxazole (85%), and fluoroquinolones (92%) and piperacillin-tazobactam (59%). When an alternative existed, the prescription of temocillin was maintained on the advice of an infectious disease specialist in 6 cases and/or in the perspective of ambulatory care in 5 cases. Carbapenems were

switched by temocillin in 6 cases. Its role in saving carbapenems or in de-escalation is respected since imipenem remains a viable alternative in 78% of cases. However, the cost of treatment is 20 times more expensive than with carbapenems. The recommended dosage in the legal mentions was followed in 81% of cases for an average duration of treatment of 13.4 days.
Conclusion: Local recommendations help to improve the use of temocillin and spare the use of carbapenems. Prescriptions of temocillin are in accordance with the marketing authorization of the product. A better match between local recommendations and hospital practice is being assessed.

HP-PC028: A difficult tacrolimus dose and galenic formulation adaptation in a liver transplant patient with total gastrectomy

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Background and Objective: After liver transplantation, prevention of graft rejection is based on the immunosuppressants drugs (IS) ad vitam. Classically, the association of a calcineurin inhibitor (most often tacrolimus), mycophenolate mofetil and corticosteroids is prescribed. The dosage adjustment of tacrolimus is performed pharmacologically as well as clinically. In the postoperative period, residual tacrolemia (t_0) should be between 6 and 10 ng/ml. t_0 is measured in the fasting patient just before taking tacrolimus. Similarly, the occurrence of adverse effects such as tremors, renal failure or hyperkalaemia may lead to a reduction in the dose of tacrolimus.
Design: A 74 kg patient with previous history of total gastrectomy underwent a liver transplantation on April 24, 2017 (Day 1). At day 2, treatment with tacrolimus immediate release (LI)/MMF was initiated.
Results: Despite daily increase in tacrolimus doses, tacrolemia remained steady below the target, around 3 ng/ml. A decrease in the bioavailability of tacrolimus LI was suspected due to total gastrectomy. A switch to tacrolimus sustained release was decided according to clinical pharmacist counselling. The sustained release form, by increasing contact time in the gastrointestinal tract, may facilitate the absorption of tacrolimus. A gradual increase in tacrolimus sustained release form to 24 mg/d (0.3 mg/kg) resulted in a t_0 at 5.1 ng/mL on day 30. Although this t_0 was low, a complete kinetics of tacrolemia showed a normally exposure to tacrolimus. Moreover, t_0 continued to increase to 7.8 ng/L on day 39 with the same doses of tacrolimus. Despite an improvement in the liver tests and clinical status, a 5.9 mM serum potassium level appeared, demonstrating a potential overdose of tacrolimus. Toxicity is all the more worrying as this dosage is 1.5 times higher than the usual dosage (0.1–0.2 mg/kg). A decrease to 20 mg/d was thus decided, leading to a reduction in tacrolemia to 5.4 ng/mL and serum potassium to 4.8 mmol/L.
Conclusion: A switch from tacrolimus to LI to a sustained release form yielded an optimal t_0. Although a high dosage was required, it was relatively well tolerated and resulted in improved liver tests.

HP-PC029: Review and adequacy of institutionalized patients medication through collaboration between pharmacists of nursing homes and hospitals

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Background and Objective: To review patients' medications with renal failure (RF) and/or swallowing dysfunction and to determine if dosage adjustment is necessary and/or if the dosage form is appropriate.
Setting and Method: The Nursing home unit proposes a one-month collaboration between internal resident pharmacists and pharmacists from nursing home. The population of this centres is usually older than 65 years, pluripathological and polymedicated. Some patients have special situations that may require modification of drugs doses or changes in the dosage form.
We selected those patients who had any type of catheter for the administration of food and/or medication or swallowing problems and those with RF and recent blood test to estimate the renal clearance. Information sources: the prescribing computer program of the Nursing centre, the patient's medical history, the summary of products characteristics and the Catheter Guidelines for the administration of medicines are used. The creatinine clearance estimation was done with the Cockcroft-Gault formula.
Main outcome measures: -
Results: Of the 270 residents, 92 were part of the study: 41 with RF diagnosis and 51 with medication pulverized (MP). We made a total of 43 change proposals: 29 in RF and 14 in MP. RF proposals: 4 cases because of severe adverse effects risk and the remainder because of blood accumulation drug risk. MP proposals: 2 cases because of irritation and/or oropharyngeal ulceration risk and the remainder were due to inefficacy of the modified release dosage form when administered in the pulverized form. At the moment that the internal resident pharmacists finish the rotation in the Nursing centre 1 proposal in RF and 10 proposals in MP have been accepted.
Conclusion: This experience has shown the importance of a pharmacist periodically identifying these and other situations that can occur in a Nursing centre, helping to improve the quality of care received by these patients.
Although the number of total proposals may seem high, it is explained because several patients had more than one proposal. As for the number of proposals accepted, it is logical that those referred to MP are easier to implement than those referring to RF (these ones requires more detailed analysis by the medical team). The low number of accepted proposals is due to the fact that they were made the day before the internal resident pharmacists finished the rotation.

HP-PC032: Evaluation of medication review by pharmacist—patient perspective

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Background and Objective: Since 2013 pharmacists have been performing Medication reviews (MR) in the acute medical ward at Bispebjerg Hospital. The MR contains a precise medication list (medication reconciliation) and a critical review of the medication list with suggestions for change in prescriptions for the physicians to act upon.
An important part of this method is a conversation with the patient, which is intended to gain the best possible medication history as well as information on adverse events and adherence to medication regimens.
The aim of this study was to evaluate how the patients experience the conversation with the pharmacist.

Setting and Method: During 2 weeks in March 2017, two pharmacist students conducted a survey where they asked 21 patients, currently admitted to the acute medical ward, how they had experienced the conversation with the pharmacist. This was done by a questionnaire containing ten questions, where the pharmacist students wrote down the patients' answers. This was done to insure that patients who would have been too fragile to answer a questionnaire them self was not excluded from the study.
Main outcome measures:
Results:

- 100% of the patients felt that the pharmacist listened to them.
- 95% of patients would like the opportunity to talk to a pharmacist about their medication if they were to be hospitalized again.
- 34% of patients gave more information about their use of medicines to the pharmacist, than they would otherwise have told a nurse or a physician.
- 25% of the patients said that they had become more aware of taking their medicine in a more appropriate way after the conversation with the pharmacist.
- Overall, patients described that the conversation with the pharmacist created a greater peace of mind about their use of medicines.

Conclusion: The conversation between the pharmacist and the patient ensures that the patients optimize their use of medicines, resulting in greater peace of mind. The conversation also reveals information about the patients' use of medicines, that the patients would not otherwise have told a nurse or a physician, thus ensures the best possible medication history.

HP-PC033: Could dexrazoxane be used to treat extravasations of liposomal anthracyclines?

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Background and Objective: The extravasation of chemotherapeutic agents is a challenge for oncologic care teams. The management of non-liposomal (conventional) anthracyclines is well-established in clinical practice guidelines, including general measures and specific antidotes, such as dexrazoxane. However, there is little scientific evidence on the management of liposomal and pegylated liposomal anthracyclines. The aim of this paper was to review the scientific literature on the extravasation of liposomal and pegylated liposomal anthracyclines and determine the clinical impact of this type of extravasation, focusing on dexrazoxane.
Setting and Method: A bibliographic search was conducted using the Pubmed database through the following keywords: liposomal anthracycline extravasation, pegylated liposomal anthracycline extravasation, and liposomal doxorubicin extravasation as keywords, respectively. Inclusion criteria were: publication in English and human study with data on clinical cases, i.e., case reports, case series and clinical trials. No time limit was applied. Exclusion criteria were: congress abstracts and studies/reports of non-liposomal anthracycline extravasation.
Main outcome measures: Identified articles, included patients, patients treated with dexrazoxane and outcomes.
Results: Based on the search equations, 22 articles were identified. After eliminating duplications and studies not using dexrazoxane, only 7 articles were analysed. They reported on a total of 17 patients. No clinical trials or reviews were traced, only case series and case reports. Seven articles met the study eligibility criteria and included seventeen cases. Extravasation occurred with three drugs: liposomal doxorubicin in nine patients (53%), liposomal daunorubicin in four (23.5%), and pegylated liposomal doxorubicin in four (23.5%). General measures for extravasations were applied in all patients, but only three received dexrazoxane. All cases were completely resolved at 2–3 months except for one patient in whom dexrazoxane was not used.
Conclusion: The pharmacokinetic profiles of liposomal and pegylated liposomal anthracyclines differ from those of conventional anthracyclines, modifying their effectiveness and safety. General measures may be inadequate to heal areas affected by extravasation, which may require dexrazoxane administration. However, each case should be individually evaluated for the administration of dexrazoxane in off-label use until scientific evidence is available on its effectiveness and safety as antidote for these formulations of anthracyclines.

HP-PC034: Extravasation of taxanes: an updated protocol

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Background and Objective: Extravasation is the leakage or accidental infiltration of intravenous drugs into the surrounding tissues from the vein. Taxanes can lead to an immediate inflammatory painful reaction and with some of them may result in local tissue destruction (necrosis) and other complications. Many articles have been published describing algorithms to manage taxane extravasations. However, the scarcity of evidence makes difficult to develop an optimal management scheme. The aim of this study was to develop a protocol to manage taxoids extravasations including general measures and antidotes.
Setting and Method: A bibliographic review was developed using the Pubmed search tool. Three searches were conducted using "cytostatic extravasation", "taxoids extravasations" and "extravasations treatments" as keywords respectively. No time limit was applied. Only articles in English or Spanish were included. Human filter was applied.
Main outcome measures: General measures and antidotes.
Results: The first action is to explain to the patient the suspect of extravasation and the procedures for dealing with it in order to get his co-operation. Inform both patient's medical team and senior nursing staff. Take extravasation kit. Secondly, stop the injection/infusion immediately leaving the cannula in place and aspirate as much of the drug as possible from the injection site using a syringe in the cannula., after that remove the cannula. Thereafter, mark the extravasated area, make a photograph and note the amount, concentration and extravasated drug. Apply dry cold compresses for 20–30 min at a time, 4 times a day for the first 24–48 h following extravasation. According published articles, administer hyaluronidase only in case of paclitaxel extravasation. The dose of hyaluronidase recommended in bibliography is 1500UI diluted in 3 ml of NaCl 0.9%, prepare 6 injections of 0,5 ml and give subcutaneously in and around the extravasation site. Offer patient appropriate analgesia. Do not cover with banding and continue to observe hourly for 24 h.
Conclusion: The development of algorithms for management of chemotherapy extravasation, which allow a quick and effective intervention, is absolutely crucial for oncological care teams. Pharmacists can play an important role providing the suitable kit of extravasation containing the protocols updated for all type of chemotherapeutic drugs extravasations.

HP-PC035: The role of a pharmacist at trauma intensive care unit

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Background and Objective: Many studies have proved that interventions of pharmacists could decrease adverse events related to medication, prescription errors, mechanical ventilation time and, more in general, improve the performance of emergency and critical care services in order to provide the highest cares for patients. The aim of this study was describe the role of a hospital pharmacist at trauma intensive care unit.
Setting and Method: Descriptive study of the role of a pharmacist working at trauma intensive care unit for 2 months from September 2016 to November 2016.
Main outcome measures: Admitted patients (AP), medical prescriptions (MP), pharmaceutical interventions (FI) and level of acceptance. The collected variables were classified into different areas of knowledge except for stock management and knowledge management.
Results: Total of AP: 122. Total of FI: 82. Attended queries: 25. FI/AP = 0.67:
The daily work included 6 areas of knowledge.

- Nutrition. MP: 30. Nutritional IF: 21 (70%). Types of nutritional IF: nutritional assessments (3), pharmaceutical advice for nutritional prescriptions (12), dose adjustment of enteral nutrition (3) and enteral nutrition exchanges (3). Level of acceptance: 100%.
- Pharmacokinetics. Vancomycin prescriptions: 4. Monitoring of serum levels of vancomycin: 3. Types of IF: discontinuation of vancomycin prescription because of vancomycin high serum levels (3), dose adjustment (8). Level of acceptance: 100%.
- Pharmacotherapy. Ratio of MP checked by pharmacist: 108/122 (88%). IF: 45. Types of IF: dose adjustment, because of renal impairment (22%), missing medicine (25%), unsuitable pharmaceutical form (11%), incorrect dose (10%), inappropriate dose scheme (7%), others (25%). Level of acceptance: 90%.
- Medication reconciliation at hospital admission. Reconciliation was only done on demand by the pharmacist as medical team asked it. Ratio of reconciliation: 5/122. Level of acceptance: 100%.
- Stock management. Management of high-cost medicine not included in hospital medicine guideline: 1.
- Knowledge management. Several clinical sessions were given to medical and nurse teams about electronic medical prescription and artificial nutrition. Level of acceptance: 85%.

Conclusion: The high level of acceptance of pharmaceutical interventions registered in this work represents the real value of a pharmacist working at so special care unit as a trauma intensive care unit is. To enroll pharmacist as one more piece of intensive care units could be a key event to develop at near future in Europe, particularly in Spain, to get a more complete medical care for critical ill patients.

HP-PC036: Intervention fidelity within a randomised controlled trial on comprehensive medication reviews in hospitalised patients

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Background and Objective: MedBridge, a multicentre cluster-randomised cross-over trial aims to study the effects of multiprofessional medication reviews including active follow-up after hospital discharge on elderly patients´ healthcare consumption. Intervention fidelity, the extent to which a study intervention is delivered as intended, is essential in order to draw solid conclusions about an intervention's effect on study outcomes. The objective of this research project was to investigate the intervention fidelity within the first study period of MedBridge, specifically addressing intervention delivery and study protocol adherence.
Setting and Method: Data was collected concurrently with the first (out of six) eight-week study period of the MedBridge study in Uppsala University Hospital and Gävle Hospital. Patient characteristics and data for the main outcome measures were extracted from the patients' electronic medical record including clinical pharmacist notes.
Main outcome measures: Intervention delivery: The number of identified medication discrepancies, drug-related problems (DRPs) and the correction rates of the discrepancies and the acceptance rates of pharmacist proposals.
Protocol adherence: The number and proportion of patients receiving each intervention component.
Results: Intervention delivery: In total 75 medication reviews were analysed. A mean of 1.8 ± 3.0 and 2.2 ± 2.3 discrepancies/patient were identified in Uppsala and Gävle respectively. The correction rates were 92 and 88%. A mean of 3.0 ± 2.8 DRPs/patient was detected in Uppsala and 1.4 ± 1.5 DRPs/patient in Gävle. The acceptance rate of pharmacist proposals was 75 and 64%.
Protocol adherence: All eligible patients (43/43) in the control group and 95% (42/44) in the intervention group were asked for informed consent. Medication reconciliation upon admission and comprehensive medication review were performed in 97% of all the intervention patients, whereas 46% received a reconciliation upon discharge. Seventy-two percent of the patients received the first follow-up-call, with only 26% within the predefined 2–7 days after discharge.
Conclusion: This study shows a high overall intervention fidelity in the first period of the MedBridge study. Improvement measures should focus on intervention components surrounding hospital discharge.

HP-PC037: Impact of antibiotic prophylaxis guidelines in orthopaedic surgery: a retrospective multi-centre study

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Background and Objective: Antibiotic prophylaxis in orthopaedic surgery is known to be effective for preventing postoperative infections, hospital stay and costs. In 2008, local guidelines on antibiotic prophylaxis in surgery were published as a result of a Pharmacovigilance work group which involved 7 hospitals in the Lombardy Region. However, guidelines give general indications and the implementation into clinical practice is not always efficient. The objective of the study was to evaluate the impact of the introduction of local guidelines on antibiotic prophylaxis in elective orthopaedic surgery 7 years after implementation.
Setting and Method: A multi-centre retrospective study was conducted involving three centres which had implemented the guideline in 2008 and were still in use. Medical records of patients undergoing orthopaedic surgery in 2006 and 2015 were reviewed collecting data about patients, surgeries, postoperative infections, antibiotics. Data, collected from medical records, were transferred to a specifically designed database application in FileMaker Pro. Statistical analysis

was performed by using SPSS and R. Comparisons were analysed using Chi square tests, multivariable logistic regression and analysis of variance. The effect estimate was reported in risk ratio (RR) and pooled using a random effects model.
Main outcome measures: Adherence to the local guideline.
Results: A total of 791 patients who underwent elective orthopaedic procedures (elective surgery without implant, arthroplasty and closed fracture fixation) were analysed: 399 procedures for the pre-2008 guideline period and 392 surgeries for the post-2008 guideline period. "Adequate" antibiotic prophylaxis did not substantially change in this ward after the implementation of the guideline (RR 1.01; 95% CI 0.92–1.11, $p = 0.830$). Variable results were observed in terms of "adequate" antibiotic prophylaxis in the 3 different centres. The distribution of the "inadequate" prophylaxis was greater when antibiotic prophylaxis was not required (46.4% for 2006 and 57.5% for 2015) compared to non-administration of antibiotics when required (28.4% for 2006 and 27.6% for 2015).
Conclusion: Our data suggest that despite the introduction of the local guideline on antibiotic prophylaxis in surgery, no substantial improvement was obtained in the use of antibiotics in orthopaedic surgery 7 years after implementation. Defensive medicine was shown to be widely used in clinical practice with the administration of antibiotics when not indicated which can lead to different complications. Therefore, the Hospital Pharmacist should continue training healthcare workers and auditing periodically after the publication of the guideline to improve implementation.

HP-PC038: Clinically relevant drug interactions in heart transplant recipients using complementary therapies

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Background and Objective: Heart transplant recipients (HTxR) have complex medication regimens (MR). CHA (complementary health approaches) are frequently used (46–56%) in other chronic pathologies. Without a clinical evaluation, CHA could increase MR complexity, affect the MR effectiveness and cause further health related problems.
The objective of the study is to determine the frequency of use and types of CHA that are commonly used by such patients, and to evaluate if there are any clinical relevant interactions with HTxR medication regimens.
Design: A prospective observational study was carried out in HTxR $\geq$ 18 years of age, at least 18 months post-transplant surgery. At the time of hospital discharge, patients were advised of potential interactions between CHA and their MR.
The clinical pharmacist conducted a clinical interview during a scheduled visit to collect the necessary information about CHA. They were classified according to the NIH National Centre for Complementary and Integrative Health (NCCIH) directives.
Micromedex®, Lexicomp® and Stockley® were consulted to detect potential interactions between CHA and MR. The multidisciplinary heart transplant team discussed the interactions clinical relevance.
Results: We included 31 patients (p), 22 (71%) were male. The average age was 53.5 ± 11.7 years. Of these recipients, 17 p (54.8%) took some CHA. 32 different CHA were found with an average of 0.74 ± 0.85 CHA per patient.
CHA were classified as herbs 25 (78.1%), homeopathy 6 (18%), vitamins and minerals 5 (15%), probiotics 2 (6.3%) and as other dietary supplements 14 (43.8%).

Reasons given by patients for using CHA were: to stimulate immunological system 6 p (35%), to reduce gastrointestinal symptoms 6 p (35%), to stimulate central system 3 p (17.6%), to reduce anxiety 2 p (12%), to enhance diuresis 1 p (5.9%) and other multiple uses 6 p (35%).
The investigation team considered that 15.6% of CHA-MR interactions were clinically relevant: green tea (increases tacrolimus levels), horse-tail (potential nephrotoxic effect) and echinacea (immunomodulatory effect).
Conclusion: Compared with other chronic pathologies, we found similar CHA percentages in our survey population. More than 50% of HTxR takes some CHA without a prior clinical evaluation.
Although further study with an increased sample is needed, we observe the need for interventions focused on informing patients about risks associated to CHA and to detect and correct potential CHA-drug interactions in order to ensure therapy efficacy and to reduce patients' doubts.

HP-PC039: Implementing medication reconciliation led to decrease the cumulative exposure to sedative and anticholinergic drugs at discharge of elderly hospitalized in an orthopaedic unit

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Background and Objective: Sedative and anticholinergic medications are widely used in older adults. They are associated with adverse clinical outcomes, especially falls that can lead to hospitalization. In the orthopaedic unit, the mobile geriatric multidisciplinary team (MGMT) is consulted to assess clinics of patients over 75. Recently, we have integrated systematic medication reconciliation and medication review to therapeutic recommendations. The aim of our study was to evaluate the impact of this process on in-hospital prescriptions, and exposure to sedative and anticholinergic drugs.
Setting and Method: We recruited patients over 75yo hospitalized in the orthopaedic unit of a 1200-bed University Hospital. After a clinical assessment, medication reconciliation was performed and medication review was implemented to provide therapeutic recommendations. Cumulative exposure to anticholinergic and sedative drugs within the chronic treatment was measured by the drug burden index (DBI). We retrospectively compared recommendations provided by the MGMT, before and after implementation.
Main outcome measures: Inappropriate medication prescriptions (IMP), therapeutic recommendations (number, acceptance rate) and drug burden index (DBI) were assessed.
Results: 58 and 56 patients were recruited before and after implementation, respectively. Demographics were comparable for both groups. After implementation: (1) the number of therapeutic recommendations significantly increased (2.2 ± 1.9 vs. 3.4 ± 2.2 $p < 0.05$), their acceptance rate was comparable (57 ± 43% vs. 62 ± 37%); (2) the DBI of chronic treatment was significantly decreased at discharge (1.09 ± 0.72 vs. 0.81 ± 0.58, $p < 0.01$).
Conclusion: Medication reconciliation ensured the process of medication history and provided a solid basis for medication review. We had a significant impact on cumulative exposure to anticholinergic

and sedative drugs at discharge. Further studies are required to evaluate the long-term clinical impact.

HP-PC040: A systematic literature review on the positive predictive value of clinical decision support

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Background and Objective: Decision support has been shown to have positive effects on patient outcomes. However, the expected safety improvements that clinical decision support should bring could be jeopardized if clinicians override system alerts because of *alert fatigue*.
This systematic review's objective was to assess the clinical relevance of clinical decision support.
Setting and Method: A systematic search of the scientific literature published between February 2009 and March 2015 on computerized provider order entry, clinical decision support systems, and the predictive value associated with alert fatigue, was made using PubMed database. Articles eligible for inclusion were in English, had a full text available, assessed medication, and provided a level of predictive value, sensitivity, or specificity. Articles were excluded if they were: (1) qualitative studies; (2) user-satisfaction or opinion surveys; (3) physician adherence studies; (4) analyses of the impact of human factors.
Main outcome measures: Clinical relevance of clinical decision support had been assessed through their predictive value report in articles or calculated from articles.
Results: Of 928 titles identified, 376 abstracts were eligible for review. Of these, 26 studies qualified for a full text review. Seventeen articles were retained, and from a review of their references, 4 articles were added to the study. The study showed a massive variation in positive predictive values: from 5.8 to 83%, with most results between 20 and 40%. The best results were observed when patients' characteristics, such as co-morbidity or laboratory test results, were taken into account. There was also an important variation in sensitivity, ranging from 38 to 91%.
Conclusion: Efforts should be made to improve the sensitivity and positive predictive value of advanced computerized provider order entry alert systems. The present study highlights that decision support systems must consider as many patient characteristics as possible. Clinical decision support should integrate more information from more varied sources, such as demographic data and data from the pharmacy or the laboratory, in order to reduce false positive alerts and alert fatigue.

HP-PC041: Medication reconciliation in Swiss hospitals : how to make a blockbuster ?

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Background and Objective: Many countries have standardised processes for medication reconciliation (MR) with defined roles for different healthcare professionals. The clinical pharmacist is usually the main actor. However MR is not yet established in Switzerland and resources of clinical pharmacists are weak. Since 2013 we assessed the feasibility of different models of MR in our Service of Internal Medicine to find the best scenarios and actors to guarantee its success.
Design: Our first experience was made within a prospective observational study (LEAR-HF study, November 2013–December 2014) involving 147 patients with confirmed heart failure. The MR was performed upon admission and discharge by the clinical pharmacist. Our second experience was developed within a national pilot program (Progress!, The safety of medication at transition of care, November 2015–October 2016) involving 534 patients in our service. The MR was performed only upon admission and every participating hospital could choose his main actor. We selected the ward physician, trained by a senior physician and a clinical pharmacist.
Results: In the LEAR-HF study, we developed a precise and reproducible method of MR that can identify effectively discrepancies (4.1 discrepancies/patient upon admission and 2.3 upon discharge). Because we had motivated actors (the clinical pharmacist and a specific transition nurse), MR was performed for 76% of patients upon admission and 69% upon discharge. The two main problems in this scenario were the resources (the actors couldn't be engaged for a long term) and the process (time needed, paper tools, coordination). During the pilot program Progress!, we developed an electronic MR tool which made the process clearer, but unfortunately not shorter. The actors were less efficient (57% of patients had a MR upon admission) because they were busier and the staff was often changing, requiring a great work to train and keep them motivated. This scenario seemed compromised without added resources and active participation of other caregivers (i.e. nurses, medical secretaries).
Conclusion: Even though we didn't found the recipe to make a blockbuster, we discovered some tricks. The prerequisite is to have motivated producers (public Health, hospital directorate) and a realistic budget to engage more than one good actor and invest in accessories (i.e. performing computerized tool). Then it might be more successful if it's restricted to a target audience (i.e. high-risk patients) and if the public is involved (patients, ambulatory care).

HP-PC043: Improving patient safety: an analysis of pharmaceutical interventions at discharge

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Background and Objective: Transitions of care are linked with an increased risk of medication errors. In hospital settings, such errors may occur on admission, during inpatient stay or at discharge. For prevention it is important to know what kind of errors and at which point during the hospital stay they occur.
We conducted an observational study in order to record and classify pharmaceutical interventions during medication reconciliation at discharge and to measure their acceptance by physicians.
Setting and Method: All patients being discharged from surgical or medical wards of our regional hospital, who had given their oral consent, were eligible for medication reconciliation by a clinical pharmacist.
Medication reconciliation was performed according to the recommendations of the Swiss Organisation for Patient Safety. When a medication error or a drug-related problem (DRP) was detected, a specific recommendation was made to the responsible physician.

All interventions and their outcomes were documented during one year since March 2016 using a revised version of the codification tool for clinical pharmacists provided by the Swiss Society of Public Health Administration and Hospital Pharmacists (GSASA). For this purpose five main and 25 subcategories of DRPs have been defined.
Main outcome measures: Types of medication errors or DRP.

Results: During 12 months, 1444 pharmaceutical interventions regarding DRPs or medication errors were documented. 359 (25%) interventions were related to errors which occurred on admission; 598 (41%) interventions were related to prescribing errors at discharge; in 440 (31%) cases noncompliance with current medical guidelines was found; in 29 (2%) cases documentation in patients' records was incomplete and in 17 (1%) cases the intervention was related to other issues.

Analysis of the subcategories showed that recording a wrong dosage was the most common error on admission as well as at discharge. Recording a wrong drug name was the second most common issue on admission, while an inaccurate switch to the patient's own medication was the second most common error at discharge.

Of all pharmaceutical interventions, 947 (66%) led to an adjustment of the original prescription. In 97 (7%) cases, detailed advice was given directly to the patient and in 90 (6%) cases, the GP was informed about the DRP in the discharge report. 232 (16%) interventions were not followed up, whereas 70 (5%) were rejected.

Conclusion: Our study confirms the high risk of medication errors at discharge from hospital. Medication reconciliation is an effective way to minimize DRPs at discharge and clinical pharmacists' recommendations are widely considered by prescribers. The collected data, illustrating not only the types of common medication errors, but also the weak spots during the medication process, allowed us to start a focused teaching of the responsible ward physicians, thus increasing patient safety.

HP-PC044: Establishment of an information platform increases spontaneous reporting of adverse drug reactions

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Background and Objective: The pharmacist is responsible for encouraging adverse drug reaction (ADR) reporting. In a local centre in Northern Taiwan, promotion and rewarding of ADR reporting have continued for over 6 years but failed to bring significant changes. This study aims to find a solution to increase ADR reporting.

We hypothesized that under-reporting is due to the inconvenience of the reporting system. Reports were made conventionally through printed sheets. We proposed that reports made per month will increase if they were computerized.

Setting and Method: An ADR reporting platform was established in April 2015, before which was defined as the first stage of this study (January-March, 2015) and after which the second stage. The third stage commenced in November 2015, after adding a reporting module to physicians' prescription system. ADRs could be reported simultaneously when documenting drug allergies.

Main outcome measures: ADR report rates during the three stages of the study were compared. Effects of the information platform on reporting were also analysed.

Results: During the first stage, the number of ADR reports averaged 6 per month. In the second stage, the number of reports per month averaged 1.86. Introducing the information platform had little effect on the monthly number of ADR reports.

The average number of reports each month during the third stage of the study was 11 ± 3.06, with 70.43% made electronically. Reports per month increased significantly after installing the reporting module in November 2015 ($p < 0.001$, t test).

In the first two stages, 29.03% of ADR reports were made by physicians, as compared to 70.42% of cases in the third stage of the study. Increased physician reporting possibly account for these differences.

Conclusion: Adding a reporting module to the prescription system significantly increased ADR reporting. Improved accessibility is likely the cause. An addition of similar modules to computer systems of other healthcare professions may be considered to encourage spontaneous ADR reporting.

HP-PC045: Setting up a clinical pharmacy full process to secure transitions of care in a for-profit health facility: proof by acts

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Background and Objective: In a private clinic performing surgery and medicine activities (140 medical beds, 170 surgical beds), the pharmacy staff consist of 3 full-time pharmacists who offer 20% inpatients at least one pharmaceutical analysis of their computerized prescriptions. Present human resources are insufficient to offer all inpatients a high quality pharmaceutical service. This project aims to evaluate the benefits of clinical pharmacy services in terms of mortality and morbidity. First, we demonstrate feasibility of setting up an efficient clinical pharmacy process in a for-profit health facility, based on multi-professional cooperation, including medication reconciliation at admission, at discharge, and pharmaceutical analysis during hospitalization.

Design: A twelve-month program to implement a clinical pharmacy full process in 80 cardiology beds, representing 4.800 patients per year (patients mean age: 78 years old).

The first step is the recruitment of a full-time pharmacist. Then, an original process has been developed, according to all caregivers:

1. Nurses perform the medication assessment at admission of the patient, relying on several sources of information, including the community pharmacist (CP) if necessary.
2. Hospital pharmacist (HP) conducts medication review at admission and pharmaceutical analysis during hospitalization. He creates a therapeutic summary (TS) document containing his telephone number and various information concerning the patient and his stay: age, height, weight, glomerular filtration rate, reason for hospitalization, treatment at admission, therapeutic changes and reasons for these changes. Finally, this document may contain instructions for the further management of the patient.
3. Cardiologist may modify the document just before the patient discharge and then sign it.
4. Cardiology secretariat sends the document to the general practitioner annexed to the discharge letter and nurses give a copy to the patient for the CP, attached to the order.

Results: 6 months later, all inpatients benefit from medication review and pharmaceutical analysis. At least one pharmaceutical intervention was formulated for about 20% of patients (acceptance rate: 85%). Over 95% of patients leave the clinic with the TS document co-signed by both pharmacist and cardiologist. Significate medication errors are intercepted by CPs for approximately 5% of outgoing patients.

Conclusion: The feasibility of setting up an efficient clinical pharmacy full process in a for-profit health facility is confirmed. The recruitment of a HP contributes, for nearly 5000 patients per year, to maintain a safe environment for medication and to assist prescribers in the continuity of treatment between home and hospital. Analysis of medico-economic indicators will contribute to improve clinical pharmacy as a cost-effectiveness activity in order to make it sustainable.

HP-PC046: Drug-drug interactions in different electronic health record systems: an international comparison

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Background and Objective: Drug-drug interactions (DDIs) have the potential to cause serious harm. Electronic health record (EHR) systems with integrated decision support can alert physicians to potentially dangerous DDIs during the prescribing process. However, these alert warnings are often overridden by prescribers, with override rates in excess of 80%. Previous studies have identified 15 *high-priority* DDIs which should always generate warnings in all EHRs; 33 *low-priority* DDIs have also been identified that do not merit interruptive alerting. The objective of this study was to investigate whether alert warnings for the high-priority and low-priority DDIs existed in five different international EHRs, compare the severity level assigned to them, and establish the rate at which they were overridden.
Setting and Method: This was a comparative, retrospective, multinational study of five EHRs across a range of countries including the United States, United Kingdom, Republic of Korea and Belgium.
Main outcome measures: Inclusion, severity level, and override rate of DDIs.
Results: Of those previously defined 15 high-priority DDIs, alert warnings were found to exist for 11 in the Korean and UK systems, 9 in the Belgian system, and all 15 in the US systems. Of 742 individual drug–drug combinations included in those 15 class–class interactions, 619 (83.4%) were included in the Belgian system, 462 (62.3%) in the US inpatient and 441 (59.4%) in the US outpatient system, 212 (28.6%) in the UK system, and 53 (7.1%) in the Korean system. Alert warnings were active for all DDI combinations in the US and Korean EHRs, but only 8.4 and 52.4% in the Belgian and UK EHRs, respectively. The override rates for high-priority alerts requiring provider action ranged from 56.7 to 85.6%. Of those 33 previously defined low-priority DDIs, active alerts existed only in the US systems and the majority were non-interruptive. The inpatient and outpatient US systems generated 38 and 237 interruptive alerts, with override rates of 57.9 and 66.7%, respectively. The UK and Korean systems alerted on none of the 33 low-priority DDIs, the Belgian system included 24 inactive low-priority DDI alerts.
Conclusion: Alert warnings existed for the majority of high-priority DDIs in the different EHRs although it was easy to override some of the most severe interactions in most systems. Alerts were delivered for only a few low-priority DDIs. This study highlights a lack of consistency in how DDIs are configured in different knowledge bases. Future efforts should concentrate on enforcing an international standard for high risk DDIs and implementing strategies to minimize overriding of severe drug interaction alerts while balancing over- and under-alerting.

HP-PC047: Diabetic patients admitted in a cardiology ward: what place for clinical pharmacists to improve patients' care?

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Background and Objective: Diabetes is a frequent disease inducing severe complications such as myocardial infarction, stroke and chronic renal failure. Hospitalization is usually the right time to reevaluate complex and chronic conditions. However, for diabetic patients admitted in a cardiology ward, diabetes care may not be the first priority, and a multidisciplinary care, including clinical pharmacists, could improve diabetics' care. The aim of this study was to evaluate current practices of care for these patients and if improvements can be envisioned, in order to implement a clinical pharmacist in a cardiology ward.
Setting and Method: This prospective study was approved by an ethics committee. Patients were included during 4 weeks (January 2017). All patients treated with an antidiabetic drug (all routes) for type 2 diabetes and hospitalized in the cardiology department for $\geq$ 24 h were included. Patients admitted for a coronary angiography were not included. Variables collected were demographic characteristics, emergency hospitalization, cause of admission, prescribed antidiabetic treatment and relevant biological values (glycaemia, HbA1c, serum creatinine level, LDL-cholesterol).
Main outcome measures: Primary outcome was respect of the American Diabetes Association (ADA) guidelines for hospitalized diabetic patients: fasting blood glucose and HbA1c at admission, prescription of an adapted insulinotherapy using established protocols if hyperglycaemia $\geq$ 180 mg/dL. Secondary outcomes were: analysis of counter-indications for oral antidiabetic drugs, patients' adherence (0–5 score) and treatment understanding (0–100% score).
Results: Among 48 patients admitted in cardiology during the period, 26 were included (54%). Mean age of included patients was 74 years (75% of men). Thirty-five percent were emergency hospitalizations. At-home treatments were insulinotherapy (58%), and other antidiabetic drugs (61%). Concerning respect of the ADA guidelines: fasting blood glucose was performed in 77%, HbA1c in 50% (mean 8.0%, standard deviation (SD) 1.6%). Insulin therapy was prescribed in 50% of patients with glycaemia $\geq$ 180 mg/dL. Two counter-indications were found (metformin and renal failure). Mean adherence score was 3.4 and understanding score 52%.
Conclusion: This study showed that ADA guidelines were not always followed, especially for HbA1c measurement. In this context, a study evaluating the impact of a clinical pharmacist implementation in a cardiology department on these patients' care is being conducted. Clinical pharmacy activities developed are: admission and discharge medication reconciliation, prescription review and risk factors measurement reminders.

HP-PC048: For the patient's sake—process and effort evaluation for medication reconciliation implementation in a tertiary care hospital

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Background and Objective: Provision of Medication Reconciliation (MedRec) at hospital admission according to current standards is

crucial to ensure safe patient transitions.[1] Benefits of MedRec have widely been reported.[2] The study aim was to conduct a feasibility study to evaluate required resources and process aspects when implementing MedRec on a high turnover hospital ward.
Setting and Method: Best possible medication history (BPMH) was collected by the clinical pharmacist on weekdays as part of routine clinical pharmacy services (i.e. medication review) on two urological wards (50 beds) in Austria's largest teaching hospital for a period of 2 months. All newly admitted patients were interviewed using a structured questionnaire according to WHO guidelines.[3]
Main outcome measures: Time needed for MedRec
Time from patient's hospital admission to finalized BPMH
Number and types of inquired sources to complete MedRec
Average number of drugs per patient
Number of MRPs at admission.
Results: MedRec (av. (± SD) duration: 10.0 ± 4.4 min) was performed in 142 patients (23.2% female; age: 58.7 (± 17.3 years). A total of 23 h:42 min were spent on MedRec during the study period; av. 47 min (± 20 min) per day. Time from admission to BPMH added up to 47 min (± 3 h:26 min). The number of inquired sources (e.g. general practitioner, family members, former hospital admission,…) to complete BPMH was 1.9 (± 0.7). In 22.8% BPMH was completed solely based on the patient's information, in 57.7% a second source was necessary. Patients took 4.7 (± 4.3) medicines at admission, while 14% didn't take any medication. In 68.3% of patients medication related problems (MRPs) were intercepted in the course of the MedRec process.
Conclusion: A considerable amount of time was needed to compile BPMH during the feasibility study. Although MRPs could be prevented and BPMH provided the basis for further medication review, extensive resources are needed for expansion of MedRec services. Prioritisation is therefore needed.
Acknowledgement: Special thanks go to Prof. Dr. Harun Fajkovic and Dr. Bernhard Grubmueller from the Department of Urology.
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HP-PC049: Preventive TPMT*2, *3B and *3C genotyping on Azathioprine treatment in daily clinical practice

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Background and Objective: Azathioprine is an immunosuppressive drug used in the treatment of multiple sclerosis, many immune diseases and after an organ transplantation. This is metabolized by the TPMT enzyme, so a small variation on the DNA region encoding the expression of this enzyme may affect over its activity and then, this may affect over the efficacy or causing an adverse drug reaction to Azathioprine. Carrying the TPMT*2 (rs1800462), *3B (rs1800460) and *3C (rs1142345) alleles have been associated with a poor TPMT activity, provoking a gathering of drug and then myelosuppression. Because of this, the Azathioprine data sheet advise to evaluate the TPMT activity before the use of this drug.
The aim of this project is to implement the use of this preventive genotyping in our hospital.
Design: The most important pharmacogenomic dosing guidelines (CPIC and DPWG) classify patients depending on their TPMT*2, *3B, *3C genotype in 3 phenotype groups: Extensive metabolizers, those patients not carrying any of these SNP´s; Intermediate metabolizers, those carrying an allele *2 or *3B or *3C, and those carrying the *3A allele (A *3B allele plus a *3C allele); and bad metabolizers, recessive homozygous patients for at least one of the 3 studied polymorphisms, and patients carrying one TPMT*2 allele combined with a *3B or *3C or *3A allele.
According to these pharmacogenomics guidelines, we recommend not to use this drug in "Bad metabolizer" patients and for Intermediate metabolizer patients, an initial dose of 1–1.5 mg/Kg/day, growing this depending on individual tolerance, and waiting at least 2 weeks to reach normal blood drug levels.

We genotype these 3 polymorphisms using Taqman allelic discrimination assay and give a dosing advise to physicians in 24 h from the first dose of the drug.
Results: Since the implementation of this pharmacogenomics test in our hospital we have genotyped 104 patients: 7 in 2012, 11 in 2013, 19 in 2014, 24 in 2015, 26 in 2016, 17 in 2017 (until April 25th). Among these patients, 94 are extensive metabolizers, 9 are Intermediate metabolizers (7 are *1/*3A; 2 are *1/*3C) and 1 is bad metabolizer (*3B/*3C).
Conclusion: It is possible to genotype the TPMT *2, *3B and *3C polymorphisms in the daily clinical practice in patients treated with Azathioprine and this may be useful to prevent myelosuppression events.

HP-PC050: Implementing CYP2C19 genotyping in our daily clinical practice

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Background and Objective: Clopidogrel is used for the prevention of cardiovascular events in patients with acute coronary syndrome (ACS), particularly those undergone percutaneous coronary intervention (PCI); and it has provided significant reduction in major vascular events in patients with peripheral artery disease in general. Different polymorphisms have been associated with differences in Clopidogrel response in acute coronary syndrome patients, among them, the *CYP2C19* polymorphisms showed the highest level of evidence, According to CYP2C19 genotype, the effectiveness of Clopidogrel may differs establishing normal, intermediate and poor metabolizers and this is useful information to select the correct antiplatelet treatment.
The aim of this project is to implement the CYP2C19 genotyping in our hospital.
Design: Since 2013, physicians prescribing Clopidogrel in our hospital may ask to the Pharmacy Unit to genotype the CYP2C19*2 and *3 alleles from 3 different clinical areas (Neurology, vascular surgery and cardiology).
According to the CPIC and DPWG pharmacogenomic dossing guidelines, depending on their CYP2C19 genotype, patients may be

normal metabolizers (CYP2C19*1/*1, not carrying these polymorphisms), intermediate metabolizers (CYP2C19*1/*2 and CYP2C19*1/*3, carrying a single copy of one of these SNP) and poor metabolizers (CYP2C19*2/*2, CYP2C19*2/*3 or CYP2C19*3/*3).

After the genotyping request is done, we take a saliva sample and genotype these SNP's using the Taqman allelic discrimination assay and giving a pharmacogenomic dossing recommendation to the physician in less than 24 h from the request is done.

According to the CPIC and DPWG guidelines we recommend a drug change for intermediate and poor metabolizers; changing to Prasugrel, Ticagrelor or Aspirin depending on individual characteristics.

Results: Since the implementation of this pharmacogenomics test in our hospital we have genotyped 36 patients from the vascular surgery department, 54 from Neurology and 1073 patients in cardiology (Cardiology: 260 in 2013 (Since April 1st), 389 in 2014, 263 in 2015, 161 in 2016).

Among all these patients, 866 are normal metabolizers (CYP2C19*1/*1), 271 are Intermediate metabolizers (*1/*2; 1 patient was *1/*3) and 26 are poor metabolizer (*2/*2).

Conclusion: It is possible to genotype CYP2C19 polymorphisms and give a dosing recommendation to select the antiplatelet treatment, and this has a growing acceptance among physicians.

HP-PC051: Genetic polymorphisms influence on the response to tocilizumab

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Background and Objective: IL-6 makes significant contributions to such autoimmune and inflammatory diseases as rheumatoid arthritis (RA). Tocilizumab (TCZ) is a humanized monoclonal antibody inhibitor of IL-6 receptor.

Previous studies have shown that G-allele at the IL-6-174G > C (rs1800795) polymorphism is related with the high-producing IL6.

CD69 receptor is a C-lectine transmembrane protein expressed by T cells, Natural Killers (NK) and active B cells. This receptor is involved on the production and regulation of T cells, B cells and NK and these are involved in Interleukin-6 (IL-6) production.

The SLC9A7 gene encodes a sodium and potassium proton antiporter (NHE7). This protein is localized in trans-Golgi network, related with the protein transport for glycoprotein production.

The engagement of FcGRs by TNF antagonists could affect to macrophage-mediated clearance of immune-complexes.

According to this, the CD69 A > G (rs11052877), *FcGR3A* (A > C) (rs366911), SLC9A7 G/T (rs7055107) and IL-6 (G > C) (rs1800795) genetic polymorphisms may be useful as efficacy predictors of Tocilizumab in RA patients. The aim of this study is to evaluate the influence of these polymorphisms on Tocilizumab response.

Setting and Method: The CD69 A > G (rs11052877), *FcGR3A* (A > C) (rs366911), SLC9A7 G/T (rs7055107) and IL-6 (G > C) (rs1800795) genetic polymorphisms were genotyped using predesigned TaqMan® genotyping assays technology and analysed on a ViiA7® Real-time PCR system. The statistical analysis was performed using SPSS v.20.

Main outcome measures: The CD69 A > G (rs11052877), *FcGR3A* (A > C) (rs366911), SLC9A7 G/T (rs7055107) and IL-6 (G > C) (rs1800795) genetic polymorphisms were genotyped using predesigned TaqMan® genotyping assays technology and analysed on a ViiA7® Real-time PCR system. The statistical analysis was performed using SPSS v.20.

Results: We recruited 184 patients from 10 different hospitals.

Even though we found a bigger proportion of good responders among CD69 GG carriers than A/G or A/A carriers at 3 months (60 vs. 43.27%) 6 months (72.73 vs. 59.17%) 9 months (76.19 vs. 65.66%) and 12 months (90 vs. 73,95%), these results were not statistically significant ($p = 0.17$; $p = 0.22$, $p = 0.34$ and $p = 0.09$).

The IL-6 G > C genetic polymorphism was significantly associated with "responders" at 3 months (CC vs non-CC $p = 0{,}039$, OR 0.270, 95%CI 0.072–1.005) but not at 6 ($p = 0.666$), 9 ($p = 0.233$) and 12 ($p = 0.244$) months.

The SLC9A7 G/T polymorphism was significantly associated with remission according to EULAR criteria at 6 months (GG vs no-GG $p = 0.04$; OR 0.42; 95% CI 0.18–0.99) and almost at 12 months (GG vs no-GG $p = 0.053$; OR 0.46; 95% CI 0.21–1.01).

We found no statistical significant association between responders and the *FcGR3A* (A > C) (rs366911) SNP.

Conclusion: The CD69 A > G (rs11052877), SLC9A7 G/T (rs7055107) and IL-6 (G > C) (rs1800795) genetic polymorphisms seem to be useful as genetic predictors of Tocilizumab response but this must be further studied.

HP-PC052: A new secure health messaging system to enhance the hospital-community pharmacy relationship

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Background and Objective: Individual pharmacist-led consultations for paediatric kidney transplant recipients were implemented recently in the nephrology department of our hospital. A new secure health messaging system allows to forward the documents used during this consultation to the patients' community pharmacist. This study aimed to evaluate both of these new tools.

Design: A retrospective monocentric study was carried out from February to May 2017. The community pharmacies named by the renal transplant patients seen in the preceding months were contacted to evaluate these new tools. The community pharmacists were asked to connect to the secure messaging system; and three documents were sent through this system. The documents consisted of the treatment plan, the medical protocol, and fact-sheets specific to the immunosuppressive drugs. Afterwards, a questionnaire was transmitted and filled up by the community pharmacists.

Results: Among the 47 pharmacists included in the study, 21 answered to the survey. A quarter of them experienced difficulties in communicating with the hospital; a half of them encountered problems when ordering the medications for the first time. One third had problems with magistral preparations. Only 26% of the pharmacists received the prescription before the discharge of the patient immediately after the transplantation. Every pharmacist interviewed thought it would be wise to receive the prescription few days before discharge. The medication schedule interested 86% of the pharmacists. Every pharmacist found relevant to receive the documents. Also every pharmacist found the information included in the medical protocol appropriate. The fact sheets provide unknown information to

95% of the pharmacists. About 55% of the pharmacists ignored the existence of the secured messaging system, and 71% could log in easily. The problems encountered by the others were technically resolved by the helpdesk. Almost every pharmacist (94%) found this communication channel suitable to a daily use.
Conclusion: The difficulties related by the pharmacists during the first delivery could have been prevented by the use of these new tools before the discharge. This new communication channel now allows to anticipate these problems and to communicate the prescription in a secure way to the community pharmacy before the patients discharge. The medical protocol, the fact-sheets, and the medication schedule were widely approved by the community pharmacists, and seem to provide them useful information. The first feedback on this new organization from the patients, their parents, the nephrology team, and the community pharmacists is enthusiastic.

HP-PC054: Medication reconciliation by pharmacy technicians: could the French Territory Hospital Group be an opportunity?

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Background and Objective: Medication reconciliation (MR) is a priority of the WHO High 5s program (MedRec) to improve patient safety around the world. In France, clinical pharmacy services are extending despite a lack of human resources. Several studies showed that MR performed by pharmacy technicians (PT) was as effective as that performed by pharmacists. However, PT involvement in MR remains limited and unstructured in our country. New legislations have recently been introduced and Territory Hospital Group (THG) have been created to provide better access to healthcare and to optimize pharmaceutical activities by promoting inter-institutional collaboration, leading to potential release time for PT to be involved in MR advanced practice role.
The aim of this study was to determine whether THG may be an opportunity to extend MR process by PT.
Design: The pharmacists from the nine hospitals of our THG were met to carry out the inventory of the current clinical pharmacy practices performed in each hospital and to discuss their perception of PT potential involvement. Semi-structured interviews were carried out with different PT of our THG to collect their levers and barriers, skills, and work organization, observing them while they worked.
Results: All hospitals accepted to describe their current clinical pharmacy practices. In April 2017, twelve PT from five hospitals were interviewed after pharmacist agreement to take part in the study. Three hospitals already developed a MR process without PT, and only one project involving PT was ongoing. The pharmacists of the five hospitals supported an extending of PT role in MR. However, the release time allowed by pooling activities in the THG for clinical pharmacy services could not be estimated. For all PT, the main barriers to participate in MR were the lack of time and training. Almost all PT assumed their rightful place in the MR process ($n = 11$) and their desire to be part of the care team in the ward was the major level of change ($n = 9$).
Conclusion: Even though the deployment of MR with PT in the THG is globally supported, there are a lot of conditions to implement the process, such as an appropriate training. The THG may not be an opportunity according to pharmacist's priorities as only five hospitals accepted to participate in this study. The role of PT in supporting pharmacists continues to evolve and should be clearly defined in performing clinical pharmacy practices in France.

HP-PC057: Follow-up of septic patients in orthopaedic surgery

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Background and Objective: Osteoarticular infections (OAI) require long-term antibiotic treatment for 6–12 weeks, which increases the risk of adverse effects. In this indication, antibiotic therapy modalities are discussed in our hospital during a multidisciplinary meeting (MM) composed of orthopaedics, rheumatologist, bacteriologist, radiologist and infectiologist. The aim of this study was to verify that a suitable biological monitoring (BM) was proposed and carried out at all stages of OAI patient management, from the MM until his discharge.
Design: Retrospective collection of all hospitalized patients with documented IOA and for which an adapted antibiotic therapy has been proposed in MM, from 1 January to 31 March 2017. The main outcomes include, at each stage were, antibiotics used, dosage, duration of treatment, BM proposed by the MM, performed during hospitalization, proposed in the hospitalization report, and prescribed on the discharge prescription. Determination of the compliance rate (CR) was used to assess if the proposed surveillance was appropriate for the prescribed drug.
Results: We collected data from 28 patients. After an empiric treatment based on vancomycin in combination with piperacillin/tazobactam, the most frequently drugs used were rifampicin, levofloxacin and clindamycin. In the MM, in 26 (92.9%), 23 (82.1%) and 5 (17.9%) patients, dosage, treatment duration and BM were expected respectively. The drug BM was conform for three patients (CR = 60%). BM performed during hospitalization and proposed in the hospitalization report were present in 26 (89.7%) and 12 (41.4%) patients, respectively, with a CR of 78 and 0%, respectively. Among the 16 computerized prescriptions found, BM was already prescribed in each case with a CR of 81%.
Conclusion: Concerning the drug BM, during the MM, those data highlights that there is much room for improvement. However, the MM therapeutic decisions may have to change during the medical-surgical round. The physician then records the new therapeutics and/or follow-up to be performed in medical observations. The clinical pharmacist by providing his own skills in MM would reduce the iatrogenic risk related to antibiotic therapy. Moreover, early intervention of clinical pharmacist should facilitate the medical care future.

HP-PC058: Restructuring the daily and nominative drug dispensing (DNDD) and storage of drugs at Robert-DebrÕ Hospital (AP-HP): organizational and financial impact

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Background and Objective: Robert-Debré (AP-HP) is a mother–child teaching hospital in Paris, France, with 475 beds and nearly 50,000 admissions per year. Daily and Nominative Drug Dispensing (DNDD) concerns 95% of the beds. A 5S project led to a reflection on the improvement of the hospital management of the DNDD. The drugs were stocked at the central pharmacy stock and in every picking stations (PS) used for the DNDD. Pharmacy technicians must count every drug given back from the units before integrating them back to the PS stock. The objective of our study was to simplify the medication use process by changing the financial stock management,

limiting the drug return management, and optimizing storage locations and stock movements.
Setting and Method: From December 2016 to April 2017, this multidisciplinary project involved the staff of the hospital pharmacy (pharmacy technicians, residents, managers, pharmacists, and agents); nursing management; direction of the organization, projects and quality; direction of the transformation (head office of the AP-HP). The resource available were: simulations via the Copilote® software and an Excel® spreadsheet, pharmacist and pharmacy technician expertise, limited furniture available (re-using of existing bins and picking stations (PSs)), external help and view from pilot direction and nurse direction.
Main outcome measures: Three scenarios are envisaged for the new reorganization. The number of bins, and the annual cost will be evaluated to choose the best. Two will be refused and the third selected.
Results: Several scenarios were considered:

- **Scenario A** to maintain the 6 PSs in the pharmacy stock and reorganize them (753 bins, 613,870€/year). This project didn't simplify the drug return management by pharmacy technicians.
- **Scenario B** to install mini-PSs for each clinical unit around a shared bigger PS (626 bins including 94 for the shared PS, 632,400 €/year and 115,000€/year for the shared PS). Advantages were a decrease of bins thanks to the shared PS, more references in each mini-PSs and a time saving for the pharmacy technicians. The disadvantages were the lack of space for the installation of the shared PS, reduced fluidity of movement for staff, and technical impossibility to generate financial drug consumption for each unit from the shared PS.
- **Scenario C** to create 14 mini-PSs: 1 Mini-PS for each clinical unit (789 bins, 667,620€/year). Advantages were gained time for the pharmacy technicians, better optimization of bins in mini-PCs. This scenario was chosen and the total reorganization took place in April 2017.

Conclusion: Through this 6-month period, all the staff worked together toward better pharmacy technicians' work conditions and drug use process simplification. Although every drug back from the clinical unit is still checked (temperature storage condition, expiring date), the drugs are directly back to the PS stock without any administrative task. This study illustrates one step of the drug use process review and the helpful multidisciplinary collaboration

HP-PC059: Analysis of efficacy and safety of intravenous biphosphonates in osteogenesis imperfecta in a tertiary level hospital

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Background and Objective: Osteogenesis imperfecta (OI) is a disorder characterized by osteopenia, frequent fractures and chronic bone pain. Histologic studies have shown that increased bone turnover is the rule in OI bone, this justifies using bisphosphonates in order to reduce osteoclast mediated bone resorption. The main objective of our study is to describe the efficacy and safety of intravenous biphosphonates in children.
Setting and Method: Retrospective observational study of all paediatric patients diagnosed with OI treated with intravenous bisphosphonates. Data sources: electronic medical records.
Main outcome measures: Demographic parameters, biphosphonates treatment regimen, concomitant medication, efficacy and adverse effects.
Results: Three children (2 boys) were diagnosed with OI. Age: 6, 7 and 13 years old. One patient (gene mutation COLA1A1: c.333 + 1G > A) is from Asia and he has no family history. The other two patients are Caucasians and siblings with a family history of the same genetic disorder (COLA1A1:c.2908_2911delAGAG). All of them have blue sclerae and multiple bones fractures.
All patients have received zoledronic acid (dose: 0.05 mg/kg/6 months; 4–5 cycles). One of them, had been previously treated with 2 cycles of pamidronate (dose: 0.75 mg/kg/day*2 days/4 months). All patients have been concomitantly treated with oral vitamin D and calcium.

All the children had low bone mineral density in the lumbar spine, with Z scores ranging from − 5.3 to − 2.2. The mean Z score improved from − 3.33 to − 1.23. Two patients had high levels of alkaline phosphatase (1,111 and 1060 IU/L) before starting treatment with biphosphonate, after two cycles of treatment both of them had levels in normal range. No fracture was observed from the start of treatment with biphosphonates.

Adverse effects were only observed with the first infusion and they were: fever (100%), myalgia (33%) and asthenia (33%). Intravenous biphosphonates did not cause hypocalcaemia in any patient.
Conclusion: Intravenous biphosphonates constitute an adequate therapeutic option for the treatment of OI in children. Alkaline phosphatase levels and Z score evolution demonstrate treatment benefits. Zoledronic and pamidronate were well tolerated, they only caused mild adverse effects related to the first infusion.

HP-PC061: Medication use, medication discrepancies, symptoms possibly related to adverse effects and quality of life in a geriatric population - a cross-sectional study from real life

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Background and Objective: Geriatric patients use many medications and medication errors are frequent. Correct use of medications may prevent medication errors and optimize therapy, which again may reduce hospitalizations, health care costs and enhance quality of life. The aim of this study was to characterize the patients at the geriatric ward with regards to medication use, discrepancies in medication lists at hospital admissions, symptoms possibly related to adverse drug reactions and Health-related quality of life (HRQoL).
Setting and Method: This cross-sectional study was performed in a daily life setting at a geriatric ward at the University hospital of North-Norway (UNN) during a two-month period in October-December 2015. We included all admitted patients 65 years or older. We registered medication use, performed Medication reconciliation (according to the IMM methodology), symptom score (short version of the Phase 20 questionnaire evaluating 10 symptoms possible related to adverse effects of medications) and a HRQoL interview (EQ5D-VAS questionnaire).
Main outcome measures: Medications used, medication discrepancies (number and type), symptoms (number and type), HRQoL index and VAS score (0–1 or 0–100, respectively. 0 is worst possible and 1 or 100 is best possible).
Results: We included 60 patients. Mean number of medications used was 9.4 (median 9.0, range 2–25). We identified 161 medication

discrepancies (MDs) in 73% of the medication lists. The mean number of MDs per list was 2.7 (SD 2.9, median 3.0, range 0–11). The MDs identified most frequently concerned commission of medications (84%), followed by omission (25%) and different dosing regimen (25%). Patients had a mean number of 4.4 symptoms (SD 2.2, median 5, range 0–9), dryness in mouth being the most frequent (61.8%), followed by general tiredness (60.0%) and pain (52.7%). The mean EQ5D index score was 0.724 (SD 0.074, median 0.74, range 0.618–1). The mean VAS score was 58.9 (SD 25.8, median 50.0, range 10–100).

Conclusion: Geriatric patients at UNN use many medications, have medication lists that are not correct according to what they are taking at home, and are experience many symptoms possibly related to medications. However, their health-quality of life seems to be above average.

HP-PC063: Oral chemotherapy drugs: new pharmaceutical needs for patients? Implementation of oral chemotherapy pharmaceutical consultation. Preliminary results in a French non-teaching hospital

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Background and Objective: The use of oral oncology drugs increased during the last years. The medication management with oral chemotherapy is important for patients: safety of prescriptions, therapy monitoring, treatment adherence, contact with treating providers (family, physician, community pharmacist, nurse). Pharmacy services were developed to improve the safety of patient's cancer care. Since January 2017, pharmacy department of Centre Hospitalier de Martigues a French non-teaching hospital has implemented, in collaboration with oncologists, oral chemotherapy pharmaceutical consultation. During this pharmaceutical consultation, the order is checked and drugs information is provided. Education about toxicity for best self-management, concurrent medication reconciliation and detection of drugs interaction is realized. To complete the consultation an information sheet for patient is provided.

Design: 5 months after this implementation we have realized a preliminary evaluation based on: number of patients, number and duration of pharmaceutical consultations, drugs prescribing, patient's sheet completed, positive outcome defined as detection of medication problem (according to the Society of Clinical French Pharmacy) with feedback to physician, community pharmacists contacted.

Results: Twenty-one patients [male: 11; female 10, mean years 67 (33–85)] have been enrolled into oral chemotherapy consultations and 25 consultations have been achieved (3 follow-up) in average 34.1 min (10–60). For all patients a pharmaceutical sheet was completed. Eleven different oral chemotherapy drugs were recorded: lung cancer = 3, hematologic malignancies = 8; and 52% (n = 11) of consultations concerned a drug from IMiD's class (thalidomide, lenalidomide or pomalidomide). Eighteen positive outcomes for medication management have been registered: 7 for drugs interaction with concurrent medication (2 with phytotherapy), 6 for management of the prevention adverse effects (no embolic, nausea, vomiting, diarrhoea or analgesia prophylaxis), 3 comedication overdose, 1 comedication not received and 1 too long chemotherapy cure prescription. When feedbacks to physician were transmitted, physicians accepted 88% of pharmaceutical interventions. Fourteen different adverse effects were detected. Only 3 community pharmacists have been contacted.

Conclusion: This pilot study shows encouraging results but the analysis of this results by pharmacist staff of oral chemotherapy showed 3 priorities actions to improve and develop this program: implementation of systematic follow-up consultations, evaluation of adherence to treatment, develop community pharmacist communication and education in collaboration with community pharmacists associations.

The rise of oral chemotherapy is a challenge to pharmacist in hospital and community to develop clinical pharmacy services. Oral chemotherapy monitoring by pharmacist in collaboration with others care-givers is crucial to improve security and efficacy of this treatment.

HP-PC064: Evaluation of a new tool to select prescription for pharmaceutical validation during the week-end

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Background and Objective: Since last April, on-duty pharmacist analyses every new admitted patient's prescriptions during the weekend. In front of this considerable workload, we reflected on our pharmaceutical validation practices. So we decided to introduce a new patient selection tool, basing on at-risk biological parameters. The aim of this study was to evaluate and compare the clinical relevance of pharmacist interventions (PIs) between these two periods.

Design: After a previous study to identify patients at risk of PI (Deweale ESCP Oslo 2016) we built a computerized request in our software system. The software filter screened every patient according to the following predefined items: serum potassium (K) disorder ($K < 3.3$ and > 5.5 mmol/l), and/or low estimated glomerular filtration rate value (< 50 ml/min/1.73 m^2), international normalized ratio (INR) > 4.5 and all serum vancomycin results. The request's results are sent to the on-duty pharmacist with patient identification number in order to analyse their prescriptions. We compared the number of PIs and PIs clinical relevance according to Hatoum scale via Fisher's Exact Test over a period of 5 weekends between May and June 2016 (i.e. before the patient selection tool) to the same period in 2017 (i.e. with the new tool of patient screening).

Results: Only 56 patients' prescriptions were analysed with the tool against 126 for the same period in 2016, reducing by more than half the number of patients' prescriptions (55.6%). 18 and 10 PIs have been achieved in 2016 period and 2017 period, respectively. The number of PIs was reduced by 44.4%. Concerning clinical relevance of PIs in 2016, 88.3% of PIs (n = 15) had a minor clinical impact (Hatoum score from 0 to 1) and 16.7% (n = 3) had a significant clinical impact (Hatoum score from 2 to 3). In 2017, 30% (n = 3) of PIs had a minor impact and 70% (n = 7) had a significant clinical impact. Clinical relevance of PIs was significantly different between the 2 periods ($p = 0.011$).

Conclusion: Overall, the number of patients' prescriptions analysed and PIs were reduced by almost half between the two on-duty periods, PIs clinical relevance appears to be stronger with the new screening method. Although, it is too soon to say this new tool saves time we can see that it makes to screen most risked patient. Nevertheless, our low hindsight (5 weeks) limits the scope of this study and complementary data will be necessary to confirm this trend.

HP-PC065: Assessment to pain post-operative protocol in orthopaedic and chest surgery

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Background and Objective: Post-operative pain required a multimodal analgesia thanks to the use of several drugs in combination. In addition to morphine, acetaminophen, ketamine, ropivacaine and ketoprofen are usually used. Some of these drugs had to be adapted to weigh (< or > 50 kg), age (> or < 75 years old—y/o), co-morbidities and/or Angiotensin II Receptor Blockers (ARBs) or ACE inhibitors (ACEi) prescription and renal impairment (RI). Computerized protocols authorized a quick and secure prescription for post-operative procedure. The objective of this study was to identify the assessment of the post-operative computerized prescription according to the adapted protocol for patients.
Design: A one-month retrospective study was conducted for all patients undergoing an orthopaedic or chest surgery. The main outcome was the determination of the proportion of patients with prescription non-conform to protocol; for each patient with an non adapted protocol; we detailed biological, clinical and medication parameters.
Results: Post-operative prescriptions of 499 patients were analysed, 351 and 148 in orthopaedic and chest ward, respectively. The average age of patient was 59.8 y/o (from 16 to 96) and the mean number of analgesia drugs was 3.32 (from 2 to 4). Non-conform protocol prescription involved 116 (23.2%) patients, ranging from 1 to 3 drugs misused (mean 1.34). Acetaminophen was misused in 204 cases, 185, 61, 19 due to age > 75 y/o, RI and weigh < 50 kg, respectively. The use of morphine was not optimized in 15 cases, 12, 4 and 3 because of age > 75 y/o, RI and 3 weigh < 50 kg, respectively. Ketoprofen was not indicated in 64 cases, 53, 11 and 10 because of age > 75 y/o, RI, ACEi/ARBs co-prescription or with age over 75 y/o.
Conclusion: Overall, almost a quarter (23.2%) of analgesic protocols were properly fitted to pathophysiological and medication context. Despite the use of computerized protocol, it appears that clinical pharmacists are valuable in providing a safeguard against no-personalized prescription.

HP-PC066: Pharmacist counseling for patients with neuropathic pain in an outpatient clinic

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Background and Objective: Neuropathic pain is a chronic problem which requires multidisciplinary approaches for the management. Patients' adherence to and satisfaction with drug therapies affect the success of pain management which can be improved by patient education. Therefore, aim of this study was to identify patients' satisfaction on provision of drug information by a pharmacist in an outpatient clinic.
Setting and Method: The study was conducted in the Hacettepe University Hospitals, Outpatient Pain Unit during March–May 2017. The patients with neuropathic pain and on any of amitriptyline, gabapentin, pregabalin or doluxetine treatment were included and informed verbally about the usage of these drugs and their side effects by a pharmacist. Patients' satisfaction on provision of information was assessed by four questions (general satisfaction, pharmacist's feedbacks to their questions, comprehensibleness of information, type and content of information) on 5-point Likert scale after a month via telephone contact.
Main outcome measures: To evaluate patients' satisfaction on drug information service provided by a pharmacist and emphasize the importance of multidisciplinary approach in pain management.
Results: Ninety patients were included, informed and followed in the study and 60% were on monotherapy (44% on duloxetin, 43% on pregabalin, 9% on amitriptyline and 4% on gabapentin). The mean (± standard deviation) duration of provision of information was 8.8 (± 2.9) minutes. Sixty-seven (74.4%) were already informed by nurses at the clinic before consulting by a pharmacist. However, 48 out of 67 (71.6%) patients indicated not to receive any information before and 98% emphasized that they would like to have a provision of information from a pharmacist continuously at the clinic.
In regards to patients' satisfaction (n = 90) which was assessed by four questions, ≥ 95% of participants rated as ≥ 4 and 90% indicated to have such service at community pharmacy as well.
Conclusion: The patients are satisfied with the provision of drug information by a pharmacist beyond the routine clinic practice. Given the fact that, appropriate drug use is essential for the success of treatment in neuropathic pain, it is important to have such information service provided by a pharmacist regularly at the pain clinic where multidisciplinary collaboration encourages patients' adherence and maintain effective pain control.

HP-PC067: Use of vitamin k in a traumatology service

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Background and Objective: Vitamin K deficiency can cause severe bleeding that may be caused by an overdose of coumarin-type oral anticoagulants. Therefore, in most cases this vitamin is prescribed prior to surgical intervention in order to reverse the international normalized ratio (INR) values and get a safe haemostasis for surgery. The aim of the present study is to evaluate the use of vitamin K in patients admitted to a traumatology service.
Design: Prospective study conducted in a Traumatology Service, from January to March 2017. All patients who were ≥ 65 and previously treated with oral coumarin anticoagulants (acenocoumarol and warfarin) were included. The reason for admission, sex and age, as well as INR, indication and type of anticoagulant were recorded at admission. Dosage and duration of vitamin K treatment were then evaluated according to baseline INR values, and their adequacy to what is indicated in the data sheet.
Results: A total of 36 patients were included (mean age of 79.92, 72.2% women, 27.8% men). Regarding the diagnosis, 75% were admitted for some type of fracture, 13.9% for elective surgery, 8.3% for a complicated hematoma and 2.8% for a dislocation. The total number of patients was treated with acenocoumarol, and it was indicated in 72.2% non-valvular atrial fibrillation (AF), 11.1% for venous thromboembolism, 8.3% for valvular AF, 5.6% for prosthetic heart valves, and 2,8% for ischemic stroke. Patients were classified according to the INR value at admission, with 38.9% of patients with infra-therapeutic INR (< 2), 33.3% with therapeutic INR (2-3), 25% of patients with supratherapeutic INR (> 3) and 2.8% of patients who were not measured the INR during hospitalization.
Of the patients with infra-therapeutic INR, 64.3% received vitamin K at a dose of 10 mg/24 h, 7.1% at a dose of 10 mg/8 h and 28.6% were not treated. The mean duration of vitamin K treatment in this group was 2.2 days and the mean dose per patient was 3. About patients with therapeutic INR, 33.3 received treatment with vitamin K at a dose of 10 mg/24 h, 16.7% at a dose of 10 mg/12 h, 8.3% at a dose of 10 mg/8 h and 41.8% did not receive any dose. The mean duration was 2 days and the mean dose was 2.7. In the group of patients with supratherapeutic INR, 55.6% received vitamin K at a dose of 10 mg/24 h, 22.2% at a dose of 10 mg/8 h and 22.2% did not receive any dose during hospitalization. The mean duration was 2.6 days and the

mean dose was 3.4. Of the total of patients, treatment was prolonged after surgery in 25%. Double dose (10 mg) of the indicated in the data sheet (5 mg) was used in 100% of patients.
Conclusion: There is a large variability in the use of vitamin K in the patients studied. An overuse of the drug is observed in patients with infra-therapeutic INR with respect to those patients with therapeutic INR. In addition, the dose used is higher than that indicated in the data sheet and the duration of treatment is prolonged in a high percentage of patients over time. Therefore, it would be interesting to protocolize the treatment with this drug in order to optimize its use.

HP-PC068: Evaluation of professional practices: the use of vancomycin in orthopaedic surgery

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Background and Objective: In Nîmes University Hospital Centre, intravenous (i.v.) vancomycin therapy is used in routine hospital practice to treat septic orthopaedic patients. Nurses reported a high incidence of infusion phlebitis in patients hospitalized in the orthopaedic surgery unit. Infusion phlebitis, which is a well-known side effect of vancomycin, is defined as an inflammation of the vein endothelium with pain, swelling, redness and warmth at the i.v. site. The aim of this study is to evaluate the infusion methods of vancomycin in the orthopaedic surgery unit, see if those follow the international guidelines in order to determine if there is a link between the infusion methods and the incidence of infusion phlebitis.
Design: From August 1st 2016 to January 31st 2017 we conducted a retrospective study by analysing every vancomycin prescriptions from two orthopaedic surgery units (60 beds). Moreover, from March 1st 2017 to May 1st 2017 we conducted a prospective study thanks to the nurses who filled out a questionnaire about the infusion method used for each patient treated by i.v. vancomycin. We also made a literature review to determine the guidelines for vancomycin infusion methods.
Results: During those 6 months, 66 patients received a vancomycin infusion, so about 11 patients per month. The average duration of treatment before the antibiotic was switched was 5.7 days and the average dosage was 38 mg/kg/day, it represented about 3 g per day. In the unit, vancomycin is administered continuously by intravenous route thanks to a syringe pump. The volume of those syringes is 50 mL, in which 1 g of antibiotic is diluted with either sodium chloride 0.9% or glucose 5%. So it means nurses have to use 3 syringes for one day of treatment. The final dilution of vancomycin is 20 mg/ml. During the 2 months prospective study, 85% of patients who had peripheral venous line (87%) experienced an infusion phlebitis, on average on the third day of treatment.
Conclusion: As for continuous infusion, international guidelines recommend a 5 mg/mL dilution when a peripheral venous catheter is used. Literature review allows us to conclude that the endothelial toxicity of vancomycin is concentration and time dependent. Moreover, using an infusion of 4 mg/mL over 24 h, an infusion phlebitis rate of 13% was reported. It appears crucial that the unit needs to change their vancomycin dilution methods to reduce infusion phlebitis incidence. With the syringe pumps, knowing the average dosage is 3 g of vancomycin per day, it means using about 12 syringes. It would take nurses four times as long and four times as many operations of the i.v. line. The average duration of treatment is not long enough to use a central venous catheter systematically (significant infection risk). Since a vancomycin infusion is stable for 24 h, the purchase of infusion pumps with a larger infusion volume has been requested. It will allow nurses to follow dilution guidelines without increasing the number of operations on the i.v. line.

HP-PC069: Improving patient monitoring of methotrexate across transitional care settings

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Background and Objective: An interprofessional collaborative team work approach, based on an efficient monitoring process is essential to maximize treatment effectiveness and ensure patient safety as they transition across different care settings. The objectives were to assess patient compliance towards monitoring needs and laboratory investigations, as well as adherence to prescribed treatment.
Setting and Method: Rheumatology patients on methotrexate attending the Rheumatology Clinic and under the care of the participating clinicians were recruited for the study. Face to face interviews were carried out and two sets of questionnaires were used to document patient compliance towards ordered laboratory investigations (Patient Compliance to Laboratory Blood Tests Questionnaire) and adherence to prescribed treatment (Medication Compliance Questionnaire).
Main outcome measures: Assessment of patient compliance towards ordered laboratory investigations and assessment of patient compliance to prescribed treatment.
Results: A total of 20 patients (mean age 63 years) participated in the study. When considering compliance to monitoring and laboratory investigations, 95% (n = 19) of patients interviewed were compliant towards monitoring. Thirty percent (n = 6) of the patients managed to mention a total of 3 side effects that can result secondary to methotrexate. Liver failure was the most common side effect mentioned by patients (n = 6). When asked if they recall their baseline monitoring, only 50% (n = 10) of the patients interviewed were aware that they were tested for Hepatitis B & C. The majority of the patients, (n = 19) were aware that liver and kidney function tests together with a full blood count formed part of the baseline monitoring tests. When asked why blood tests are routinely performed, 10% (n = 2) did not know. Eighty-five percent (n = 17) of the patients inform their doctor that they are being treated with methotrexate. Out of these, 52% (n = 9) also inform the pharmacist of their methotrexate treatment when buying non-prescription medicines or getting prescribed medications. The Medicines Compliance Questionnaire indicates that 40% (n = 8) of patients rarely miss their dose, and when they do, it is because they forgot (n = 4), due to the side effects (N = 3), and 1 patient was indifferent. When asked of the subsequent actions, 3 out of the 4 patients who forgot to take the dose, take the dose as soon as they remember. The patients who skip their dose due to side effects or indifference stated that they just skip the dose.
Conclusion: The study indicates that routine education is required in order to ensure enhanced compliance to monitoring needs as well as prescribed medications. A booklet entitled *Methotrexate Monitoring Booklet* was developed and validated with the aim of increasing patient awareness and education regarding compliance towards treatment and blood tests.

HP-PC070: Development and evaluation of the Maltese Rheumatology Shared Care Guidelines: linking primary and secondary care settings

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Background and Objective: Shared care guidelines (SCGs) provide an infrastructure assisting healthcare professionals in clinical decision making, allowing the seamless transition of patients between primary and secondary care settings[1]. The objective is to develop Maltese Rheumatology Shared Care Guidelines (MRSCGs) for rheumatology drugs, emphasizing the role of community pharmacists in order to address communication barriers between different healthcare sectors.
Setting and Method: The study was carried out in Malta where rheumatology patients get their chronic medication supply free of charge from a community pharmacy of their choice. A list of rheumatology drugs necessitating the development of MRSCGs was compiled. Already existing foreign SCGs, Protocols, and Shared Care Agreements were reviewed. MRSCGs for infliximab, etanercept, methotrexate, leflunomide, hydroxychloroquine and azathioprine were compiled and validated by an expert panel to asses design, content and layout.
Main outcome measures: Development and evaluation of Maltese Rheumatology Shared Care Guidelines.
Results: The MRSCGs consist of 3 sections. Section A outlines pharmacological background, indications, drug administration and dosage regimen. Section B is divided into 2 subsections. The first subsection defines the responsibilities of rheumatology consultant, higher specialist trainee, clinical pharmacist, rheumatology nurse, general practitioner, community pharmacist and the patient. The second subsection consist of a Shared Care Details sheet which addresses communication issues. Section C includes appendices for clinical particulars; monitoring worksheets; Shared Care request form, Acceptance letter by GP to participate in Shared Care, Fast Track Referral Form and Pharmaceutical Care Documentation Sheet which is intended for community pharmacists. The expert panel ($n = 10$) agreed that community pharmacists dispensing the medications are part of the extended healthcare team with whom communication should be improved. All members agreed that the MRSCGs contain detailed but concise information and that they are user friendly.
Conclusion: The MRSCGs are tools which in the absence of electronic records facilitate documentation and sharing of pharmaceutical care issues and plans across different care settings. Willingness of healthcare professionals to participate in Shared Care and patient's adherence to treatment and commitment will determine the effectiveness of the guidelines.

HP-PC071: Pharmacist-led discharge service at an acute general hospital

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Background and Objective: Transition of care relies on the provision of a supportive patient process starting at admission and continuing at every transition point. The goal is to achieve this is through a structured, patient-centred service employing an innovative model of pharmacist intervention. The objective of the study was to develop a patient-centred pharmacist-led discharge service.
Setting and Method: The study was carried out at a general acute public hospital. A novel clinical pharmacy service was implemented whereby patients flagged by healthcare professionals are reviewed by a pharmacist prior to discharge. A dedicated pager service was established whereby healthcare professionals can contact a designated pharmacist for assistance on any medication-related issues and patient counselling prior to discharge.
Main outcome measures: Establishment of pharmacist led discharge service to patients moving from secondary care setting to primary care setting.
Results: During the working hours of the pharmacy department, the pharmacist was paged 120 times from 20December 2016 to 1 July 2017. A total of 315 patients were flagged to the pharmacist for intervention. Activities performed by the pharmacist include validation of discharge information by providing a clinical check, arrangements to ensure ongoing medication supply at discharge and patient counselling on the medication treatment at discharge.
Conclusion: An on-demand clinical pharmacy paging service enables multidisciplinary medication reviews of flagged patients during transition of care. At its core, the inclusion of a pharmacist in the discharge process can prevent medication errors, indirectly provides cost-avoidance on the institution and acts as a measure to promote patient safety at transition of care. By redesigning the discharge process to include pharmacists' interventions prior to patient discharge transitional care can be facilitated.

HP-PC072: Development and evaluation of shared paediatric pharmaceutical care plan

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Background and Objective: Effective transitional care as paediatric patients move across primary and secondary care settings is essential to provide a smooth and safe pharmaceutical care service. One of the barriers to effective transitional care is lack of communication at sharing identified pharmaceutical care issues between hospital pharmacists and community pharmacists. Community pharmacists may not have easy access to the medication plan or discharge note outlined within the secondary care setting leading to a lacuna in the pharmaceutical care service offered. The objective of this study was to develop a shared paediatric pharmaceutical care template aimed at improving communication between pharmacists across different care settings.
Setting and Method: The study focused on paediatric rheumatology patients and was carried out at the general hospital. A literature review was carried out to identify an appropriate template. A discussion with an expert panel was held in order to identify which sections of the pharmaceutical care plan template should be included to facilitate communication and sharing of identified pharmaceutical care needs between the primary and secondary care settings. Following a primary validation by the expert panel, the finalised care plan was piloted in a monthly paediatric rheumatology outpatient clinic.
Main outcome measures: Development and evaluation of the Shared Paediatric Pharmaceutical Care template.
Results: The template consists of three sections. Section A relates to carer and patient details, allergies, and co-morbidities. Section B consists of the first clinic date visit, previous and current drug history. Section C documents pharmaceutical care issues, monitoring plans and pharmacist actions. Following the pilot study the first draft of the Shared Paediatric Pharmaceutical Care Plan was revised so as to be more user friendly and easier to complete. The final template for Shared Paediatric Pharmaceutical Care Plan for rheumatology was used as a baseline to draft other paediatric templates such as the one for oncology in paediatrics.
Conclusion: In the absence of an electronic system connecting the different care settings, the developed Shared Paediatric Pharmaceutical Care Plan facilitates the communication between the hospital

pharmacist and the community pharmacist. Through this shared plan, the community pharmacists is able to follow up on pharmaceutical care issues identified within the hospital setting thereby improving the service provision.

HP-PC073: Medical treatment of pain in patients going through a hip- or knee arthroplasty

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Background and Objective: To evaluate the treatment of pain in patients going through a hip- or knee arthroplasty at Levanger Hospital. In addition to efficiency of the treatment it was desirable to look at satisfaction among patients given medical information when discharged from the hospital. It was also a part of the study to see in what degree internal/local procedure at Levanger Hospital is followed and if there are differences in treatment recommendations in different treatment sites in Norway.
Setting and Method: The study was completed as a follow-up study of postoperative medical treatment of pain in the orthopaedic ward at Levanger Hospital. Patients above 18 years old that was going to fulfil a hip- or knee arthroplasty was recruited. Data from the patients was obtained by filling out diary schemes while at the hospital and until 21 days after the hospital stay and an interview by phone 2–3 weeks after leaving the hospital. For comparison there were also obtained treatment recommendations for postoperative medical treatment of pain from 11 different treatment sites in Norway.
Main outcome measures: NRS, numeric rating scale, measure pain on a scale from 0 to 10. The goal of treatment after a hip- or knee arthroplasty is NRS less than 3, or 3, from day one after surgery. Categorisation into, satisfied or not satisfied with medical information, local procedure is followed or not followed, or treatment recommendations are the same or not the same.
Results: Paracetamol and NSAIDs was a part of the treatment in all hospitals. Opioids as permanent medication was recommended in eight of eleven hospitals and three hospitals had gabapentin in their treatment regime. In total 50 patients was included in this study. For 34% of the patients the internal/local procedure is followed. After the patients left the hospital 70% of the patients used their medicines as prescribed. The goal of treatment were for the study population reached at day 17 after surgery. Women specified more pain than men and did never reach the goal of treatment during the following up. About the medical information the patients received 92% were satisfied. Nevertheless, 38 patients missed information about length of treatment, 32 patients missed information about reduction in use of pain medication, and 28 patients had not received information about what they were going to do if the pain got worse.
Conclusion: There are variations between different treatment recommendations obtained in this study. The internal/local procedure at Levanger Hospital was followed in the treatment of 34% of the patients in the study population. The postoperative pain relief was not satisfactory according to national recommendations. Even though patients were satisfied with the medical information they missed information about treatment length, reduction in use of pain medication, and what they were going to do if the pain got worse.

HP-PC074: Prescription and compliance of calcium and phosphate balances in patients on haemodialysis

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Background and Objective: The main purpose of this study was to compare medical treatment of calcium and phosphate balances in patients on haemodialysis at Levanger Hospital and patients receiving haemodialysis in local health centres run by Health Trust Nord-Trøndelag (HNT). In addition, the study examined if the different haemodialysis units had correct and compatible medicine lists of their patients. Compliance of phosphate binders and possible causes to noncompliance were also studied.
Setting and Method: The Integrated Medicines Management (IMM) model was used for medication reconciliation and medication review in patients on haemodialysis at HNT. Identified medication discrepancies were classified and the clinical relevance was evaluated. Drug related problems associated with the calcium and phosphate balances were discovered. The study assessed if the patients had blood values within the international measurement standards for phosphate, calcium and parathyroid hormone (PTH), and which drugs they used for the treatment of calcium phosphate balances. The compliance of phosphate binders was evaluated by medical interviews and search in medical records.
Main outcome measures: Identified medication discrepancies and blood levels for phosphate, calcium and PTH. Interview with patients and search in medical records related to compliance for phosphate binders.
Results: Totally 38 patients were included in the study, 12 received haemodialysis treatment at Levanger Hospital and 26 in local health centres. The prevalence of patients who had values of phosphate, calcium total and PTH different from the international guidelines were respectively 83, 33 and 25% for patients at Levanger Hospital, and 69, 38 and 50% for patients at the local health centres. At Levanger Hospital, 67% used phosphate binders, 75% vitamin D analogues and 33% anti-PTH-drugs. At the health centres, the result was respectively 96, 81 and 19%. There was a significant difference in the number of patients that used phosphate binders ($p = 0.014$) and serum PTH ($p = 0.018$) between the two groups. The medication reconciliation identified in average 1,9 medication discrepancies per patient in the dialysis note, 2,4 in the medicine lists from the primary health care and 4,1 in medical lists from primary doctors, compared to the "drugs-in-use list" from the pharmacist. A total of 1/3 of the patients were considered noncompliant of phosphate binders, and the main causes were that patients forgot to take their phosphate binders (46%) and gastrointestinal side effects (36%).
Conclusion: There were significant differences in the use of phosphate binders and serum PTH levels between patients receiving haemodialysis at the hospital and at the local health centres, indicating that patients further away from the kidney specialists try to benefit the effect of the phosphate binders before use of anti-PTH drugs. There were a great number of medication discrepancies between the medicine lists. This can indicate that the communications between different treatment units are insufficient. Noncompliance of the phosphate binders was a common problem and the main causes were gastrointestinal side effects and patients forgetting to take their medicine.

HP-PC079: Interest of a daily pharmaceutical validation of targeted molecules

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Background and Objective: In order to prevent drug-induced iatrogenesis, the pharmacy department within the local University Hospital has set up a systematic and transversal pharmaceutical analysis of 6 molecules (apixaban, rivaroxaban, dabigatran, colchicine, weekly methotrexate and tinzaparin). The selected molecules are

at risk because of a narrow therapeutic range, necessary dose adjustments or particular frequencies of administration. This new clinical pharmacy approach is completing the biweekly analysis of the patients' prescriptions.
The objective of this work was to evaluate the relevance of this drug-targeted clinical pharmacy practice, and to define possible improvements.
Design: During 6 months, from July to December 2016, and each day from Mondays to Saturdays, the pharmacy residents analysed prescriptions of the 6 molecules using DxCare® software (92% of beds covered, n = 2500 beds). Pharmaceutical validations and interventions were collected in a spreadsheet which has been analysed retrospectively.
Results: Out of the 2,161 lines of prescriptions analysed, 11% (n = 243) were the subject of a pharmaceutical intervention (PI). The percentage of PI related to the number of lines analysed per molecule was: 19% for colchicine (n = 75 PI), 15% for methotrexate (n = 16 PI), 12% for tinzaparin (n = 49 PI), and 8% (n = 103 PI) for direct oral anticoagulants (DOA). Most frequent PIs were unadapted prescriptions (relative to weight and/or renal function). 70% of PIs concerning colchicine were due to non-adaptation to renal function. 10% of PIs concerning DOAs were due to co-prescription with an anticoagulant (injectable or oral form). Concerning methotrexate, 47% of PIs were related to misuse of folic acid (not prescribed or prescribed on the same day), whereas only 6% related to an error in the frequency of administration (n = 1 PI). 80% of PIs concerning tinzaparin were due to an inadequate prescription based on the patient's weight, and 11% were subject to confusion between preventive and curative dosages.
The global PI acceptance rate was 54%. Prescriber approval was uncertain for 10% of PIs due to incorrect filling of the spreadsheet.
Conclusion: Despite a complete pharmaceutical analysis of patients' prescriptions at least twice a week, a significant number of prescriptions for high risk iatrogenic molecules could not be validated. PIs performed directly with physicians limit the risk of adverse events which, for some, are included in the "Never Events" list. Considering these two observations, this work remains relevant. It will therefore be continued and extended to more drugs also considered at higher risk in our hospital such as newly commercialized insulins. Training of pharmacy residents will be strengthened in order to improve the homogeneity of PIs and their relevance.

HP-PC080: URGEMED study: identification and qualification of adverse drug events in the emergency department short stay unit

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Background and Objective: Medication reconciliation (MR) has proven its effectiveness in the prevention and management of preventable adverse drug events (ADEs). The aims of URGEMED project are to promote a partnership between five hospitals to share documents and experiences and to identify and manage ADEs. This work intended to qualify the identified ADEs in order to target high-potential pharmaceutical interventions (PIs).
Design: One pharmacist is present in the emergency department short stay unit (EDSSU) at least half a day in each centre. During the pharmaceutical presence, all patients of EDSSU are potentially included in this prospective multicentre study. Patients benefited from MR, full medication review and a search for ADEs related to the cause of admission. The identified ADEs are characterized according to the potentiality, the preventability and the link with the reason for admission. PIs are described with the French Society of Clinical Pharmacy's criteria.
Results: After 9 months, 545 patients (sex ratio F/H: 0.45, mean age: 74 ± 24 years) were included. On average, patients were taking 8 ± 4 medications (prescribed/over-the-counter drugs). These interventions allowed identifying 270 ADEs and 182 potential ADEs in 263 patients. Out of these 270 known ADEs, 187 were considered preventable. The rate of patients admitted to EDSSU following an ADE was 24% (133/545). The rate of conventional hospitalization was higher for patients admitted with ADE: 81% (212/263) versus 66% (185/282) [$\alpha < 10^{-4}$; OR = 2.18 (1.47–3.23)]. The majority of the 452 PIs concerned nervous system (24%), cardiovascular (22%) and antithrombotic (18%) drugs. Twenty-seven percent of interventions were due to an adverse drug reaction, 18% to a supra-therapeutic dose, and 11% to a compliance problem. In the majority of cases, the pharmacist suggested a stop (41%), a dose adjustment (24%) or an addition (12%) of medication.
Conclusion: The collaboration of the pharmacist with the emergency physician improves the detection of ADEs. More than a quarter of patients hospitalized in EDSSU are admitted at least partly as a result of an ADE. The qualification of ADEs allows the targeting of PIs on drugs and/or patients presenting a high risk level.

HP-PC081: URGEMED study: qualification and economic impact of hospitalizations following an adverse drug event

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Background and Objective: In the framework of an inter-hospital partnership around the medication reconciliation (MR), we identified and dealt with adverse drug events (ADEs) in the emergency department short stay unit (EDSSU).
Design: All patients admitted on identified beds to the EDSSU during the deployment of a pharmacist were included in this prospective multicentre study. Patients benefited from MR, full medication review and a search for ADEs related to the cause of admission. The calculation of the financial impact was based on the cost of the admission to EDSSU and the potential modification of the income after pharmaceutical intervention (PI) if the short stay was followed by a conventional hospitalization.
Results: After 9 months of activity, 545 patients (sex ratio F/H: 0.45, mean age: 74 ± 24 years) were included. These interventions allowed identifying 270 ADEs including 187 preventable and 182 potential ADEs in 263 patients. The rate of patients admitted in EDSSU following an ADE was 24% (133/545). The rate of conventional hospitalization is higher for patients admitted with ADE: 81% (212/263) versus 66% (185/282) [$\alpha < 10^{-4}$; OR = 2.18 (1.47–3.23)]. The cost's average for a stay in EDSSU is 623 ± 300 € and 2345 ± 1186 €

for a stay in EDSSU followed by a conventional hospitalization. In our study, the cost for the National Insurance was 1023 169 € with 267,113 € due to an ADE of which 177,233 € were considered preventable. Fifty-six patients had amendments made to their diagnosis following PI. Eight patients required conventional hospitalization instead of an initially planned discharge. For this patient group, the hospital turnover increased by 16.9% (€ 13,776). The pharmacist's cost for the activity was 17.4% of the generated revenue (€ 2393/€ 13,776). The MR activity associated with the search for ADEs generated € 11,379 in direct income for the hospital.
Conclusion: URGEMED aims first of all at improving patient's care through an emergency physician/pharmacist collaboration. This study also shows that this activity may be economically viable for hospitals.

HP-PC082: Implementing a protocol for intravenous polyvalent immunoglobulins use in a neonatal unit

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Background and Objective: Neonatal allo-immune thrombopenia is due to an incompatibility of maternal and foetal platelet types. Without early treatment, intracranial haemorrhage is the most serious side-effect of thrombopenia. Several studies show the efficacy of intravenous human polyvalent immunoglobulins (IVIg) when administered in the first days of life. These blood derivatives must be subjected to a controlled prescription, especially in an off-label use. Our objective is to secure IVIg's prescription and administration, in a neonatology ward.
Design: A literature review was realized via PubMed with keywords including "foetomaternal platelets", "allo-immunization" and "neonatal thrombopenia".
We asked paediatricians to determine a platelet threshold to administer IVIg, and to choose the appropriate IVIg's brand name for neonates depending on concentration and excipients. We also discussed with pharmacist in charge of blood derivatives about the prescription and traceability modalities, as well as the required scientific justification. We have prefilled the supporting prescription record, in order to facilitate prescriptions in emergency situations. We asked a referent nurse to evaluate the administration form.
Results: Literature review allowed determining an IVIg dosage of 1 g/kg/d, renewable after 24 h if needed. A new regimen could be proposed after 3 weeks. In case of circulatory bad tolerance, posology may be reduced to 0,4 g/kg/d during 5 days. The platelet threshold was set to 50×10^9/L.
The prefilled off-label prescription record includes indication, name and dosage of chosen IVIg, bibliographic references, and the whished efficacy threshold. Paediatricians fill in the form with clinical details of the patient and keep a copy in patient record.

Administration record was made as a checklist (as transfusion administration records). It allows checking patient identity, drugs' conformity. A pre-completed infusion rate table is included, allowing to simply calculate hourly debit depending on patient weight. Finally, it indicates needed surveillance, and its frequency, to check infusion tolerance.
Conclusion: By simplifying the physician's prescription and providing to nurses a help for medicines administration, this work contributed to secure IVIg use in neonatology.
This approach should be implemented for all drugs needing a particular surveillance, considering extreme fragility of patients in this ward.

HP-PC083: Discrepancies found at technical medication discharges performed by pharmaconomists

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Background and Objective: Hospital discharge is associated with a high risk of medication errors. Indeed transferring prescriptions from one electronic medication system to another is associated with a high risk of errors. These errors can have consequences for the patients e.g. if they are discharged with a wrong dose or medicine and may at worst lead to readmission. To support the patient safety of the hospital discharge a technical medication discharge service has been developed and implemented at two wards at a Danish Hospital. Knowledge about type and frequency of errors related to transfer of electronic prescription at hospital discharge may indeed support patient safety of hospital discharge allowing for focused intervention and training of clinical personnel.
Design: The purpose of the present study was to identify and analyse prescription discrepancies found upon hospital discharge when pharmaconomists perform technical medication discharge.
In the period 03.10.16–30.11.16 pharmaconomists performed technical medication discharge at two wards at a Danish Hospital in the Capital Region of Denmark. Technical medication discharge implied dispensing medicine for two days; check that necessary prescriptions for antibiotics and other new medicine are available and control of date for discontinuation of antibiotic treatment. In connection to the technical discharges the pharmaconomists identified discrepancies between prescriptions in the hospital electronic medication system and the public electronic medication system used by general practitioner. The number of technical medication discharges was registered together with the number and type of discrepancies identified.
Results: In total 168 technical medication discharges was performed of which discrepancies were identified in 72 of the cases. A total of 143 discrepancies were found and were categorized into 12 categories. The four main categories were; Lack of prescription ($n = 41$), Dosing time ($n = 18$), no indication for the medicine ($n = 20$) and dose ($n = 22$).
Conclusion: Through technical medication discharge pharmaconomists identified a total of 143 prescription discrepancies which could be categorized into 12 categories. The main categories were: Lack of prescription, dosing time, no indication for the medicine and dose. Identification of prescription discrepancies may indeed support patient safety of hospital discharge allowing for focused information and training of clinical personnel to prevent future discrepancies.

HP-PC084: Using the quality control circle at outpatient pharmacy to reduce dispensing errors and enhance medication safety in a Regional Hospital in Taiwan

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Background and Objective: In Taiwan, patients always fill their prescriptions at the outpatient pharmacy in hospital after visiting the doctors. As a result, the amount of dispensing is larger than other countries. The amount of dispensing in our regional hospital is about 65,000 per month. Dispensing errors occur at a rate of 0.12%. We aim to enhance medication safety by using quality control circle (QCC) to reduce dispensing errors.

Setting and Method: There were 6 pharmacists in the quality control circle and the quality control circle was established on June 1st, 2016. The program was scheduled for 5 months. Dispensing errors were retrospectively studied during May to July 2016. We used fishbone diagram to identify possible causes for dispensing errors, and Pareto chart to focus on the most significant problems. After analysing, our goal was designing efficient plan-do-check-action (PDCA) cycles by brainstorming to reach the target. The target of dispensing rate was to decrease to 0.03%. The rate of dispensing error was continuing followed up till February 2017.
Main outcome measures: Dispensing errors were been documented from May to July 2017.
Results: The PDCA cycle included rearranging the position of medicine in dispensing area, adding the warning labels on look-alike, sound-alike medicines, shipping the medicine from medicine storeroom to outpatient pharmacy according to the consumption weekly, reassigning the work of each pharmacist in outpatient pharmacy, arranging volunteers to unpack the packaging of medicine under the supervision of pharmacists and adding examinations for identification of the medicine.
After implementing PDCA cycles for one month, the rate of dispensing error decreased from 0.12% to 0.03% successfully. Reduction rate was about 78.8%. The rate kept below 0.03% for the following 3 months.
Conclusion: After doing the quality control circle, we continued reducing human errors at outpatient pharmacy to decline dispensing errors. Keeping the rate below 0.03% can largely reduce potential harm and increases medication safety. It also has additional benefits including improving dispensing quality and efficiency, reducing patient's time for filling the prescriptions in the outpatient pharmacy (saving about 57 min hours per month) and enhancing patients' satisfactions.
In conclusion, the quality control circle is suited for regional hospital to improve medication safety and should be applied continuously.

HP-PC085: Monitoring the use of high cost antibiotics at Sacco Hospital

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Background and Objective: Antimicrobial resistance has increased dramatically in the past few years often due to inappropriate and excessive use of antibiotic drugs. Since antimicrobial resistance represents an emerging problem, a specific antimicrobial prescribing procedure was defined at the hospital: an antibiotic order form was implemented for all high cost antibiotic prescriptions in order to monitor and assure the rational use of antimicrobial drugs. The form had to be compiled by an infectious disease specialist and to be sent to the Pharmacy. In January 2017 the form was reviewed adding to Daptomycin and Tigecycline also the new antibiotics Dalbavancin, Ceftolozane/Tazobactam, Ceftaroline fosamil as possible prescribed drugs. The objective of the work was to analyse all the high cost antibiotic prescriptions made from January 2016 to May 2017 and to compare prescriptions made before and after the introduction of the newest molecules.
Design: Every antibiotic order form sent to the Pharmacy from January 2016 to May 2017 was analysed extracting the following data: infection, prescribed drug, prescription ward, antibiogram, dosage and duration of therapy.
Results: One-hundred and sixty-two antibiotic order forms (118 patients) from different wards (57.5% infectious diseases, 14.3% surgery, 21.1% intensive care, 7.1% others) were analysed. Only 69% of them were totally completed. Major infections were endocarditis and skin and soft tissue infections. Prescribed drugs were: 68.7% Daptomycin (52 in 2016, 29 in 2017), 22% Tigecycline (17 in 2016, 9 in 2017), 6% Dalbavancin, 2.5% Ceftolozane/Tazobactam, 0.8% Ceftaroline fosamil. Dosage and duration were compliant with drugs data sheet indications, except for 28 patients admitted to the infectious disease ward who required continuation (67.8% Daptomycin, 28.6% Tigecycline, 3.6% Dalbavancin). Antibiotic resistance was an important reason for prescribing a specific high cost antibiotic in 29.6% of cases: 19 patients in 2016 (54.3%), 16 patients in five months of 2017 (45.7%).
Conclusion: The analysis of antibiotic order forms highlighted an increase in the use of high cost antibiotics especially for resistant pathogens found in critical wards. The introduction of the newest antibiotic drugs did not show a decrease of the use of older antibiotics. The increasing trend of prescriptions and antibiotic resistance confirm the importance of local antibiotic prescription monitoring programs and the need to implement the system for all antibiotics.

HP-PC086: Patients' perspective and experiences of type 2 diabetes and its management in Jordan: A focus group study

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Background and Objective: Diabetes is a major public health concern globally, particularly in developing countries including Jordan. The aim of the present study was to explore the patients' perspectives and experiences regarding type 2 diabetes and its management. Findings should feed the development of future pharmaceutical care intervention programs designed to improve health outcomes in patients with type 2 diabetes
Setting and Method: Focus groups methodology moderated by the research pharmacist with a predesigned topic guides was used to collect data from individuals with type 2 diabetes during their visit to outpatient diabetes clinic at the Royal Medical Services Hospital in Amman, Jordan. All interviews were recorded, transcribed and analysed using a thematic analysis approach.
Main outcome measures: Patients' information needs about type 2 diabetes and its management and patients' experiences about barriers to medication and self-care adherence
Results: A total of 6 focus groups, with 6 participants in each one were conducted. Participants in the present study demonstrated a great information needs about diabetes and the prescribed treatment. Medication regimen characteristics including rout of administration, number of prescribed medications and dosage frequency in addition to perceived side effects represented the major barriers to medication adherence. In addition to demonstrating negative beliefs about the illness and the prescribed medications, participants showed negative attitudes and low self-efficacy to adhere to necessary self-care activities including diet, physical activity and self-monitoring of blood glucose.
Conclusion: Future pharmaceutical care intervention designed to improve health outcomes in patients with type 2 diabetes should consider improving patients' understanding of type 2 diabetes and its management, simplifying dosage regimen, improving patient's beliefs and attitudes toward type 2 diabetes, prescribed medications and different self-care activities in addition to improving patient's self-efficacy to perform different treatment recommendations.

HP-PC087: Screening and prevention of non-steroidal anti-inflammatory drug risk: Doctors and hospital pharmacists' roles

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Background and Objective: NSAIDs were the second most frequent spontaneously reported drug class in Thailand. Screening of NSAID risk among doctors and pharmacists are important to maximize drug safety. This study aimed to assess the frequency and details in screening and prevention of NSAID risk in patients by doctors and hospital pharmacists.
Setting and Method: A cross-sectional study was performed during 4-month period. Self-administered questionnaires were distributed by mail to all 206 orthopaedic doctors and randomly selected 761 pharmacists from hospitals in Northeastern Thailand.
Main outcome measures: Frequency and practice details provided on screening and prevention of NSAID risks in patients.
Results: Total of 417 hospital pharmacists (54.8%) and 66 doctors (32.0%) returned the questionnaires. Underlying diseases (100%), NSAID allergy (84.8%), patients' age (81.8%), and long-term NSAID use (81.8%) were frequently screened by doctors before NSAID prescribing. History of renal (100%), gastrointestinal (GI) (95.4%), and cardiovascular (CV) complications (78.8%) were commonly screened by doctors. Before dispensing by pharmacists, history of drug allergy (97.1%), underlying diseases (69.0%), and abnormal symptoms associated with NSAID use (51.0%) were often screened. There was no difference between doctor groups in risk screening, but significant differences were found in hospital pharmacists working in different type of hospitals on screening about underlying diseases ($p = 0.004$), concomitant drugs ($p = 0.026$), seeking treatment ($p < 0.001$), taking supplements ($p < 0.001$), and alcohol drinking ($p = 0.018$). More than 70% of pharmacists (P) and doctors (D) claimed to provide prevention of NSAID risks for GI (both100%), CVS (P77.1 vs. D98.5%), and renal (P81.3 vs. D100%) systems to patients. However, significant difference was only found in pharmacists to prevent renal risk among different type of hospitals ($p = 0.003$). Doctors mostly prescribed proton pump inhibitors to prevent GI risk (84.9%) and chose other pain killers to prevent CVS (68.2%) and renal (75.8%) risks, while pharmacists mostly advised patients to take NSAIDs with meals (97.4%), avoid using multiple NSAIDs (37.7%), and use in short-duration (46.2%) to prevent GI, CVS and renal risks respectively.
Conclusion: There were obvious gaps in risk screening and prevention by healthcare professionals especially for CVS and renal risks. More concern of these activities would minimize NSAID risk to patients.

HP-PC088: Improving transdermal patch administration through patient education

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Background and Objective: Transdermal patch administration is error-prone. Errors primarily occur because the patients lack the knowledge on how to use their patches correctly. Therefore, patient education seems a promising strategy to improve the patients' administration skills. We investigated the impact of comprehensive patient education by a clinical pharmacist on correct transdermal patch administration compared to routine counseling during patient-physician conversation in a pilot trial.
Setting and Method: Patients in an outpatient pain clinic were consecutively allocated to the intervention or control group. Intervention patients received comprehensive patient education by a clinical pharmacist including information on preparation of the application site and attaching the patch to the skin, patch monitoring during application, patch replacements, mechanism of transdermal drug absorption, patch storage and patch disposal. Control patients received routine information during patient-physician consultation. In both groups identical written patient information leaflets were dispensed to the patients. 4 weeks after patient counseling according to group allocation, patients were called for a follow-up assessment.
Main outcome measures: Knowledge of the patients on correct transdermal patch administration and barriers in the transdermal patch administration process.
Results: In total 23 patients participated in the pilot trial (intervention group N = 11, control group N = 12). Comprehensive pharmaceutical counseling significantly increased the number of patients who correctly answered the knowledge questions [baseline N = 1 (8%) vs. follow-up N = 8 (67%), $p = 0.02$]. When comparing knowledge changes between intervention and control group at follow-up, a statistically significant difference was just missed ($p = 0.06$).
Conclusion: Comprehensive patient education improves knowledge on correct patch administration. However, pursuing further error-prevention strategies such as redesign of patches to improve adhesion are essential to optimize safe transdermal patch use.

HP-PC089: Medication dispensing on the ward: do pharmacy technicians perform better than nurses?

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Background and Objective: In many hospitals in Europe nurses are the caretakers that perform the final drug dispensing and administration to patients. For dispensing this task often consists of dispensing the prescribed drugs from a ward stock with some kind of distribution system to patients on their wards. In our hospital this system consists of an electronic prescribing system with an electronic dispensing chart in the dispensing process. The electronic dispensing chart is used for logging on the caretakers identity.
Pharmacy technicians perform a variety of tasks with respect to drug distribution in our hospital. Amongst that are preparation and admixing of parenteral drugs, controlling prescribed medication orders, forwarding them in the electronic drug ordering system and dispensing drugs from the central pharmacy stock to the ward stock. One of the tasks of drug distribution in our hospital that is still exclusively done by nurses is the final dispensing of drugs from the ward stock and the administration to patients.

This study was performed with the aim of assessing the difference in accuracy of drug dispensing to patients on the ward between pharmacy technicians and nurses.
Setting and Method: This study was performed at a 500 bed general teaching hospital in the Netherlands. Our hospital pharmacy has 4 ward pharmacies on every floor of our hospital. On these ward pharmacies 2–4 pharmacy technicians prepare and admix parenteral

drug in laminar flow cabinets for hospitalised patients and perform other tasks in the drug ordering process and medication reconciliation. In both groups discrepancies were recorded in 8 terms by a senior hospital pharmacist and an senior pharmacy technician: wrong patient, wrong drug, wrong dosage form or administration route, wrong strength of drug, wrong quantity, wrong dispensing time, drug missing or not in ward stock and other discrepancies (diverse).
Main outcome measures: The number of discrepancies in dispensing medication orders for the next 24 h on a ward between nurses and pharmacy technicians.
Results: The number of discrepancies in dispensing 453 medication orders by nurses was 91 (20.1%). The number of discrepancies in dispensing 1200 medication orders by pharmacy technicians was 51 (4.25%).
Conclusion: The results revealed that the number of discrepancies made by nurses is much higher (N = 91; 20.1%, almost 5 × higher) than the number of discrepancies of the pharmacy technicians (N = 51; 4.25%). No effort was undertaken in this pilot study to reveal the cause of this difference, since the purpose of this study was mainly to investigate if pharmacy technicians were able to do more nursing tasks in the drug distribution process in our hospital. Drug dispensing on the ward was one of the tasks that was investigated. This study showed some promising results in further improving the drug distribution process in our hospital by letting pharmacy technicians perform the drug dispensing on the wards.

HP-PC090: Drug–drug interaction: what place does it occupy in the whole of pharmacist interventions in a French university hospital?

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Background and Objective: Although the number of clinically relevant drug–drug interactions (DDIs) is probably low, serious DDIs may be responsible for a significant number of adverse effects, leading to hospital admissions and prolongation of existing hospitalization. Computerized physician order entry and pharmaceutical validation systems warm physicians and pharmacists of various DDIs, contributing to dilute important drug-related information. The aim of this study was to determinate the proportion of DDIs in the whole of pharmacist interventions (PIs) in our hospital.
Design: A retrospective collection of PIs over a period of 12 months was conducted in our hospital. The secondary outcomes include classification/quantification of the adverse effects induced by DDIs; comparison of accepted PIs rate between DDI and no DDI intervention using Pearson's Chi squared test; determination of the proportion of each DDI typology (i.e. pharmacokinetic (PK) or pharmacodynamics (PD) interactions). Concerning PD-DDIs, an independent senior clinical pharmacist adjudicated the potential clinical relevance of these interactions, using the code of Van Roon et al. and a Hatoum-like scale.
Results: Over the 12 months period 12192 PIs has been achieved and 105 concerned DDIs (0.86%) few steps behind untreated medical indication (31.2%). There was no significant difference between accepted PIs rate of DDI and accepted PIs rate of no-DDI interventions ($p = 0.82$). Among these 105 DDIs, 47 interested PK mechanism and 58 were PD-dependent (1 DDI with PK and PD mechanism). The most prevalent adverse effects induced by DDIs were QT prolongation (24.7%) and increased risk of bleeding (8.6%). 24 (41.4%), 21 (36.2%) and 0 PD-DDIs had Hatoum score at 1 (significant impact), 2 (very significant impact) and 3 (vital impact), respectively.
Conclusion: Although many hours are devoted to teaching DDI mechanisms and principles, only few PIs involved DDI related problem in clinical practice. Most of DDIs had a minor clinical relevance (63.8% Hatoum score 0 and 1). Indeed, most of DDIs required an increase of clinical and biological surveillance and rare are the ones which constitute an absolute contraindication.

HP-PC091: Baseline characteristics of multimorbid patients included in a RCT

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Background and Objective: A randomized controlled trial (RCT) aimed to investigate the effect of a pharmacist intervention on time to hospital readmission was conducted between August 2014 and March 2016. The inclusion criteria were defined to enrich with multimorbid patients with complex medication use, which we believed would have most effect of the intervention. Here we describe the characteristics of the included patient population at the time of hospital admission (baseline).
Setting and Method: Patients were included at admission to an internal medicine ward in Norway after written informed consent. Acutely admitted patients using minimum 4 medicines from minimum 2 ATC-groups (level 1) were asked to participate. Six clinical pharmacists identified drug related problems (DRPs) based on the patients actual medication use before hospitalization, revealed by medicines reconciliation. A senior physician calculated the Charlson comorbidity index score retrospectively, based on journal data.
Main outcome measures: Descriptive statistics of the included patient population, i.e. gender, age, number of medications, assistance with medication administration, comorbidity and characteristics of DRPs.
Results: Baseline characteristics of 325 of the 400 included patients in the RCT have so far been assessed. Among these 166 were females (51.1%) and median age was 78.7 years (range 23.1–96.4). The majority (91.7%) of the patients were home-living before hospitalization. Around one third of the patients had assistance with administration of medicines from a nursing home, home nurse or multi-dose-dispensed medications. The median number of diagnoses on admission was 5 (range 1–12) and the median Charlson comorbidity score was calculated to be 3 (range 0–12). Median number of prescribed medicines on admission was 8 (range 4–19) regular and 2 (range 0–10) on demand. The pharmacists identified a total number of 4209 DRPs at hospital admission, with a medium number of DRPs per patient of 12 (range 3–42). Every included patients had minimum three DRPs identified at admission.
Conclusion: The inclusion criteria of the present RCT resulted in intervention on a highly multimorbid, old population using complex medication regimens. The enriched occurrence of DRPs resulted in a population with many medication issues to be optimized, but there is a risk that the extensive multimorbidity will overrule the clinical consequences of DRPs, and hence reduce the sensitivity of the pharmacist intervention.

HP-PC092: From oral route to the first injection of Long Acting Antipsychotics: Is the time lapse sufficient?

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Background and Objective: Long Acting Antipsychotic Injections (LAAI) are increasingly prescribed thanks to their administrations frequencies and due to a better medication compliance for some patients. Therefore, patients must be stabilized under oral intakes before starting LAAI. Indeed, the effective dose have to be found, as well as a good tolerance of the drug. According to pharmaceutical companies, the only recommendation is the maintenance in patients tolerant by mouth. In literature, 4–8 weeks is the minimum to ensure the effectiveness of the treatment. The recommended duration of oral intake before switching to LAAI should be 4 weeks at least. The aim of this study is to assess whether or not maintenance of oral therapy is sufficient among naturalistic patients.
Design: We selected three LAAI: aripiprazole long acting (LA), paliperidone palmitate long acting and olanzapine pamoate long acting. We listed all initiations of these three drugs from December 2016 to May 2017 from the electronic patient record. Each patient's record is reviewed in order to find information about posology and duration of oral route before the 1st injection. The population is separated in 4 groups depending on the duration of the oral intake. Group 1: 3 month or more, group 2: 1 to 3 month, group 3: 1 week to 1 month, group 4: less than 1 week. Two judging criteria are evaluated: duration of oral route and the number of posology adjustment (ratio on 28 days).
Results: Overall population: 133 patients with an average age of 37. Sex ratio: 1,77 (M/F).
32 patients are excluded due to the lack of information or because they have already been treated by the same Long Acting Antipsychotic.

Aripiprazole LA (n = 24): group 1: 12,5%, group 2: 7%, group 3: 46% (average = 16 days), and group 4: 12,5% (average = 2.6 days). In group 3, we have an average ratio of 2,3 posology adjustments on 28 days.

Olanzapine LA (n = 16): group 1: 50%, group 2: 25%, group 3: 18.75% (average = 16.3 days), and group 4: 6.25%. In group 3, we observed an average ratio of only 1 posology adjustment on 28 days.

Paliperidone palmitate LA (n = 61): group 1: 4.9%, group 2: 14.75%, group 3: 67.2% (average = 16 days), and group 4: 13% (average = 5.6 days). We noticed average ratios of almost 2 for group 3 and of 2.75 for group 4.
Conclusion: Patients treated by paliperidone palmitate LA and aripiprazole LA are in majority switched to LAAI before 4 weeks of oral route, respectively 80.2% and 58.5%, with an high ratio of dose adjustments. We observed that 25% of patients treated by olanzapine pamoate LA are also switched too fast. This lower percentage for olanzapine pamoate LA could be explained by the mandatory patients monitoring during 3 h after administration. The olanzapine pamoate LA is reserved to the hospital in France. According to literature the time lapse of oral route is not sufficient in most of the cases. However a quick instauration reduces the length of the hospital stay. A fast switch raises the question of therapeutic adherence. In case of relapse, is it due to inappropriate molecule or dose?

HP-PC094: Optimisation of administration procedure to preterm infant for a clinical trial

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Background and Objective: Fludrocortisone tablets are the only pharmaceutical form available on the market administered in clinical practice to treat new born to symptoms of adrenal insufficiency. Drug administration in preterm infants is done with nasogastric tube. However this drug is practically water insoluble and subjects to quick degradation in solution. In order to control the exact dose delivered after extemporaneous preparation for a clinical trial including PK PD study, some preliminary tests were conducted to optimize the reconstitution and administration procedure.
Setting and Method: Various enteral catheter (dead volume less than 2 mL), solvents (water, NaCl 0,9%, Glucose 10%, InOrpha, SF ALKA DRY), volumes (2 mL clinical limitation) and methodologies of reconstitution (directly inside the syringe, inside a cup than in the syringe, with or without agitation) were tested to optimize the reconstitution and administration procedure.
Main outcome measures: Visual inspection of the solution, evaluation of the catheter obstruction, drug dosage and stability at the final extremity of the enteral catheter were evaluated.
Results: Clinical practices of dispersion of the tablet in water, NaCl 0.9% and Glucose 10% causes obstruction of all size of catheters, regardless of the mode of preparation. With InOrpha and SF ALKA DRY the entire 2 mL were necessary to dissolve the tablet after agitation in a cup. No direct dissolution inside the syringe was possible. As InOrpha is ready-to-use (while SF ALKA DRY necessitates a reconstitution) it was firstly selected. With 2 mL of InOrpha, best results are obtained with the 6Fr 75 cm catheter: 73.9% of the drugs is recovered but with important variability (CV = 23,3%) probably linked to the diameter of the catheter and the limit of solubility of the excipients/active ingredient. With 2 mL of SF ALKA DRY, 73.3% (6Fr 125 cm) and 73.1% (6Fr 160 cm) of the drugs is recovered, with good reproducibility (CV = 2.5 and 3.5%).
Conclusion: Those preliminary assays were necessary to guarantee the reproducibility of the administrable dose of the drug, which is an important potential bias in the clinical trial. Those assays appear fundamental for our clinical trial but also to improve clinical practices.

HP-PC095: Impact of an antibiotic stewardship intervention on the prescription of quinolones, carbapenems and anti-MRSA agents on the emergency departments: the first 4 years

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Background and Objective: Emergency departments (ED) are excellent places for antibiotic stewardship implementation in order to promote rational use of antibiotics, considering that most empiric therapies start at this level of care and tend to be maintained through hospitalization. Hospital Beatriz Ângelo (HBA) is a general, JCI accredited paper-free hospital, opened in 2012. Antimicrobial prescription is done using an electronic system able to generate real time automatic e-mail notifications whenever there's a mismatch between the chosen antibiotic and the context (infection or prophylaxis), or conditioned agents (such as quinolones, carbapenems and anti-MRSA agents) are prescribed, allowing a rapid onset antibiotic stewardship. Analysis is then done by the Infection Control and Antibiotics Committee (ICAC) and interventions are made.
Assessment of the trend in the prescription of quinolones, carbapenems and anti-MRSA agents in patients admitted to an ED, based on March sampling of four consecutive years (2014–2017).

Setting and Method: Retrospective analysis of automatic e-mail notifications generated by the prescription system, during the considered period.
Main outcome measures: Variation of antibiotics prescribed in ED.
Results: In analysis period, notifications were generated as follows (2014/2015/2016/2017): quinolones: 76/48/29/45 (41% reduction between 2014/2017); carbapenems: 36/40/20/20 (44% reduction); and anti-MRSA agents: 13/9/3/1 (92% reduction). Levofloxacin represents respectively 59%/65%/72%/47% of the quinolones prescribed. For carbapenems, Meropenem represented respectively 50%/85%/90%/95%. Finally, with regard to anti-MRSA agents, reports were almost exclusively of Vancomycin (respectively 100%/89%/100%/100%). In the same period respectively 882/878/906/807 hospitalizations were made via ED.
Conclusion: During this period there was a significant overall reduction in the initial prescription of all antibiotics under analysis, which was greater to anti-MRSA agents, followed by carbapenems and to a lesser extent by quinolones. These results are in line with defined objectives for the use of these agents, and do reflect a significant change of the behaviour of prescribers at the ED, reflecting the gradual interventions, starting with "in loco" pharmaceutical validation and intervention (end of 2014), soon followed (February 2015) by full antimicrobial stewardship interventions by the ICAC in both front to end and end to front strategies. Training and awareness activities for ED prescribers are a central part of the program. Concerted and multidisciplinary interventions are essential in order to reduce inappropriate antimicrobial prescription.

HP-PC096: Evaluation of new HCV treatments outcomes performed by clinical pharmacists in a multi-professional team

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Background and Objective: To evaluate the efficacy and safety of therapeutic profile with DAAs in clinical-practice and the impact of multidisciplinary action on the results.
Setting and Method: Prospective study of co-infected HIV/HCV and mono-infected patients (G1/G2/G3/G4) submitted to regimens including new DAAs, since March-2015/July-2016. In the day-1 treatment, an evaluation of the pharmacotherapeutic profile of each patient was made. In the first and last pharmaceutical-consultation, a 'Beliefs about Medicines Questionnaire' (BMQ) was delivered. The score obtained in 1st-BMQ allows identifying those who're most likely to be non-adherent. The primary endpoint was sustained virologic response (SVR12) post-treatment. Adverse events were considered through pharmaceutical appointment reports.
Main outcome measures: Adherence to treatment; Categorisation of effectiveness (effective or ineffective) of treatment considering the sustained virologic response as a marker
Results: There were included 167 patients, 70.1% male with mean age 48 and predominantly mono-infected (83%). G1 was the most prevalent (63%). 52% patients have advanced fibrosis (F3/F4), only 17% were non-responders to previous regimens. The most commonly prescribed regimen: Ledipasvir + Sofosbuvir + Ribavirin (77%), the remaining did Sofosbuvir + Ribavirin (21%). Overall pharmaceutical appointment, it was detected potential drug–drug interactions between 28 different drugs and HCV regimes resulting in discontinuation or replacement of 42 therapeutic schemes. Most common side effects were fatigue (32%) and headache (20%). Furthermore, two cases of hepatitis B reactivation were reported. 1st-BMQ: 21 patients (23%) had negative score, reflecting an increased risk of non-adherence. Of these, 81% increased score in the last-BMQ. 7 patients detected with non-compliance in pharmaceutical-consultation, 100% had negative score in 1st-BMQ. 93% out of 83 patients who successful end treatment, showed SVR. 4 experienced virologic breakthrough: two G1 under Ledipasvir + Sofosbuvir (12 weeks); one G4 under Ledipasvir + Sofosbuvir (24 weeks); one G3, under Sofosbuvir + Ribavirin (24 weeks).
Conclusion: The BMQ is an important tool to detect patients who have increased risk of non-adherence to treatment. Knowing that most patients have increased overall score on the last survey highlights the positive impact of pharmaceutical appointment on compliance. The results confirm the efficacy and tolerability of DAAs in clinical practice.

HP-PC098: Impact of a rationalized carbapenem dispensing in a general hospital

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Background and Objective: Carbapenems are a broad spectrum antibiotics and have a high stability towards β-lactamases. Thus, they are closely monitored antibiotics, involving a follow-up of prescriptions in order to prevent the emergence of resistant mutants. A nominative dispensation and a systematic 72-h reassessment were implemented in 2014 in the hospital to regulate the prescription.
The aim of this work was to assess the nominative dispensation of carbapenems over a period of 3 years (2014, 2015, 2016).
Design: The analysis of nominative dispensations was conducted with pharmacy's data. The studied parameters were dosages, duration of treatments, germs, localization of infections, wards and cost. The statistical tests were performed using Graphpad software: Chi Square test of independence, analysis of variance (ANOVA), and Kruskal–Wallis one-way analysis of variance.
Results: In 2016, the annual cost of carbapenems increased by 10%. The consumption of carbapenem in daily defined dose (DDD) increased from 11 484 in 2015 to 14 081 in 2016 (+ 22.6%), with + 91.3% for meropenem and − 15.4% for imipenem, while ertapenem remained stable. The introduction of treatments was constant (1 235 in 2015 vs 1 335 in 2016), despite a decrease of imipenem (− 10.8%) outweighed by the increase of meropenem (+ 59.1%). The mean duration did not differ significantly among the 3 years ($\alpha = 5\%$). Nevertheless, the proportion of long term treatments (> 7 days) decreased from 33.9% in 2015 to 28.8% in 2016 ($p = 0.0059$). Concerning short term treatments (< 3 days), we did not have significant difference, in spite of an upward trend. Mean daily dose of meropenem increased (3.49 g in 2015 vs 3.81 g in 2016 ($p = 0.0131$)) unlike the doses of imipenem. High doses of medication (≥ 6 g a day) increase since 2014 (5.6% in 2014, 7.5% in 2015 and 14.3% in 2016 ($p < 0.001$)). The main prescribers of these high doses were intensive care unit (ICU) (72% in 2016).
Conclusion: In 2016, treatments with carbapenem slightly raised. The decrease of imipenem was counterbalanced by the heightened use of meropenem. The increase of the costs can be explained by a higher purchase price of meropenem, as well as to the high doses of meropenem. We observed changes in therapeutic strategies, high doses of meropenem were prescribed by ICU during the first days of treatment and was stopped earlier. Our antibiotic stewardship for carbapenems allowed to decrease the long-term treatment and constrain most treatments to 72 h.

HP-PC099: Dosing appropriateness of dabigatran in a university hospital

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Background and Objective: The introduction of the direct oral anticoagulants (DOAC) widened the options for anticoagulation in atrial fibrillation and venous thromboembolism. Although these compounds have made anticoagulation more convenient, caution is warranted in patients with kidney impairment as they are partly renal cleared. The purpose of this study was to determine the appropriateness of dabigatran dosing.
Setting and Method: Retrospective analysis to determine dosing appropriateness of dabigatran (Pradaxa®) in a cohort of patients older than 60 years admitted to the UZ Brussel (a 721-bed tertiary hospital) in 2016. For rivaroxaban (Xarelto®) and apixaban (Eliquis®) data are still under collection and will be presented at the symposium.
Main outcome measures: The main outcome was to determine the percentage of (in)appropriate prescribing during hospitalization according to the dosing instructions from the summary of product characteristics. The secondary outcome was to describe the incidence of adverse drug events (bleeding or thromboembolism) due to inappropriate dabigatran use.
Results: Dabigatran was prescribed to 107 patients during 144 hospitalizations. The median cohort age was 78 years and consisted in 91 (63.2%) cases of females. Due to missing data on renal function, no judgement of appropriateness could be made for 3 patients. In 36 (25.5%) hospitalizations an inappropriate dose was prescribed according to renal function (Cockroft and Gault), age and indication including 16 underdosed patients (44.4%) and 20 overdosed patients (55.6%). Five patients were admitted to the hospital due to haematuria while using dabigatran.
Conclusion: Despite the fact that Pradaxa® is in use for a couple of years and clinical expertise is acquired with this drug, a substantial percentage of inappropriate dosing is observed entailing an increased risk of bleeding in overdosed patients and a potential hazard for thrombotic events in underdosed ones. Further education and/or a clinical decision support system guiding physicians in choosing the correct dose seem warranted to improve the situation and enhance patient safety.

HP-PC101: A clinical pharmacist service increases the availability of medication plans in routine paediatric care

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Background and Objective: Medication plans are considered to increase patient safety, especially in patients with three or more long-term medications. Research on medication plans mainly focusses on elderly patients but children can also be affected by polymedication. Especially children who are treated in social paediatric centres frequently suffer from severe diseases requiring several medications. Thus, we aimed at investigating the feasibility of creating medication plans in routine paediatric care supported by a clinical pharmacist service.
Setting and Method: In an exploratory study, we analysed the medical records of paediatric patients with an appointment in the social paediatric centre of a university hospital in January and February 2017. For those who received medication according to the current medical records a pharmacist compiled a medication plan based on those data. In collaboration with the treating physician, the medication plans were revised concerning unclear or incomplete documentation to increase comprehensibility and unambiguousness of the medication plans.
Main outcome measures: During the 8 weeks study period, we analysed the number of paediatric patients receiving medication and the number of dispensed medication plans.
Results: Records of 211 patients were screened. Of those, 117 (55%) patients received at least one medication, including 8 patients with pro re nata medications only. In median, the patients with medications were prescribed 2 long-term medications (Q25/Q75 1/4; min./max. 0/12). 50/117 (43%) patients were treated with at least 3 long-term medications. The pharmacist succeeded in creating a medication plan in accordance with the treating physician in all cases a plan seemed to be useful (relevant long-term medication) with all pieces of information defined as necessary by the official German medication plan.
Conclusion: As a considerable number of children treated in a social paediatric centre received long-term medication, medication plans should also be provided in paediatric patients. Pharmacists facilitated the availability of medication plans in routine paediatric care. To establish medication plans in paediatric patients, a clinical pharmacist service is an appropriate and feasible instrument to provide the required information to patients and their parents.

HP-PC102: Anti-infective drug shortages in France

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Background and Objective: Drug shortages affect patients, clinicians, health care facilities and national regulators. There have been increasingly frequent drug shortages in France during the last years: multiplied by 10 in 6 years, from 44 declarations to the French health national agency (ANSM) in 2008 to 438 in 2014. With a new law article in January 2016 and its decree implemented in January 2017, the new legal categories of major therapeutic interest (MTI) was created: drugs and drug classes for which a shortage is detrimental for patients, can put their vital prognosis at stake in the short or medium term, or be a loss of opportunity for patients with a serious disease or a disease which evolution could be serious without any treatment. Our objective was to describe the impact of this new legislation on routine drug shortages information in the daily practice.
Setting and Method: We summarized all drug shortages published by the French health national agency from January to March 2017.
Main outcome measures: Data collected concerned: international non-proprietary name, Anatomical Therapeutic Chemical classification system (ATC) drug class, possible alternative, manufacturer, and shortage reason. We contacted Quebecer and Swiss pharmacist for comparison.
Results: 49 drugs or 24 different international non-proprietary names were found to be on shortage. Among them 35 were anti-infective (71.4%), antineoplastic (18.4%) and nervous system drugs (6.1%). Generic manufacturers were concerned by 36.7% of shortages. Drug was not available at all for 26.5% of shortages, but 73.5% were still available for restricted use. For nearly 80% drug, shortage reason was not given by the French health national agency. Anti-infective drug shortages concerned: amoxicillin-clavulanic acid, cefixim, cefotaxime, oxacillin, piperacillin- tazobactam, and vaccine (BCG tuberculosis vaccine, hepatitis A vaccine, Hepatitis B vaccine, dTcaP vaccine, DTCaPHib vaccine). Switzerland and Quebec were only

concerned by piperacilline-tazobactam shortages among anti-infective drugs.
Conclusion: Drug shortages are a serious public health issue that is worsening for many years now. A cross-sectional study on October 2015 described and compared drug shortages in France and Canada: anti-infective drugs concerned then < 25% of the drug shortages, antineoplastic < 10%. The new legislation replaces anti-infective drugs and vaccines at their central place for taking care of patients. It also binds the pharmaceutical companies commercializing MTI drugs to develop and implement shortage management plans and help to place anti-infective drugs.

HP-PC103: Pharmaceutical interventions costs assessment

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Background and Objective: Drug-induced iatrogenesis is a primary concern for clinical pharmacists. The aim of this work is to assess the cost of several pharmaceutical interventions (PI).
Setting and Method: During the study time, PI are provided from Monday until Friday from 9:00 am to 4:00 pm in the emergency department (ED). PI were reported on a standardized form. Pharmaceutical conclusions were disclosed to the attending physician and recorded in the medical record. If appropriate, the pharmacist could provide additional interventions for each case.
Main outcome measures: PI were categorized accordingly to the technical level of the PI: (DA) screening for drug or food allergy, (CA) patient compliance assessment (Girerd score), (MM) patient ability to manage his personal medication (Girerd score + Mini Mental State Examination), (A) patient advice/information concerning the ongoing drug prescription, (HRS) screening for high risk of iatrogenic situation (food, behaviour), (DI) drug interaction screening, (PPA) pharmacist prescription analysis, (SMA) self-medication drugs analysis or (FPA) full pharmacist prescription analysis (prescribed + self-medication), (BPMH) best possible medication history, (DII) screening for drug-induced iatrogenesis (involved in differential diagnosis assessment), (MR) medication reconciliation.
Mean intervention duration was measured. Each PI cost was calculated based on the mean intervention duration and the hourly gross wage of a French hospital pharmacist (53.83 € per hour). The level of technicity of each PI was not taken in account.
Results: Fifty-seven patients [age: 66 (17–93), male/female ratio: 0.4] were included in this prospective monocentric study between 2013 and 2015. The IP requested by the attending physician in the ED were: DII 57.9% (33/57), FPA 56.1% (32/57), HRS 54.4% (31/57), BPMH 24.5% (14/57), DA 22.8% (13/57).
At least one drug-induced iatrogenic event was identified through the PI in 45.6% (26/57) of the patients. More than a half of these events were stated as avoidable (14/26). In 36.8% (21/57) of the patient the drug-induced iatrogenesis was identified as the ED admission reason.

The cost assessment was: [DA] 2.69€ (3 min), [CA] 4.49€ (5 min), [MM] 8.97€ (10 min), [A] 13.48€ (15 min), [HRS] 13.48€ (15 min), [DI] 1.79€ (2 min), [PPA] 4.49€ (5 min), [SMA] 6.28€ (7 min), [FPA] 8.97€ (10 min), [BPMH] 22.43€ (25 min), [DII] 67.30€ (75 min), [MR] 91.49€ (102 min).
Conclusion: In the same line as the nursing care and medical billing, PI have a cost for the hospital and should therefore, with respect to their impact on patient care, be evaluated.

HP-PC104: The role of clinical pharmacist in evaluation of cardiometabolic risk and drug-related problems in patients with bipolar disorder

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Background and Objective: The aim of the study is to evaluate cardiometabolic risk and also assess medication utilization and potential drug-related problems in patients treated for at least 3 months for bipolar disorder.
Setting and Method: The study was conducted at the psychiatry clinic of training and research hospital on patients with bipolar disorder who fulfilled the DSM-IV-TR diagnostic criteria for bipolar disorder between April and July 2014.
Main outcome measures: The MetS (metabolic syndrome) was assessed using the National Cholesterol Education Program Adult Treatment Panel III (NCEP/ATP III) and the Framingham 10 year coronary heart disease risk score was calculated. The Liverpool University Neuroleptic Side Effect Rating Scale (LUNSERS) was used to retrospectively assess the prevalence and intensity of side effects in antipsychotic treated patients and the 8 item Morisky Medication Adherence Scale (MMAS-8) was used to retrospectively evaluate patients' medication adherence. Drug related problem has been retrospectively detected by using Pharmaceutical Care Network Europe Classifications V6.2 in Turkish. Serum interleukin-6, hsCRP, Tumor necrosis factor alpha, and serum insulin were measured with special ELISA kit.
Results: The mean age of 60 patients (39 female, 21 male) was 41.8 ± 14.3. The most frequent bipolar disorder treatment among these patients was the combination of atypical antipsychotics and mood stabilizers (68.3%). The MetS was present in 46.7% of them. Based on Framingham 10 years coronary heart disease score, %85.0 had a low; 8.3% had a moderate and 6.7% of them had high for 10 years coronary heart disease risk. There was a statistically significant negative correlation between medication adherence and the prevalence and intensity of side effects ($r = -0.441$, $p < 0.01$). There was only statistically difference in hsCRP levels between the groups according to presence of The MetS ($p < 0.05$).
Conclusion: According to results of present study, it was obtained that elevated risks of cardiovascular disease and metabolic syndrome are essential problem in bipolar disorder and also it was presented that the medications used in management of bipolar disorders induced side effects would be influenced by medication adherence.

HP-PC105: Drug and vaccination status reconciliation by the clinical pharmacist at the emergency department of the University Hospital Brussels

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Background and Objective: In order to improve quality of care and patients' safety in the emergency department (ED) of the University Hospital Brussels, a clinical pharmacist program has been implemented since October 2016. The objective was to assess the role of the clinical pharmacists, by documenting the amount and the most frequent types of suggested interventions, together with their relation to the different classes of medications. Furthermore, we also aimed to objectify the influenza vaccination status of the elderly population in Brussels.
Design: A five-month single centre study was conducted at the University Hospital Brussels. Two dedicated clinical pharmacists were alternately present at the ED from Monday till Friday between 8.30 a.m. and 4.30 p.m. Patients' medications, influenza vaccination status and personal information were inquired and documented by the clinical pharmacists. Their main focus were elderly patients (> 65 years old) and/or patients with polypharmacy (> four medications). The obtained medication histories were inspected for potential interactions, contra-indications and other recommendations.
Results: The reconciled medication lists of 483 patients were reviewed. 266 female patients (n = 266; 55%) and 217 male patients (n = 217; 45%), with a median age of 80 years (range: 17–100 years). The median number of medications after reconciliation was eight per patient (range: 0–26). 670 interventions were suggested by the clinical pharmacist, which corresponds with an average of 1.3 interventions per patient. The most frequent suggested interventions were advice regarding side-effects, guidelines and relative contra-indications (n = 119; 17.8%), drug interactions (n = 115; 17.2%) and detection of non-compliance (n = 94; 14%). Interventions were most frequently suggested for neurological and psychotropic medications (n = 146; 20.9%), cardiovascular (n = 122; 17.5%) and gastrointestinal drugs (n = 70; 10%) and analgesics/antipyretics (n = 68; 9.7%). The vaccination status was inquired in 239 patients. 154 (64%) patients had already received an influenza vaccination, 14 (6%) patients planned to receive one and 71 (30%) patients did not receive a vaccination in 2016–2017.
Conclusion: Clinical pharmacists play an important role to improve medication safety in the ED, for example by decreasing potential medication errors through medication reconciliation. Their responsibilities can be further expanded, potentially by creating a risk profile for patients with a high risk for potential medication errors.

HP-PC106: Evaluation of drugs used in paediatric bone marrow transplantation unit in terms of drug interactions

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Background and Objective: Paediatric hematopoietic stem cell transplantation (HSCT) is an effective treatment used since 1970′s. Lots of drugs are used for treatment and complications which exist during and after transplantation period. Increasing number of drugs is important in terms of drug interactions. Our objective is emphasize the importance of clinical pharmacist role on detecting drug interactions in paediatric HSCT unit as a team member.
Setting and Method: This study was carried out between 1st October 2015 and 1st May 2016 in Hacettepe University Hospitals- Ihsan Dogramaci Children's Hospital Paediatric Bone Marrow Transplantation Unit inpatient service. It was a prospective observational study. After patients and their parents' consents were taken, patients who were on HSCT treatment were included the study. During the study clinical pharmacist evaluated drug orders daily.
Main outcome measures: Drugs of the patients used during treatment were evaluated by a clinical pharmacist in terms of potential drug interactions by using Micromedex Solutions® database. Also clinical significance of drug interactions according to physicians and pharmacists were compared.
Results: A total of 20 patients with a mean age of 8 years (min: 0.6, max: 17) were evaluated. Eighty percent of patients were male. Thirty five percent of the patients had transplantation due to nonmalign hematologic diseases. A total of 454 potential drug interactions were detected in 20 patients. The number of interactions resulting from the drugs used for the HSCT was 396 (87.2%). 215 interactions were major; 210 were moderate; 18 were contraindicated and 29 were classified as minor. The most observed drug interaction (in 15 patients) was cyclosporin–fluconazole interaction. In preparation regimen period 21.4% of the interactions and after transplantation period 24.6% of interactions were found clinically significant by the physician. According to pharmacist both in preparation regimen period and after transplantation period 52.3% of interactions identified as clinically significant.
Conclusion: Because of extent and complexity of HSCT period and high number of drugs, the possibility of drug interaction risk increases. Determining clinical significance of potential drug interactions will be helpful to physicians when they manage treatment. Therefore clinical pharmacist's involvement in the multidisciplinary team to identify and prevent drug interactions is considered as a valuable tool in increasing the success of HSCT.

HP-PC107: Clinical pharmacist's contribution on managing drug related problems in paediatric hematopoietic stem cell transplantation

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Background and Objective: Hematopoietic stem cell transplantation (HSCT) is a treatment regimen for many malignant and non-malignant diseases seen in childhood. Drug related problems are frequently encountered in paediatric HSCT, where a large number of different drug have been used at all stages before and after transplantation. The aim of this study is to contribute to the treatment process through determination and prevention of the drug related problems as a clinical pharmacist in the HSCT unit team.
Setting and Method: This study was carried out between 1st October 2015 and 1st May 2016 in Hacettepe University Hospitals Ihsan Dogramaci Children's Hospital Paediatric Bone Marrow Transplantation Unit; as a prospective observational study. Inpatients and outpatients between 0 to 18 years of age were included in the study. The treatment of the inpatients was prospectively monitored.
Main outcome measures: Patient information was collected daily from patient files and withdrawn from the Nucleus® program, where patient information was entered online. Patients were monitored and evaluated for drug-related problems (drug interactions, drug side effects, drug preparation and administration). Clinical pharmacist made suggestions to physicians for the problems identified.
Results: Twenty inpatients between 0.6 and 17 years of age and 22 outpatients between 2 and 17 years of age were included in the study. Eighty percent of patients were male. Only one patient had autologous transplantation and others had allogeneic transplantation. A total of 245 problems were identified in hospitalized patients and 37.14% of the problems were drug-related. A significant proportion of drug-related problems were preparative regimen related mucositis (47.3%) and side effects of cyclosporine (32.5%). During the study clinical

pharmacist made six suggestions for inpatients and five suggestions for outpatients. Three of suggestions for inpatients were about reducing the high dose. Suggestions for outpatients were related to drug administration time and route.
Conclusion: In our study we showed that in HSCT unit clinical pharmacist can contribute to physicians about drug side effects, drug interactions, drug doses and administration times which cause drug related problems.

HP-PC108: Importance of medication dose adjustment in hospitalized patients with impaired renal function at internal medicine ward: the possible impact of clinical pharmacist

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Background and Objective: Medication dose adjustment according to patients' renal function is key point to provide effective and safe drug therapy. In this study, it is aimed to evaluate medication dose adjustment in hospitalized patients with impaired renal function at internal medicine ward by using various estimated glomerular filtration rate (eGFR) calculators and different software programs.
Setting and Method: The study was conducted between 15 November 2016 and 1 February 2017 in internal medicinal ward among patients older than 18 years who had eGFR < 60 mL/min/1.73 m^2, used at least one medication and hospitalized more than 24 h. Chronic Kidney Disease Epidemiology Collaboration equation (CKD-EPI) was routinely calculated in this hospital.
Main outcome measures: In this study, Cockcroft-Gault Formula (C-G), and Modification of Diet and Renal Disease equation (MDRD) were also used in the calculation of estimated mean creatinine clearance in these patients. The following software programs have been used Micromedex®, Medscape and Lexicomp® to compared with results when CKD-EPI was used in calculation of patients' mean estimated creatinine clearance.
Results: A hundred participants (74.6 ± 13.1 years old; 40 male) included in this study. Of them, 90% had comorbid diseases. The mean of eGFR values of the patients was calculated as 28.1 ± 15.4 mL/min/1.73 m^2 when CKD-EPI was used. The mean of the number of drugs used throughout the hospital stay was 10.5 ± 4.0. A significant correlation between C-G formula and CKD-EPI (r: 0.915; $p < 0.001$), C-G formula and MDRD (r: 0.891; $p < 0.001$) CKD-EPI and MDRD (r: 0.996; $p < 0.001$) have been detected.
The number of required consideration for medication dose obtained from MedScape, Lexicomp® and Micromedex® was 151, 163 and 149; respectively. However, it was observed that out of them, only 61, 65 and 61 medication dose adjustment was performed at hospital setting; respectively. A significant correlation between MedScape and Lexicomp® (r: 0.951; $p < 0.001$), MedScape and Micromedex® (r: 0.968; $p < 0.001$), and Lexicomp® and Micromedex® (r: 0.917; $p < 0.001$) were determined.
Conclusion: As conclusion, it was determined that CKD-EPI is appropriate for calculation of eGFR in hospitalized patients with impaired function. Among software programs, it was found that all of them is appropriate and compliance with each other when calculation of eGFR was performed. However, the possible impact of clinical pharmacist should be considered in medication dose adjustment in hospitalized patients with impaired renal function.

HP-PC109: Beyond medication reconciliation: a pilot study for a post-hospitalization pharmaceutical care program

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Background and Objective: Medication adherence is often poor, particularly in addictology patients due to both psychoactive substances consumption and addictive disease itself. Care and medication non-adherence is one of the factors responsible for relapse and follow-up cessation in patient with addiction. After alcohol or addictive drugs withdrawal hospitalization, the first month is a high risk period for relapse. Our hypothesis is that counseling by phone calls after discharge may improve medication adherence and therapeutic efficiency. The aim of this study is to evaluate feasibility and preliminary data on medication and care adherence of the first patients.
Design: A prospective pilot study was performed with a pharmaceutical counseling before hospital discharge and a post-hospitalization follow-up by phone calls with a clinical pharmacist and a psychologist. Only patients with discharge at home were included. The tools used are a medication adherence scale (Girerd et al.) and pharmaceutical counseling for clinical pharmacist and cognitive-behavioural therapy tools for psychologist.
Results: 14 patients are included in this pilot study during 3 months. Clinical pharmacist discharge counseling ($n = 14$) was performed on addictology ward by patient meeting. A medication regimen form and instructions for home medications was given to the patient if necessary. Phone calls are planned once a week during 3 weeks; then 3 months after discharge. We have currently proceeded at 32 counseling by phone, with only 4 missed calls. 4 patients completed the all program. In this pilot study, medication adherence is "medium" or "high" and pharmaceutical advices allowed optimizing drug intake (scheduling of medication, adverse drug reaction management…). Psychological counseling is complementary to help patient to put in place strategies to avoid relapses. Patient's feedback on the program revealed that they are reassured, comforted and allow them to ask any questions about their medications.
Conclusion: This pilot study confirms that our organization is operational and our approach welcome by patients and health professionals. This post-hospitalization pharmaceutical care program permit to ensure a better hospital-to-city transition in order to prolong the benefits of hospital care, to identify relapse risks early and facilitating the return to daily life. Results on medication and care adherence must be stronger evaluated with more patients and pertinent criteria, like rehospitalisation rate. Thus it would be interesting to extend this practice to other healthcare units particularly in chronic diseases.

HP-PC110: Drug allergy and potentially inappropriate medication in hospitalised patients

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Background and Objective: Drug allergies are one of the most serious manifestations of allergic diseases. The epidemiology of drug allergies varies but is often quoted to be at 15% of all hospitalised patients. The objective of this work is to record the prevalence of drug allergies in one hospital of primary health care and to minimise drug allergy related problems.

Setting and Method: During a first period of 3 months (Dec 2016–Feb 2017, one day/month) the prevalence of drug allergies and the documentation quality in 433 patients on seven normal wards at IsarKlinikum in Munich were examined. Subsequently the process of drug anamnesis was improved by recording drug allergies at the time of in-patient admission by a skilled pharmacy technician. Further, the documentation of drug allergies in the electronic prescription system (V-Mobile) is routinely updated twice weekly. The success of this activity is being measured since July 2017 (first data available, currently 158 patients included).
Main outcome measures: The colour codes of the allergy fields of all patients were recorded as noted in the electronic prescription system (green = no allergy, grey = no data entered, red border = allergy entry during a previous stay, red = allergy). If no data were entered, the patient's chart was examined for untransferred allergies. Medication errors whereby a drug was administered despite being flagged as a drug allergy were recorded. The frequency of the parameters above, before and after establishing the improvements, was compared.
Results: Before changing anamnesis procedure, 52% of the patients were reported to have no allergies and 32% had a known allergy (23% drug allergy) entered in the prescription system. For 16% of the patients, there was no entry of allergy data. 8% of the patients (8 cases) with documented drug allergies received a drug they were marked being allergic to: dexamethasone, sufentanil, nebivolol, piperacillin/tazobactam, metamizole and piritramide (once each), tramadol twice. In no case adverse drug reactions occurred. After optimising drug admission and constant updating of allergy data, the documentation quality improved remarkably. At the first month in which the efficacy of the new measures was evaluated, 18% of the patients had a known drug allergy. The rate of undocumented allergy data was reduced to 8%. Only in one case, a drug flagged as an allergen for the patient was administered (piperacillin/tazobactam).
Conclusion: Since around 20% of patients are affected by drug allergies, high sensibility and attention to documentation of allergies and drug administration is necessary. A penicillin allergy is often quoted by patients although at least 75% in fact tolerate ß-lactam antibiotics, implicating that often there is no true penicillin allergy and therefore more information is required for a clinical decision. Our data show that improving drug anamnesis procedure and continuous updating of drug allergies in the electronic prescription system hand-in-hand with an increased awareness of allergy related risks elevate documentation quality and avoid the administration of known allergens to patients.

HP-PC111: Implementation of an antimicrobial stewardship program in digestive and hepatic surgery department

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Background and Objective: Prospective audit and feedback is recommended to reduce antimicrobial resistance by improving the use of antimicrobials. This study aimed to evaluate antibiotic prescription before and after implementation of an antimicrobial stewardship programs (ASP) in a 85-bed surgical wards.
Setting and Method: We performed 2 prospective studies, of 2 months each in 2012 and in 2014, including all systemic antibiotics prescribed in Digestive and Hepatic Surgery department based on Gyssens' algorithm and on the national and local guidelines for anti-infective drugs. ASP had been implemented between the 2 studies: restitution of the results from the first study, antibiotics counseling by an infectious diseases expert and follow-up antibiotic prescription by a pharmacist which provided both non-compulsory advices.
Main outcome measures: Treatments were considered appropriate when indication, choice of agent, dose, and duration were approved by an infectious diseases expert and a pharmacist. They were considered unnecessary when indication was incorrect, and they were deemed inappropriate when indication was approved but treatment modalities were not optimal.
Results: In the 1st study, 57 patients were included and 194 antimicrobials were prescribed. We notified 47% (n = 92) of appropriate prescriptions and 14% (n = 28) of unnecessary prescriptions. The dose was correct in 89% (n = 172) of prescriptions and the duration in 61% (n = 1118) of them. De-escalation was applied in 41% of possible cases. We identified several points that could be improved: duration prescription, prescription of metronidazole and piperacillin/tazobactam in association or low dose of aminoglycoside.
In the 2nd study, 59 patients were included and 217 antimicrobials were prescribed. We notified 56% (n = 121) of appropriate prescriptions ($p = 0.26$) and 9% (n = 20) of unnecessary of them ($p = 0.38$). The dose was correct in 88% (n = 190) of prescriptions ($p = 1$) and proportion of correct dose of aminoglycoside was improved. The correct duration were significantly increased than the 1st study: it was correct in 75% (n = 162) of prescription ($p = 0.05$). De-escalation was applied in 61% of possible cases.
Conclusion: These encouraging results show the interest to implement an ASP. The cooperation between prescribing physicians of Digestive and Hepatic Surgical department, infectious diseases expert and pharmacist can improve the appropriate antibiotic use.

HP-PC112: Attitude towards usefulness of patient information leaflets among ambulatory patients

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Background and Objective: Patient information leaflet (PIL) is an importantly accessible source of medicine information for patients in many countries. Inadequate safety medicine information provided to ambulatory patients remains a significant problem in Thailand. Therefore, this study aimed to assess ambulatory patients' attitude towards usefulness of PILs and factors associated with them.
Setting and Method: A cross-sectional study was conducted at two university hospitals located in the second largest city, North-eastern Thailand. Study samples (n = 500) were selected by systematic random sampling from ambulatory patients aged over 18 years old during 3-month period. Self-administered questionnaires were distributed to patients directly at outpatient clinics.
Main outcome measures: The attitude statements were rated on 5-point Likert scale as strongly disagree, disagree, uncertain, agree and strongly agree. Total Score of attitude was also classified as poor, moderate and good.
Results: Of the total 500 respondents, 54.8% were female with an average age of 45.2 ± 14.04. Most of respondents (66.9%) had good attitude towards usefulness of PILs. The average total score of attitude towards PILs was 49.7 ± 4.01. In positive statements, most patients strongly agreed that PILs should be introduced by law enforcement (50.7%), and PILs helped them to use medications more accurately (49.9%). They also mostly agreed that PILs helped them to use medications safer (62.7%), and online PIL should be initiated to increase accessible medication information (60.9%). In negative

statements, patients frequently strongly disagreed that they did not want some advices from doctors or pharmacists after receiving PILs (41.9%), and there was no need to produce PILs for all medications (29.8%). Moreover, they disagreed that reading PILs might be a waste of their time (63.0%), and PILs made them loss of confident when using medications (57.7%). Multivariate analysis found that patients taking less than two medications (OR 0.618, $p = 0.024$) and those ever receiving PIs had better attitude significantly (OR 0.1.971, $p = 0.062$).
Conclusion: Ambulatory patients had positive attitude towards usefulness of PILs. Therefore, Thai health authority should support and introduce strategies to provide extensively accessible PILs for patients.

HP-PC113: New pedagogic method for clinical pharmacy students and pharmacists: The V-Idee-Oh project on paediatric topics

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Background and Objective: Children are not "miniature adults" and need appropriate medicines and clinical studies for their illnesses and metabolic, psychological and motor development. Pharmacists and pharmacy student need to have specific course on this topic to develop skills necessary to practice. A university diploma named "Paediatric Clinical Pharmacy" takes place every two year at the Faculté de Pharmacie de Paris. In this context, we developed a new concept of reverse teaching skills for some topics presented in this diploma.
Setting and Method: From December 2016 to May 2017, this multidisciplinary project involved two pharmacy students (6th year), the information and communication technology for teaching unit, and two pharmacists and teachers specialized in paediatrics. A total of 30 pharmacy residents and pharmacists have to participate to this project. Our objective was (1) to propose some synthetic and dynamic videos to help pharmacists and students in this program, (2) help them to summarize and remember the most important notions on the video topics and (3) to practice this notions in front of some clinical case.
Main outcome measures:
Results: The topics chosen were "Children and drugs" and "Children and fever". For each topic, 2 videos were created: 4 videos were implemented and available for the participants. Each video lasted between 4 and 8 min each. For each video, the pharmacy students ask questions to two pharmacists (Children and drugs) or to a physician and a pharmacist (Children and fever). The participants had 2 weeks to see the videos at home. They have then to summarize the important notions on an A4 paper and to bring this summary for the course day. During the course day, they have to exchange during 20 min on their summary (what did they learn? What are the most important notions?) in small groups. After that, the participants had to prepare and discuss about different clinical case related to the thematic during 2 h with the videos protagonists. The participants were satisfied by this new V-Idee-Oh tool (90%), by the vision of the video before the course (97%). One participant was not satisfied by the preparation of the summary and 23% by the exchange around these summaries. Concerning the clinical case, 17% were not satisfied by the case complexity (to easy), but 100% were globally satisfied by this new method. The qualitative comments of the participants will be presented on the poster (positive and negative points).
Conclusion: We present here a new pedagogic method to help pharmacists and pharmacy students for the acquisition of specific knowledge. Thanks to the comments collected we will shorten the summary exchange and we will enlarge this method for other topics for the next session. Some short extracts of the videos will be available with online access for the symposium.

HP-PC116: Prevalence of diabetes in antipsychotic-treated patients: are there differences among molecules?

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Background and Objective: Psychiatric diseases are a contributing factor of metabolic syndrome (MS). According to the ObEpi survey, the prevalence of type 2 diabetes was 5.5% in 2012 in France. Several studies show a 1.5–4 higher risk of obesity with schizophrenic people than in the general population. In literature, diabetes, disease belonging of the MS, is more often associated with atypical antipsychotics (APA) prescriptions than with first generations antipsychotics (APC). The goal of this monocentric observational naturalistic study is to know if diabetes is more often associated with APA than APC. Differences between each molecule are also searched.
Design: Using the hospital database, all patients treated with antidiabetics (AD) and with antipsychotics (AP) were included. This study was carried out between May 2016 and May 2017. Type 1 diabetic patients were excluded. We crossed data in order to estimate and compare frequencies of diabetes in patients receiving APC and in patients receiving APA. Anova with Tukey post hoc test was performed to study if a significant link between APA prescriptions and diabetes exist. Results were also compared to the literature.
Results: Among the 2703 patients treated with AP, 77 were also treated with AD, which represents 2.9%. The median age is 60 with 0,79 sex ratio M/F. Anova results show a significant difference between APA and APC prescriptions in diabetic patients ($p = 0.00441$). The post hoc analysis shows significant divergences only between aripiprazole and multi prescriptions of APC and APA ($p = 0.0339$) and between aripiprazole and quetiapine prescriptions ($p = 0.0455$).
Conclusion: Our results do not show relevant differences between molecules in the occurrence of diabetes except for aripiprazole. This molecule seems more correlated to antidiabetics prescriptions. These real life results are non-consistent with the literature that highlight a higher risk of diabetes with the 2nd generation of antipsychotics. Several limitations of this study must be taken into account. First 2.9% of patients of our study were treated for type 2 diabetes whereas prevalence in France is 5.5%. Indeed, some studies show a lot of untreated diabetics patients (until 30%) in psychiatry (CATIE*). Secondly, these results must be qualified, patients may also have a lack of monitoring concerning their somatic treatment. This survey could be extended by looking at the biological test results. We could wonder how pharmaceutical care would improve MS treatment.

HP-PC117: Autologous serum eye-drops: State of play of proper use by our patients

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Background and Objective: The hospital production unit have produced and dispensed for 2 years, autologous serum eye-drops. Autologous serum eye-drop is a magistral preparation realized from patient's serum in clean-room and issued by the hospital pharmacy.

These serums are used to treat the dry eyes syndrome. This observational study aims at evaluating the proper use of the serum by the patient.
Design: This study was carried out between March 2017 and April 2017. A survey is conducted in order to test the patients' knowledge about the proper use of the treatment. Each of them (n = 9) was given the survey during the drug delivery: and the results were collected by the pharmacist at the end of the drug delivery. This anonymous survey, based on 21 questions, takes into account each step of the eye-drops channel: transportation, conservation, drops administrations rules and French blood agency (Etablissement Français du Sang) appointments. Finally, a leaflet with the survey replies is also created using National Institutes of Health and American Society of Health-system Pharmacists recommendations.
Results: All the patients of our hospital answered this survey. Among them, 89% of the patients store correctly their vials. Only one patient places it in the door instead of in the background of the fridge. Regarding to the administration, 75% of the patients do not apply their drops properly. We also noticed a lack of hygiene for 66% of them (hand washing, vials caps). All of the patient make their appointments in time. One patient wears contact lenses. More than half of them would like meetings with the pharmacist.
Conclusion: Divergences between what patients do and what they should do are shown by our results. These differences are linked either to a lack of knowledge or to the loss of the right gesture. Patients received standard replies in order to change their habits if needed. Meetings with patients at the first dispensation, and after if needed, will be organized. An explanatory note will be given to promote an optimal use of the serum. We will raise patient's awareness about their eye drops use, highlighting precautions about blood derived drugs. Moreover, expiration date of patient's serum batch will be given to the patient during his eye-drops dispensation. It would be interesting to carry out a similar study, in order to assess knowledge about autologous serum eye-drops, with pharmacists, interns and pharmacy technicians.

HP-PC118: What is the impact of regional pharmaceutical analysis recommendations: focus on the geriatric population treated by oral anticoagulant

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Background and Objective: In 2015, a study led in 6 health institutions (HI) allowed exploring prescriptions and pharmaceutical interventions (PI) related to oral anticoagulants (OA). The results showed a low rate of PI and the necessity to improve the pharmaceutical analysis (PA) process. Following this audit, regional PA recommendations were proposed to pharmacists. The aim of this study is to assess the impact of these guidelines on OA treatments in geriatric population.
Design: The study is based on the collection of prescription and pharmaceutical data on patients of 18 HI. The inclusion criteria were any geriatric patient with OA. The first part of the audit schedule is about patient data, the second one is about the drug prescribed and the third is about PI and adverse drug reactions (ADR) related to OA use.
Results: 500 patients were included in 18 HI. The average age was 83 years. 62% of patients were treated with vitamin K antagonists (VKA) and 38% with non-vitamin K antagonist oral anticoagulants (NOACs). It was the first prescription of OA for 20% of patients. The switch between OA is more frequent from VKA to NOACs (76%). 37% of patients had renal impairments. There was no monitoring of renal function in 24% of patients initiating NOACs treatment. The rate of PI was 16% whose 25% related to dose adjustments. The rate of potential PI was 4.8%. Among the 25 ADRs related to OA use detected, 8% of the events were declared to the pharmacovigilance unit (zero declaration among the VKA events).
Conclusion: NOACs are getting more important in geriatric population (27% in 2015). The study highlights that regional recommendations contributed to improve the PA process with a higher rate of PI (from 4% in 2015 to 16%). However, pharmacists should remain vigilant on the doses on both VKA and NOACs prescriptions and to keep on delivering a message about the need to declare drug events. Prescribers should also be more sensitized about the baseline renal function follow-up especially in initiation NOACs treatment.

HP-PC120: Hepatotoxicity of ketamine : what level of risk in our hospital ?

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Background and Objective: June 20, 2017, the French National Agency for Medicines and Health Products (ANSM) circulated a safety alert about ketamine and hepatotoxic risk. ANSM targeted three situations: treatment > 1 month, dose > 100 mg during several days and flow rate > 200 mg/h. Subsequently, ketamine prescriptions have been analysed in our hospital to estimate our level of risk.
Design: Ketamine prescriptions were analysed from 01.01.2017 to 21.01.2017 on the lookout for situations targeted by ANSM. Liver function of patients with risky dose was collected. Other prescriptions and discharge letters were looked up for patients with liver dysfunction in order to search for other aetiologies. Declarations of pharmacovigilance were retrospectively made.
Results: 39 patients received ketamine during this period. None of them have been treated above 1 month or have had a flow rate above 200 mg/h. Nine (23%) patients have received more than 100 mg during several days. They have received Ketamine to managing postoperative pain according to recommendation of French Anesthesia Reanimation Society (SFAR). Among these nine patients, only five get a liver function monitoring. Two of them had a hepatic dysfunction with a level of transaminases greater than 4 times the upper limit of normal. These dysfunctions appeared 1 and 2 days after ketamine introduction and have been resolved in 1 and 4 days after ketamine discontinuation. Doses of Ketamine were 144 mg per day and 108 mg per day. Not any other aetiology has been finding.
The Regional Centre of Pharmacovigilance confirms that ketamine is potentially responsible for these liver dysfunctions. Indeed, several cases of increase in transaminases have been reported during short term treatment with ketamine. Since 2014, they noted 10 serious liver dysfunctions in France. Four of which have required a liver transplantation.
Conclusion: According to ANSM alert, 23% of our ketamine prescriptions are risky. Moreover, prescribers are not enough aware of ketamine hepatotoxicity. Thus, pharmacist sent a mail of information to main ketamine prescribers. Moreover, an automated alert will be generated at the time of ketamine prescription to suggest a monitoring of liver function.

HP-PC121: Pharmaceutical care on the oncology ward using patient-reported outcomes (PRO-CTCAE)

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Background and Objective: Pharmaceutical care is a valuable service to optimise individual drug therapy und ensures medication safety. We aimed to assess the contribution of pharmaceutical care on the oncology ward in terms of recommendations for drug-related problems (DRPs). Moreover, the Patient-Reported Outcomes version of the Common Terminology Criteria for Adverse Events (PRO-CTCAE™) was used in order to assess the symptom load of the patients.
Setting and Method: The pharmaceutical care service was provided for 4 months on the oncology ward at the University Hospital RWTH Aachen, Germany. The service consisted of an extended medication history, medication reconciliation, a medication safety review, and pharmaceutical recommendations to the medical team. DRPs were classified using the APS-Doc system. The PRO-CTCAE questionnaire was applied once a week.
Main outcome measures: Type, frequency and occurrence of DRPs leading to an intervention; proportion of pharmaceutical recommendations influenced by PRO-CTCAE.
Results: 191 DRPs in 101 patients (55 male, median age 64 years, median time on the ward 7 days) led to interventions. The most common DRPs were related to potential drug–drug interactions (53.4%), drug dosage (13.6%) and drug prescription/monitoring (8.4%). 89% of DRPs occurred on the ward. For 13 patients (12.9%) recommendations were based on the PRO-CTCAE items. Implementation rate of pharmaceutical recommendations was 93.2%. Number of drugs, performance score, comorbidity and previous adverse drug reactions were shown to be significant factors predicting the DRP pattern.
Conclusion: The large number of DRPs and the high acceptance of pharmaceutical recommendations indicate the need for pharmaceutical care on the oncology ward. The PRO-CTCAE questionnaire can be a useful source of information to tailor pharmaceutical recommendations to the patients' needs.

HP-PC122: "Triple Whammy" combinations: A risk factor for surgical patients?—Prevalence at hospital admission

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Background and Objective: To identify the prevalence of"Triple Whammy" drug combinations consisting of diuretics, non-steroidal anti-inflammatory drugs (NSAIDs), ACE inhibitors (ACEI) and/or angiotensin receptor antagonists (ARA) which are associated with a drug–drug-interaction impairing renal function. The goal of the study was to evaluate the occurrence of these drug combinations at hospital admission of surgical patients and to strengthen the awareness of the interaction thereby increasing drug safety.
Setting and Method: Retrospective study over 6 months of patients admitted to 6 surgical wards of a teaching hospital, who received pharmacist-led medication reconciliation at admission. Medications, age, sex, risk factors and GFR were recorded. Univariate statistical analysis with frequency, mean/standard deviation and median/range was conducted.
Main outcome measures: Number of patients on "Triple Whammy" drugs correlated with age and risk factors.
Results: Of 1142 patients [60% male; median age 63 years (16–93)] enrolled 2% took three [median age 70 years (44–85)], 31% two [median age 69 years (27–93)], 20% one [median age 61 years (16–93)] and 46% none [median age 56 years (16–93)] of the target drugs. Patients with a triple combination had a median GFR (CKD-EPI) of 95 ml/min/1.73m2 (46–116), however 60% used the NSAID only on demand. Patients with double or triple combinations were mainly diagnosed with arterial hypertension, diabetes, nicotine abuse and/or coronary heart disease.
Conclusion: We found a wide use of the target drugs as double or triple combination, especially in elderly (> 65 years) admitted to surgical wards. National Guidelines recommend ACEI/ARA and Diuretics strongly for patients with coronary risk factors or diabetes to prevent further complications as well as protecting the kidneys. However, prescribers should be aware that concomitant use of these agents with NSAIDs may impact renal function and may lead to acute renal insufficiency. This is especially important for postoperative pain management. Results will be discussed with nephrologists and anaesthesiologists to improve drug safety in this aspect.

HP-PC123: Evolution in treatment of multiple sclerosis in a university hospital

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Background and Objective: During the last years, developments in the battle against multiple sclerosis (MS) include oral drugs, a steep forward, knowing that until recently only parenteral treatments where available. Starting last year, in our hospital have become available Aubagio® (teriflunomide) as a unique option of oral treatment for patients with relapsing forms of MS. Administrated 14 mg once-daily, reduces the number of overactive immune cells thought to cause MS flare-ups, while still allowing normal immune cell activity to occur. Teriflunomide has been approved by Food and Drugs Administration since 2012 and by European Medicines Agency since 2013.
The aim of this study was to analyse the reason of treatment change from parenteral drugs to oral drug teriflunomide.
Setting and Method: Observational retrospective study.
Data was collected from patients with MS who receiving chronic treatment for years and changed during 2016–2017. We reviewed the medical history to confirm previous treatment and the reasons of treatment change. A statistical descriptive analysis of collected data was performed.
Main outcome measures: Previous treatment, reason of the treatment change, adverse reaction with the previous treatment, any relationship between preferences for oral drugs versus age of the patient.
Results: 23 patients with mean disease duration 4,6 years, median EDSS 2,6 (1–5.5), received teriflunomide during 2016–2017, mostly women 19 (82%), the median age was 36 ± 11 years.
9 patients received teriflunomide as initiation treatment, because the preference for oral drugs (fear of injections) and from the rest of 14 patients previous failed therapies was: Betaferon®-7, Copaxone®-3, Avonex®-2, Rebif®-1, Tysabri®-1.

Medication with a higher discontinuation rate was Betaferon® and Copaxone®.

Regarding the reasons of treatment change the most frequent causes was: lack of efficacy-8, local side effects-4, systemic side – effect-1. One patient showed risk of progressive multifocal leukoencephalopathy from Tysabri®. Side-effects caused by Betaferon® and Copaxone® was skin reaction at the injection site, no depression was detected. No relationship between age and the choice of oral therapy was observed.

Conclusion: Oral drugs providing not only new treatment options and new challenges but also allow patients a better quality of life. Because there are not innocuous, the role of clinical pharmacist is crucial in monitoring side-effects, especially regarding counseling and education young patients on birth defects even 2 years after stopping teriflunomide. More real world data are necessary to assess effectiveness and long term safety

HP-PC124: Adherence to subcutaneous first-line disease-modifying therapy in multiple sclerosis

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Background and Objective: First-line disease-modifying therapy for multiple sclerosis (MS) like glatiramer acetate (GA) and interferon-beta 1-a (INFβ-1a), with subcutaneous administration, respectively 1 dose daily from GA 20 mg/ml and 3 doses weekly from INFβ 1-a have shown significant benefits in reducing relapse rates and the severity of the disease.

Long- time efficacy in delaying disability remains uncertain.

The route and number of administrations, long time ambulatory therapy and adverse reaction(RA) profile make adherence to treatment a real challenge!

The aim of the study was to evaluate the level of adherence and its relation to the clinical outcome: EDSS- expanded disability status scale and number of relapses. Does adherence vary depending on the drug in question and/or frequency of administration?

Setting and Method: Observational, retrospective study in a university hospital including patients who started GA or INFβ at least 4 years ago.

The modified Morisky -4 item medication adherence tool was used; the results were evaluated as follows: 3–4 points = high adherence, 2 points = medium adherence, 0–1 = non-adherence; also a validated self-reported questionnaire of adherence (MSTAQ) for identifying barriers to drug administration was used.

Main outcome measures: Data was collected from reviewing patient clinical records and variables analysed were:

Age at diagnosis, sex, EDSS score at baseline and after minimum 4 years, long time treatment exposure, previous failed therapies, number of relapses, RA profile, associated diseases.

Results: We analysed 80 patients, 32 men and 48 women, divided into 2 groups, respectively 40 treated with GA and 40 with INFβ, mean age at diagnosis 31.7. Mean exposure to treatment was 9 years. 24% of all patients had previous failed immunomodulatory therapies, 20% of patients developed depression either in the context of the disease or due to INFβ therapy.

Regardless of immunomodulatory received, EDSS increased, respectively 1.5 to 2.9- GA group and 2.1 to 3.3- IFNβ group.

Although the adherence was high, (90%),with no significant barriers reported, there were still patients who continued to show attacks and/or progression of disability, 11 of them had continuous progression, evolving to progressive secondary multiple sclerosis(SPMS).

Conclusion: There were no significant differences between GA and IFNβ regarding patient adherence. However, further studies are required to confirm the causal relationship between adherence and the lack of efficacy.

HP-PC125: Perceptions of a pharmacist-lead medication reconciliation process in a preoperative consultation at a urological ward

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Background and Objective: Medication reconciliation (MR) at hospital admission helps identifying unintended medication discrepancies and preventing medication errors. At the university hospital Basel, patients undergoing an elective urological surgery are routinely invited to a preoperative consultation. Before urologists reorganized the process, with the aim to improve efficiency, the collection of medication history was mainly based on medication lists from general practitioners or previous hospital stays. With the aim to ameliorate medication management and reduce potential medication errors, efficiency of and satisfaction with a pharmacist-lead MR process was tested at a urological ward.

Setting and Method: During nine weeks clinical pharmacists performed a MR for all elective patients at the urological ward using at least two different sources (structured patient interview, medication lists, or medication which was brought along). Discrepancies between the different sources were identified and, in collaboration with a clinical pharmacologist, categorised according to their potential of causing harm (high, moderate, or low risk). Discrepancies resulting from on-demand or irregular medication, missing or incomplete medication lists were not further analysed. Satisfaction of physicians and nurses with the process was explored using a questionnaire.

Main outcome measures: Number of discrepancies, their potential of causing harm as well as satisfaction of physicians and nurses with the process.

Results: Out of 94 performed MRs, 334 discrepancies evolved. Of these, 129 (38.6%) resulted from additionally identified drugs and 106 (31.7%) from listed but already completed drug therapies. Further 99 (29.7%) discrepancies resulted from dosage errors or incomplete information on the medication lists. Of 141 further analysed discrepancies, 10 (7.1%) were identified as posing a high, 50 (35.5%) a moderate, and 81 (57.5%) a low risk to patient safety. All physicians and nurses reported an improvement of quality and saving of time (60% > 10 min/patient, 40% 5–10 min/patient) in the process of collecting medication history and overall medication management (62.5% > 20 min/patient, 35.7% 10–20 min/patient).

Conclusion: A pharmacist-lead MR process is useful to identify medication discrepancies, partially with a high risk to patient safety, and improves quality as well as efficiency of the preoperative consultation.

HP-PC126: Are swiss hospital pharmacies ready for medication management support for patients at discharge? A survey on clinical pharmacy services

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Background and Objective: Clinical pharmacy services (CPS) at hospitals are developing all over Europe. In some countries, clinical pharmacists support patients throughout the discharge procedures in order to reduce the risk of drug related problems. This study aimed to update the implementation status of clinical pharmaceutical services in Swiss hospitals, with a focus on discharge procedures.
Setting and Method: An online survey was developed containing two main parts: A) clinical pharmacy services in general; B) discharge support. Questions were based on a survey conducted in 2013 and on literature research. Three practicing clinical pharmacists participated in piloting the questionnaire. All chief hospital pharmacists (n = 50) registered at the Swiss Society of Public Health Administration and Hospital Pharmacists (GSASA) were asked to participate in the survey by email.
Main outcome measures: The degree of implementation and frequency of CPS, type and frequency of involvement of the pharmacists in hospital discharge procedures, implemented models designed to facilitate the transition of patients from hospital to home.
Results: The survey took place in the German-speaking part of Switzerland from June to first week of July 2017 and 35 hospitals participated (return rate 70%). The preliminary data show that 23 (65.7%) hospital pharmacies offer CPS. Of these, 15 (42.9%) reported pharmacists taking part in daily or weekly interprofessional ward rounds. In terms of hospital discharge, 7 (20.0%) hospital pharmacies make an effort to identify patients in need of intensive support and 21 (60.0%) hospitals employ health care professionals (HCP) to support patients during the discharge procedure.
Conclusion: Most participating hospital pharmacies implemented CPS. HCP support patients at hospital discharge in most hospitals, but only a minority identify patients needing more intensive support.

HP-PC128: Time span of a total parenteral nutrition bag: from consultation to the end of administration

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Background and Objective: Nutritional support should be initiated soon in patients whom nutritional requirements are immediately assessed by a nutrition support team. Total parenteral nutrition (TPN) solutions have a risk of instability 24 h after preparation, therefore a timing of administration is important.
To determine the time span of the TPN process which starts from a consultation of nutritional support team (NST) until the end of administration of TPN solution.
Design: Two clinical pharmacists followed the process in a university hospital during two weeks in January, 2017. TPN process was analysed according to 6 stages.
Results: A total of 12 patients' TPN processes were followed in this study. A duration of compounding takes an average (± SD) of 5 (± 0.88) minutes, which differs according to the volume of TPN (average volume was 1557 (± 205.2) ml). The median duration of the process between consultation and evaluation of patient by NST, evaluation of patient and label printing, label printing and to start compounding, end of compounding and delivery to the service, delivery of bags to a service and application to a patient and consultation received and the beginning of TPN infusion were 57.5, 44, 87, 32, 56.5 and 428.5 min respectively. A mean (± SD) duration of administration was recorded as 24 h and 14 min (± 37.5). In regards to TPN bag renewal, a mean (± SD) volume of residual TPN solution was 106.9 ml ± 30.29 and 41.6% of the waste have been discarded as municipal waste rather than medical. The mean (± SD) temperature of environment during administration of TPN was 25.01 ± 1.6 °C.
Conclusion: In regards to stability problems of TPN solutions, an awareness among healthcare professionals should be raised in order to reduce waiting period. Minimizing the residual volume of TPN is important to maintain the patients' nutritional requirements and to minimize waste-cost related with TPN. An awareness of healthcare professionals regarding TPN solutions and bags as medical waste is necessary to maintain cost-effective practice.

HP-PC129: Implementation of clinical pharmacy practices in nephrology unit

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Background and Objective: A pharmacokinetic profile of drugs, particularly the elimination phase, alters by increasing age, concurrent illnesses and medications. Therefore, patients with renal disease and/or patients on dialysis are at high risk for drug related problems (DRPs) compared to general population. The aim of this study was to show the first implementation of clinical pharmacist's activities in a nephrology service in a university hospital.
Setting and Method: A prospective, observational study was conducted in nephrology service of the Hacettepe University Hospitals in June 2017. The first time, a clinical pharmacist was involved in patient care for 7 days and identified DRPs in the nephrology service. DRPs were categorized according to the Pharmaceutical Care Network System (v8). The acceptance ratio of pharmacist's recommendations by physicians were also recorded.
Main outcome measures: To identify DRPs by a clinical pharmacist in a nephrology service and to emphasize the influence of multidisciplinary team work in the management of these patients.
Results: During seven days, 30 patients were consulted by a multidisciplinary team, including a clinical pharmacist. The number of comorbid diseases and drugs used per patient was 2.5 and 8.2 respectively. Among the patients (n = 30), 17 (56.7%) were diagnosed with chronic renal failure and 13 (43.3%) with acute renal failure. Of those, 10 (33.3%) patients were on dialysis (acute or chronic failure). The patients' drug orders were reviewed by a clinical pharmacist; a total of 18 causes and related recommendations were documented, of those 88.9% were accepted by the physicians. The causes of DRPs (n = 18) were identified as; no drug treatment in spite of existing indication (7), dose too high (6), no indication for a drug (2), inappropriate timing or dosing intervals (2) and inappropriate combination of drugs (1).
Conclusion: A close monitoring of patients by pharmacists in nephrology service can help to identify and prevent DRPs, furthermore contributes to patient's health outcomes in collaboration with multidisciplinary team.

HP-PC130: Are physicians confused in the management of dyslipidemia?

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Background and Objective: Guidelines on the management of dyslipidemia are currently available and widely used by healthcare

professionals. However, treatment strategies may differ according to risk classification and threshold values of lipids which results in debate for initiation of drug treatment. This study aims to evaluate physicians' attitudes towards management of dyslipidemia and the use of guidelines in their practices.
Setting and Method: A survey of three case scenarios was distributed to physicians in an internal medicine residency program at a University hospital. The survey included questions on physician demographics and attitudes towards dyslipidemia management in three different case scenarios (Case-1: patient with a history of atherosclerotic cardiovascular disease; Case-2: patient with LDL-K > 190 mg/dL; Case-3: patient with type 2 diabetes). The physicians were asked to indicate treatment preferences on the three cases.
Main outcome measures: To evaluate physicians' preferences in the management of dyslipidemia and identify their attitudes regarding current guidelines.
Results: The survey was given to 80 physicians and 53 were returned (response rate: 66.3%). The mean (± standard deviation) age and duration in the residency program was 28.7 (± 4.9) years and 2.1 ± 1.1 years respectively. In regards to initiation of treatment for dyslipidemia, physicians based decisions on the American College of Cardiology/American Heart Association (ACC/AHA) guidelines (58.5%), the Dyslipidemia Guideline of the Turkish Endocrine and Metabolism Association (28.3%), clinical experience (7.5%), and the Adult Treatment Panel III (ATP III) guidelines (5.7%). The study indicated that physician preferences for treatment strategies varied across the three cases and appropriate treatment options were often not implemented. Among the physicians who prefer to use the ACC/AHA guidelines for treatment initiation (58.5%), appropriate treatment strategies were selected by 64.5, 9.7 and 32.3% of the physicians for the Case-1, Case-2 and Case-3 respectively.
Conclusion: There are variations in the understanding and implementation of guideline recommendations among physicians in dyslipidemia management. Clinicians should work to incorporate evidence-based recommendations into practice. Achieving international consensus on the management of dyslipidemia seems beneficial. Further research should be directed at evaluating the impact of technology (such as smart phone apps), clinical pharmacist presence in primary care, and educational interventions on adherence to guidelines.

HP-PC131: Analysis of the effectiveness and immunomediate adverse reactions of nivolumab in patients with non-microcytic pulmonary cancer

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Background and Objective: The treatment with nivolumab is of relatively recent introduction in the clinical practice so it has not yet been able to adequately assess its effectiveness and safety in the actual medical practice.
Objective: To evaluate the effectiveness of treatment with nivolumab in patients with non-small cell lung cancer (NSCLC) and the prevalence and severity of adverse reactions (AR) in clinical practice.
Setting and Method: We run a descriptive retrospective study in all patients treated with nivolumab at our centre from August 2015 to April 2017 or exitus.
Data were obtained by reviewing each patient's electronic medical record and the chemotherapy prescription program.

The following variables were recorded: age, diagnosis, stage, previous treatment lines, treatment start date, number of cycles received, AR and reasons for treatment discontinuation (tumor progression, toxicity or exitus).
Main outcome measures: To measure effectiveness, progression-free survival (PFS) was calculated. For assessment of the safety we reported all de adverse reaction suffered by the patients
Results: 24 patients were treated of NSCLC with nivolumab. There were a 79% of men, metastatic diagnosis was found in 19 patients and 21% of the patients had locally advanced disease (Stages IIIa-IIIb). The mean age was 64.9 years (range = 39–81).
45.8% (n = 11) of the patients had received two previous lines of treatment, 33.3% (n = 8) three previous lines and 20.8% (n = 5) four previous lines. The mean number of cycles received was 15.5 (range = 5–31). The median of PFS was 182 days (range = 70–322 days) in the totality of patients evaluated for response. 45.8% patients (n = 11) were currently being treated, 25% (n = 6) patients were discontinued due to toxicity and 29.2% (n = 7) due to tumor progression.

The immunomediated AR that led to the discontinuation of treatment were pneumonitis in 3 patients, nephritis, encephalitis and myositis in one patient each. In addition two other patients presented pneumonitis but of lower severity (grade 2) so treatment was temporarily suspended but was not interrupted.
Conclusion: Progression-free survival (182 days) in the patients studied was higher than that the result reported in clinical trials (2.33 months–70 days), which is may be due to the difference in the number of patients in stage IV treated (79% in our centre vs. 92.4% in pivotal trial).
Regarding safety, the AR that forced the treatment suspension were superior to those collected in the pivotal clinical trial (24 vs. 5%). Pneumonitis occurs in greater proportion in our centre (20.8% in our centre vs 3, 2% in pivotal) and its severity in our patients was worse too (3 cases of the 5 patients who presented pneumonitis were of degree 3 and in pivotal the majority of the cases were of degree 1–2).

HP-PC132: Off label use of Infliximab in GVHD: should we continue? A 5 years retrospective study

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Background and Objective: Infliximab (IFX) may be used as off-label to treat corticoid-refractory Graft Versus Host Disease (GVHD) after allogeneic stem cell transplant. Literature analysis shows that IFX doesn't seem to succeed proven efficacy in GVHD and should probably change prescribing practices of haematologists. Pharmacy performed a retrospective study to help physicians decision making.
Design: Following data stored in pharmacy database from 2012 to 2017 were compiled: age, gender, GVHD grade and type (acute or chronic), localization, previous prophylactic and curative treatments, conditioning regimen, IFX regimen, number of doses.
Results: Sixty six doses were administered to 16 patients [women 56.25%; mean age 54 years (29–68)]. Before IFX, patients received immunosuppressive regimen: on average of 2.15 for prophylaxis [0–4] including cyclosporine (n = 11), corticoids (n = 6), mycophenolate mofetil (n = 5), anti-thymocyte globulin (n = 4), methotrexate (n = 4) and tacrolimus (n = 1); and on average of 2.4 for curative treatment. Median of occurrence of GVHD was 50 days after graft [6–202]. Gastrointestinal symptoms were the most frequent (n = 12) more or less combined with skin (n = 8), liver (n = 2) or eyes (n = 1) injuries. IFX was initiated in average 107 days after GVHD [2–1133]. 7 patients had grade IV GVHD (43.8%), 3 grade III (18.8%), 1 grade II (6.3%). 12 patients (75%) developed an acute GVHD. Treatment schedule was 10 mg/kg intravenously weekly until recovery (mean doses = 4 per patient [1–8]). Clinical results of this cohort confirm literature: only 4 patients had a clinical benefice (25%); and 68.75%

(n = 11) died from sepsis (n = 6), epilepsy (n = 1), cerebral haemorrhage (= 1) and unknown causes (n = 3). Death occurred 59 days [2–164] after IFX. And only 4 patients had a clinical benefice (25%).
Conclusion: GVHD remains a major complication of allogeneic stem cell transplantation and at this time no drug has shown efficacy against GVHD. IFX was prescribed as a last line of treatment but this retrospective analysis confirms the lack of benefice. Hence, after discussion with physicians, IFX is no more used in our hospital in GVHD.

HP-PC133: Cidofovir: do we still need it in 2017?

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Background and Objective: Cidofovir (CDV) a nucleotidic analogue is a broad-spectrum antiviral agent that inhibits viral DNA polymerase. CDV no longer has a market authorization. Nevertheless, a compassionate use is still possible f, with prior approval of the French national authorities, for viral reactivations in immunocompromised patients. The aim of the study was to assess CDV's conditions of use in our hospital.
Design: A retrospective study was conducted with data stored in internal pharmacy database from 2014 to 2017 including: age, sex, indication, type of viral reactivation, dosage, treatment duration, virus load (VL), clearance and mortality. VL of adenovirus (ADV) in blood and serum creatinine were monitored at D0, W1, W2, W3, M1, M2 and M3.
Results: Sixty six doses were administered to 18 patients. Patients were mostly men (61.1%) and average age was 48 years [29-68]. CDV was used in post-allograft viral reactivation (PAVR) (n = 16; 88.9%) and papillomatosis (n = 2; 11.1%). Viruses were: adenovirus (n = 13), BK virus (n = 3), CMV (n = 2), HPV (n = 2) and JC virus (n = 1). Two viruses reactivated in 3 patients. In PAVR, initial regimen was 5 mg/kg/week followed by 5 mg/kg/2 weeks as maintenance time. Patients with papillomatosis received local injections and dosages depended on the size of lesions. Patients received CDV during 29.8 days [1–180] with an average of 3.7 injections [1–12]. VL of ADV showed a significant decrease at M3 with an average 4.5log at D0 and 3.7log at M3 ($p = 0.00122$). VL became undetectable in 9 patients at W1 or W2. It became undetectable at M6 in 1 patient. VL remained high in the 3 patients who died. We have not established a significant decrease of the creatinine clearance during the systemic treatment with CDV. Creatinine clearance was an average 87 ml/min/1.73 m^2 at D0 and 71 ml/min/1.73 m^2 at M3. Despite this treatment, 16% (n = 3) of patients died from sepsis.
Conclusion: CDV was mainly used in PAVR as a salvage therapy. The study have reported viral clearance of ADV in 10 of 13 patients (76.9%), it shows the efficacy of CDV in ADV reactivation. We have not reported nephrotoxicity, which is explained by the co-administration of probenecid, used to protect against renal toxicity (as mentioned in administration protocols).

HP-PC134: Use of antibiotics and medical records: a one-day survey

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Background and Objective: Antibiotic resistance has become a worldwide public health issue and is accelerated by antibiotic overuse. Reassessments of antibiotic treatments after 48 h and limitation of antibiotic duration are key points for limiting their use. The aim of the survey was to determine whether information of antibiotic prescriptions were traced in the patient's medical file.
Design: An prospective observational one day survey was conducted in a university hospital in March 2017 (surgery, organ transplant wards, internal medicine, neurology, rheumatology, and oncology). The data were gathered using a standardized questionnaire, including: antibiotics used, circumstances (probabilistic, prophylactic or documented infection), pathogenic bacteria, treatment durations and if so, reassessments at 48-72 h and justification of antibiotic therapy duration longer than 7 days.
Results: The prevalence of antibiotics use was 18%: 404 hospitalized patients were receiving antibiotics which represents 558 antibiotics prescribed. Most of them (n = 273; 49%) were ordered in a context of documented infections. Other indications were probabilistic (n = 201; 36%) and prophylactic treatments (n = 84; 15%). The most frequently prescribed antibiotics were beta-lactam associated with beta lactamase inhibitor (21%), followed by cephalosporins (14%), fluoroquinolones (12%), cotrimoxazole (11.5%) and penicillines (11%). Patients received an average of 1.4 antibiotics [1–6]. Enterobacteria were the most common bacteria in documented infections (30%). Localizations were mostly urinary (21%), pulmonary (16%) and digestive (13%). Reassessments at 48–72 h were noted in medical records only for 125 patients (31%), but this can be increased to 48% if prophylaxis, tuberculosis and patients treated less than 3 days are excluded from the calculation. In the same way, treatment durations were only mentioned for 142 patients (35%), but this also can be increased to 44% if prophylaxis and tuberculosis regimen are excluded. In 106 patients (26%), antibiotic treatment was conducted for more than 7 days (prophylaxis excluded) but this was justified in only 44 medical records (41.5%) mainly based on national guidelines or discussed in specific multidisciplinary meeting.
Conclusion: Efforts have to be continued to ensure an appropriate use of antibiotics and more information should be recorded in medical files. In order to upgrade these results, measures have recently been adopted such as reminding messages in CPOE system or in bacteriologic result files or educational programs dedicated to residents. This one-day survey will be achieved again few months later to assess the effectiveness of these measures.

HP-PC136: Identification and analysis of drug related problems by a clinical pharmacist during electronic prescription order validation

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Background and Objective: Drug related problems (DRPs) are known to be caused by prescribing errors. A check of appropriateness of medication therapy before delivery at the hospital pharmacy can reduce these errors. Objective: to evaluate electronic prescription order validation by a clinical pharmacist.
Setting and Method: Setting: pilot study in a tertiary university hospital (721 beds). Inclusion criteria: newly initiated as well as modified electronic prescriptions (February–May 2017) with primary focus on high risk medication (HRM; concentrated electrolytes, opioids, insulin, digoxin and methotrexate) and anticoagulants.
Methods: Prescriptions were checked on appropriateness by a clinical pharmacist (0.5 FTE). Physicians were contacted upon identification of a DRP, with a suggestion for treatment modification. DRPs were registered using a simplified version of the GSASA-classification (Swiss Society of Public Health Administration and Hospital Pharmacists).
Main outcome measures: type of DRPs in electronic prescriptions, physician acceptance rate.

Results: 19091 electronic prescriptions were analysed (HRM (n = 4217); anticoagulants (n = 1505); other drugs (n = 13459)). The clinical pharmacist identified 645 DRPs (3.3%). Of all validated HRM-orders, the pharmacist intervened 166 times (4.0%; acceptance rate 68.7%). Concentrated electrolytes needed most intervention because of 'no concordance with guidelines or contra-indication' (51.9% of 79 electrolyte prescriptions; acceptance rate 62.0%). 'Inappropriate timing or frequency' and 'overdose' were the most common DRPs for opioids (resp. 33.8 and 23.9% of 71 opioid prescriptions). 98 interventions were made on anticoagulants (DOAC (n = 27), LMWH (n = 57), VKA (n = 11)); mostly on drug dosage (under-dose 36.7%, overdose 21.0%) and indication ('no indication or duplication' 11%, contra-indication 9.2%); though the acceptance rate was low (48.0%). Other drugs were not yet classified in different drug categories, but DRPs were registered. 381 identified problems were discussed with the prescribing physician (acceptance rate 79.5%). 'Inappropriate timing or frequency' (31.5%) or 'no indication or duplication' (26.5%) were considered most occurred problems.
Conclusion: Prescription order validation by a clinical pharmacist is mandatory in order to identify DRPs. Overuse of concentrated electrolytes is most likely and an adjustment of hospital policy will be necessary to avoid future errors. Increased awareness of correct dosage, timing and frequency of administration of opioids has to be taken into account to reduce misuse. Physicians are less likely to accept interventions on anticoagulants. Additionally, the clinical relevance of DRPs and related pharmaceutical interventions remains to be evaluated.

HP-PC137: Assessing relevance of pharmacist interventions

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Background and Objective: The added value of clinical pharmacy practice to healthcare system is clearly recognized. To value and improve pharmacist interventions (PI), relevance analysis is necessary. The main objective was to assess relevance of Trousseau Tours University Hospital's PI, thanks to a systematic review.
Design: A retrospective collection over a period of 1 month of accepted PI was conducted among 2 medical and 8 surgery wards. Each PI was classed, thanks to "Tools for assessing potential significance of pharmacist interventions" Thi-Ha Vo and al., in one of 4 categories: with a clinical impact (using Hatoum scale) or a humanistic impact or an economic impact or related to process. Clinical interventions prevented a drug related problem on safety, preserved effectiveness and recommended a drug therapy or a more adapted way of administration. Intervention with a humanistic impact aimed to improve quality of life or compliance thanks to educational therapy. When a cheaper treatment was proposed, intervention was considered with an economic impact. Interventions related to process were concerning continuity of care (drug therapy recovery at admission and discharge) or multiplicity of prescriptions (due to a lack of communication between physician and surgeon).
Results: 464 accepted PI were analysed. 35% of analysed PI had a clinical impact. In this category: 57% prevented a therapeutic consequence on safety (72% of over dosage), 20% preserved effectiveness (72% of under dosage), 14,7% recommended a drug (potassium, insulin, anticoagulation, antibiotics…) or another way of administration, 7,97% suggested a biologic monitoring. Neither PI with humanistic and economic impact was found. 61% of analysed PI were related to process (21% concerning drug therapy recovery and 79% double prescriptions). 4% of analysed PI were not enough detailed to be understood and classed.
Conclusion: Assessing relevance is complex. It requests a multidisciplinary cooperation especially to judge clinical impact. Activities related to patient care are difficult to measure so humanistic impact isn't appreciated. Economic impact requires a global analysis of health care resources. Lastly, PI are reported by more or less experienced pharmacists, although the same rigor is expected to guarantee an optimal patient care.

HP-CE001: A video as a training tool about hygiene and sanitation of a hospital pharmacy

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Background and Objective: In hospital pharmacies, the legislative and normative framework aims to provide an efficient, safe and non-contaminated medication circuit. Pharmacists are responsible for developing proper work procedures, in collaboration with the hygiene and sanitation department, to prevent biological, particle or chemical contamination of drugs and contamination of healthcare workers or occupational environment. However pharmacists may be unaware of guidelines for hygiene and sanitation. Therefore, hospital housekeepers may lack of training for cleaning the hospital pharmacy. The aim of the video is to inform pharmacists and to train hospital housekeepers on hygiene and sanitation of a hospital pharmacy.
Design: Firstly, a literature search was conducted in Google and Google Scholar using the terms: hygiene, sanitation, hospital cleaning. Secondly, based on the normative framework, a cleaning plan was developed for each area/surface in the hospital pharmacy. It included: area classification (i.e. sterile vs non sterile), cleaning product (i.e. detergent disinfectant), cleaning material (i.e. disposable vs non disposable mops), techniques and frequencies. Thirdly, the script and technical specifications of the video were determined.
Results: A 23 min video was shot after the regular opening hours of the hospital pharmacy by a pharmacy resident. All the demonstrations were performed by a housekeeper and commented by a second one. A total of eight video sequences were recorded and edited with a slideshow reminding mechanism of action of cleaning products, safety rules or cleaning traceability principles. Fifteen housekeepers watched the video during a training session. Then, they were asked to complete a ten questions true/false anonymous survey. The rate of correct answers was 93%. They all knew that they are not allowed to manipulate drugs and that they must wear personal protective equipment while cleaning a sterile area. However, 40% thought that only a quaternary ammonium can be used to clean the pharmacy whereas sodium hypochlorite can also be used.
Conclusion: The video can enable the implementation of guidelines for hygiene and sanitation in hospital pharmacy into practice and may increase the level of knowledge of pharmacists thereupon. The video is now included in the regular formation of hospital housekeepers to improve the quality of their training.

HP-CE003: Therapeutic education for patient with liver transplant: national survey in France

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Background and Objective: Patient therapeutic education (TE) allows healthcare professional to transmit part of their knowledge and expertise to patients, so that patients become partners in their own care. Drug adherence and dietetic restrictions are among the most important factors determining graft and patient survivals after LT.
The objective of this study was to identify educational program for patients after LT in France.
Design: A collegial workgroup with nurses, physician and clinical pharmacist built a questionnaire with Google Forms which was tested by two pharmacists skilled to supervise TE. After identification of French LT units, the questionnaire was mailed to local responsible for TE programs. Fifty-height items were collected including, structure, management, participants, program before and/or after LT, program evaluation and eventually grant received and/or other financial support.
Results: Sixteen centres have been contacted and 13 answered. Among them, 11 have already set-up TE. Concerning the two remaining centres, implementation of TE program was planned for 2017. The main difficulties encountered in setting up the TE were: lack of time, trained and available healthcare providers, material and financial resources. Indeed, only 5 of the 11 centres performing TE claimed to receive funding from either hospital or Regional Health Agency. The main motivations for the development of TE were collaboration and teamwork. Therefore, in most centres, the TE team was associated a nurse, a hepatologist, a clinical pharmacist, a dietician, a psychologist, a health framework, a social worker, and an addictologist. Individual or collective sessions were sat-up in pre-LT or post-LT. The most widely used pedagogical tools were brochures, fact sheets and plans. Before the patient leaves the hospital, an assessment of his knowledge was carried out in eight centres. At the discharge, only five centres communicated information to the GP, the community nurse, the community pharmacist or the post-discharge centre. Finally, data on TE were recorded in the patient file for eight centres while three did not record any data.
Conclusion: Although this census is rather positive, in the sense that a TE program is present in most LT centres, practices harmonization and messages conveyed could equalize chances of all patients in terms of survival and quality of life.

HP-CE004: Interprofessional education of pharmacy and medical students—experiences with a pilot project

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Background and Objective: The WHO proclaimed in 2010 that interprofessional education leads to effective collaborative practice enabling highest quality of care. In Switzerland, interprofessional university curricula for pharmacy students are not established yet. This project was a pilot of interprofessional education addressing pharmacy and medical students in a Swiss university setting.
Setting and Method: On two half-days of regular pharmacy lectures in April 2017, all pharmacy students (2nd Master semester) and voluntary medical students (6th Master semester) took part in this pilot project. One clinical case study per half-day was prepared by pharmacy lecturers and commented by expert pharmacists and family physicians. After an introduction with icebreaker exercises, groups of 4–6 pharmacy students (phs) and 1–2 medical students (ms) worked on a clinical case study and prepared a short presentation for a subsequent plenary discussion attended by a pharmacist and a physician expert, providing an interprofessional debriefing. Evaluations were performed before, after the first, and after the second workshop. Teachers' experiences were assessed after the second workshop.
Main outcome measures: Student evaluations on role understanding using Likert-scales and open comments for feedback; teachers' experiences.
Results: The pre-evaluation questionnaire was completed by 85 (93.4%; $n_{ms} = 25$; $n_{phs} = 60$), the first evaluation by 75 (82.4%; $n_{ms} = 24$; $n_{phs} = 51$), and the second evaluation by 72 students (81.8%; $n_{ms} = 22$; $n_{phs} = 50$). They knew their own role in an interprofessional team before the workshops (ms = 60.0%; phs = 71.7%), but much better after the first (ms = 91.7%; phs = 90.2%), and the second workshop (ms = 95.5%; phs = 90.0%). Likewise, the knowledge of each other's role increased (pre: ms = 56.0%; phs = 81.7%; 1st post-evaluation: ms = 83.3%; phs = 98%; 2nd post-evaluation: ms = 90.9%; phs = 92%). Negative comments focussed on differences of educational levels between pharmacy and medical students (2nd vs. 6th Master semester) and the resulting knowledge gaps. The physician experts (n = 4) rated the difficulty level of the clinical case study as adequate and supported the continuation of the workshop with students on equal educational levels.
Conclusion: We successfully conducted two half-days of interprofessional education with pharmacy and medical students. With a few adjustments, e.g., involving students on the same educational level, the course should be introduced into both university curricula. Further extensions in time and professions are desirable.

HP-CE005: the effect of a pharmacist-led education intervention on reducing drug–drug interactions in an acute hospital setting

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Background and Objective: Educational interventions have shown promise in reducing inappropriate prescribing; however, only a small number of studies have examined the effect of educational interventions on preventing drug–drug interactions (DDIs) in clinical practice. Unlike other adverse drug reactions, DDIs can be identified and avoided; this make them an ideal target for investigation. The aim of this study, was to implement a pharmacist-led educational intervention, based on the structure of the academic detailing approach, in order to reduce the number of DDIs in the admissions unit of an acute hospital.
Setting and Method: A retrospective audit of 42 in-patient drug charts was conducted to identify a baseline prevalence of DDIs prescribed on admission to the medical assessment unit of our hospital. Stockley's Drug Interaction Checker was used to screen prescriptions. A pharmacist-led educational intervention to medical prescribers was completed in February 2016. A follow-up audit of 49 in-patient drug charts was undertaken to establish whether the educational intervention reduced the number of DDIs prescribed on admission.
Main outcome measures: The main outcome measured was the number of DDIs prescribed for patients upon admission to hospital. Pre-intervention and post-intervention data was assessed using an independent Mann–Whitney U test and a Chi squared test ($p < 0.05$ for statistical significance). The hospital medical staff were given a questionnaire in order to identify their perceptions and attitudes towards DDIs.
Results: The overall rate of polypharmacy (prescribed ≥ 5 medicines) was equally high, at 71%, in the pre- and post-intervention groups. A reduction in the number of DDIs prescribed was not achieved by the educational intervention. The overall number of patients prescribed ≥ 1 DDIs increased from 34 (81%) to 42 (85.7%). The rate of DDIs involving antibiotics increased significantly from 21 (25.3% to

31 (31.6%) ($p = 0.036$). In the questionnaire 92.9% of respondents rated DDIs as very important.
Conclusion: This study showed that a pharmacist-led educational intervention did not reduced the prescribing of DDIs in the acute setting. The results may be due to differences between the pre-intervention and post-interventions medical teams. A larger study population may have demonstrated more significant results. The clinical impact of the DDIs was not investigated in this study. Further research should investigate the impact of DDIs on patient outcomes.

HP-CE006: Training of caregivers in piccline catheters: pharmacist involvement

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Background and Objective: Following a retrospective audit of good use of PICCline, a high infection rate was reported. Corrective measures have been initiated with the establishment of training sessions for the healthcare staff of the establishment on the proper use of the PICCline through cooperation between the pharmaceutical team and the hygiene team. The aim was to determine the impact of training on good use.
Design: The training sessions were conducted in pairs with a member of the pharmaceutical team (internal or pharmacist) and a member of the operational hygiene team. The training took place according to the scheme: theoretical part on the PICCline, practical part on the proper use of the PICCline according to the recommendations of the French society of hospital hygiene. A questionnaire was distributed at the beginning and end of the session. The satisfaction criteria were the overall satisfaction, the content of the training and the materials distributed with a qualitative notation ("Very satisfactory (TS)", "Good (B)", "Insufficient (IS), Inadequate (IN)") allowed the evaluation of these courses. A statistical analysis by Excel file was carried out.
Results: The average duration of a session was 90 min. A total of 6 weekly training sessions were conducted between April and June 2017. The training involved 59 FDI from 15 different health services. The average initial knowledge level was 70.8% against 92.1% at the end of the session, i.e. a significant increase of 21.3% (p value = 2.9.10–5). Specifically, the largest increase was in PICCline (+ 36.2%). Overall satisfaction, training content and distributed materials were rated "TS" at 66, 73 and 54%, respectively, for each outcome criterion.
Conclusion: These trainings were expected by all the nursing staff and allowed the training of nurse relay within each service of care. The satisfaction observed highlights suitability for the needs of the services. The rate of progression shows an efficiency of the upgrading of knowledge. The association of pharmacists and members of the hygiene team is appreciated both for the technical side and for the professional practice.

HP-CE007: Implementation of pharmaceutic consultation for patient with piccline

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Background and Objective: Peripheral Inserted Central Catheter Line (PICC-Line) is a medical device used not only during hospitalization but also at home. A retrospective study about the good use of PICC-Line has shown a high infection rate. It was decided to set up pharmaceutic consultation near hospitalized patient in the aim of improving their care and allowing an information about traceability of the device. The aim of this consultation is to reduce PICC-Line's complication by the patient education after the exit of hospital.
Design: Two guides of appropriate use were drafted and approved by two instance of the hospital: one for patient and the second one for nurses. After the implantation, a pharmacist resident met the patient and gave him information and supports including traceability paper. The nurse's guide is given too and should be used by domiciliary nurses. A satisfaction quiz bellows to evaluate the benefice of pharmaceutic intervention.
Results: Patients provided from 15 care services different and all was hospitalized. Fifteen consultations have taken place. The consultation takes place in the patient's room 3 days after the implantation and all patient agreed to participate at the consultation. The duration of each consultation is around 20 min. The mean age was 63 years (30–89). The intervention is judged "useful" by 60% of patient. One hundred percent of patient thought that they will use the guide at home.
Conclusion: The nurse's guide allows a connection between city and hospital necessary in the management of the PICC-Line. The consultation and the spread of guide permitted an improvement of the care of patient which is at the heart of care. The pharmacist completes and precises the medical doctor's and nurse's speech. A new audit about good use allows to objectify the impact of the consultation and diffusion of guide especially about infection complication after implantation of PICC-Line.

HP-CE008: Evaluation of the development of pharmaceutical interviews with patients with a hip prosthesis

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Background and Objective: Post-operative hospitalization followed by functional rehabilitation after hip replacement is a short process. In connection with the orthopaedic surgery department, we sought to set up pharmaceutical interviews with patients in order to transmit good advice for their return home and avoid complications. The aim of this pharmaceutical interviews is to evaluate the methodology of the implementation of these interviews and to test the tools used.
Design: The guide to good use was drawn up according to the HAS recommendations published in 2013. A readability study was carried out: a Rudolf Flesch index was calculated and the passive voice utilization rate in the document has been assessed. The guides were submitted to the medical and paramedical staff of the service. An interviewed patient satisfaction questionnaire allowed for qualitative assessment of the patient's feelings about the interview process as well as the perception of the guide.
Results: The Flesch index has a degree of readability of 72 and thus a difficulty level of reading "Fairly easy" [the standard level is determined by a degree (60–70)]. The passive voice that can make reading more complex is not used in the document. The document was validated by the physiotherapy team but also by the orthopaedic surgeons of the department. A total of 9 patients received the interview. For 100% of patients, the guide is easy to use, clear and the presentation makes you want to read it. A score of 9.5 ± 0.5 (9–10) in 10 is granted on average. The place and the time of the interview are "totally" adapted in 100 and 80% of the cases, respectively. The information provided is considered "quite" clear for all patients and the interview is considered "rather beneficial" in 50% of the cases. A score of 9 ± 0.6 out of 10 (8–10) is given on average to the interview.
Conclusion: The implementation of these interviews was multidisciplinary. The patients who have benefited from the interview are

particularly satisfied with the guide, which they consider very useful. The pharmacist makes it possible to specify and supplement the information given to the patient by the surgeons and the caregivers. The patient's education and the learning of the gestures of good use allow an improvement of the care and are part of the course of care.

HP-CE009: ePIFFany@EXETER-Pharmacist-led, video-based feedback for junior doctors

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Background and Objective: To develop and implement a simple, authentic, feasible, pharmacist-led and video-based prescribing feedback intervention for junior doctors that provides support and reduces medication prescribing errors over an 8 month period.
Design: With consent, each doctor participant was filmed taking a medication history from a patient and when writing up a drug chart, using a GoPro Camera. The doctor then reviewed the footage and made plans to improve their prescribing, supported by feedback from a pharmacist. The intervention took no more than 4 h of pharmacist time and < 1 hour of doctor time per doctor participant.
The project was deemed to be service improvement, by the Trust innovation lead & clinical research advisor, which therefore did not require application to a research ethics committee.

The intervention was offered to 25 surgical junior doctors, 16 of which successfully participated in the intervention. Concurrently, once a week, before and during the project timeline, a pharmacist collected data on the acute surgical unit on prescribing errors and interventions made by pharmacists during their ward visits and morning ward rounds.
Results: The intervention was generally well accepted by the junior doctors. During the project 269 pharmacist interventions were recorded, among 241 patients. Pharmacist interventions included the correction of allergy documentation and recommendations to correct prescribing errors for example: stopping inappropriate antibiotics; changing doses to account for renal function; amending routes of administration; and the prescription of regular medicines missed by the clerking doctor.
Many prescribing errors posed minimal risk of harm to patients, but some were more serious and three were potentially fatal.

A statistically significant reduction, in the mean number of pharmacist interventions, was observed in the period after implementation. The number of pharmacist interventions reduced from 19 per day to 11.6 per day, (39% reduction) corresponding to a 20% reduction in prescribing errors per patient. The majority of these pharmacist interventions related to patients' regular medicines, rather than those newly initiated.
Conclusion: Everyone benefits from junior doctors receiving feedback on their prescribing practice—and pharmacists are well placed to provide it. The use of video footage facilitated reflection, for example, on the environment in which prescriptions are written, and led to behaviour change. Implementing this approach more widely would reduce prescription errors still further; support the development of junior doctors and potentially help with the recruitment and retention of junior doctors.
We concluded that some of the time spent 'upstream' in the prescribing education process, was likely to be saved 'downstream', by both pharmacists and junior doctors through prescribing error prevention.

HP-CE010: Evaluating the efficacy of an education program for patients with Hepatitis C—pilot study

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Background and Objective: The therapeutic patient education program for hepatitis C, developed by the REVHEPAT network, is composed of a multidisciplinary team and offers collective and/or individual sessions for all patients living with chronic hepatitis C. An annual self-evaluation of the program was conducted, and highlighted an improvement point: the patient evaluation at the end of the educational process. The aim of this pilot study is to evaluate the efficacy of the hepatitis C education program by assessing the patient's skills acquisition and their satisfaction.
Design: This evaluation was conducted by the pharmacist, for patients who have agreed to participate in the educational program, during the last treatment delivery in the hospital pharmacy. 2 questionnaires were created based on the educational goals of the program: a skills acquisition questionnaire, filled out by the pharmacist, and a satisfaction questionnaire, filled out by the patient. 3 themes were addressed, corresponding to the different collective sessions offered; "Understanding of the disease", "Treatment knowledge", "Risks factors and post-treatment follow-up". For each themes of the questionnaire, the patient had to give a self-evaluation, and then the pharmacist assessed the patient's knowledge based on their answers. These answers were evaluated by a key words system.
Results: 18 patients have participated in the pilot study, in a 2 month period. In average, they went to 1 individual session, and 2 collective sessions. 53% of patient had an accurate assessment of their abilities; their self-evaluation didn't differ from the pharmacist's. On average, throughout all themes, patients knowledge were estimate by the pharmacist as 48% "acquired", 35% "partially acquired", 17% "to revise" and 0% "not acquired". As for the satisfaction of the program, 100% thought that these sessions had answered their expectations and 94% would advise others to participate.
Conclusion: Preliminary results of this pilot study showed a real efficacy of this patient education program with a high patient satisfaction, and a satisfactory knowledge acquisition. It also highlights the educational goals to revise as well as reorients patients to further follow-up if knowledge is not acquired, by adding individual specialized sessions according to the patient needs with a dietician, psychologist, or other members of the team. The aim is to extend this study by including a larger number of patients over a longer period of time, and to open the scope of a comparison with naive of education patients.

HP-CE011: Development of a pocket prescription guide for elderly patients in a hospital group

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Background and Objective: There is a significant turnover among prescribers in hospitals. Resident students have to acquire a great deal of knowledge in a short period of time. They often do not have

specific training concerning the geriatric population. However, the iatrogenic risk is high in this population, considering that between 10 and 20% of hospitalizations in elderly patients are due to adverse effects.
The objective is to develop a pocket prescription guide, in order to improve drug prescriptions for elderly patients.
Design: The team in charge of this project is composed of geriatrics and pharmacists. The selected themes involve drug prescription and drug-induced iatrogeny in patients over 75 years of age. For each topic, guidelines and literature are reviewed. Each thematic is checked and approved by members of the working group and then by a specialist physician of the institution. The guide layout is done in collaboration with the communication department in order to obtain an engaging and easy to read support. It is then validated by the medical committee of the establishment in order to be distributed to the prescribers of the hospital group.
Results: The developed tool is presented in the form of an A5 booklet of about 30 pages. It is organized as follows: a pictorial home page and a didactic summary followed by the different parts. The topics covered are: principles of prescription in geriatrics, main iatrogenic effects, treatment of confusion syndrome, management of pain, depression, hypertension, heart failure, atrial fibrillation, diabetes, COPD, acute gout and subcutaneous administration of drugs. Each theme is treated synthetically and visually (tables, graphs) in order to facilitate the reading. This guide will be given to every prescriber.
Conclusion: This tool improves the transmission of the basic principles of prescription medication in geriatrics to prevent iatrogeny in this population at risk. It has been approved by practitioners from several hospitals of the same group, which enables to harmonize the policy between these establishments.
This written training will be evaluated by a questionnaire of prescribers' satisfaction. Moreover, an assessment of the improvement in prescriptions will enable us to determine the quality of the training and to judge the effectiveness of the tool. These evaluations will result in improvements of this guide.

HP-CE012: Advances in pharmacy education in Germany: evaluation of a ward-based clinical teaching course

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Background and Objective: The pharmacy profession has shifted towards patient-centered care. To meet the new challenges it is necessary to provide students with clinical competencies. Clinical courses with teacher practitioners are part of the pharmacy curriculum in countries like the UK or USA and increasingly established within Europe [1].
To systematically evaluate the benefits of clinical teaching in our country a quasi-randomized teaching and learning study was carried out.
Design: A clinical pharmacy course on a psychiatric ward was created for small student groups. Learning aims included: communication, medication histories, drug-related problems and counseling. The control group participated only in the theoretical part while the intervention group took part in the complete course. The effects were assessed by an objective structured clinical examination (OSCE) and a satisfaction survey.
Results: The intervention group achieved significantly better overall results on the OSCE assessment (46.4 ± 9.5 vs. 28.2 ± 9.0 of 90 points; $p < 0.001$) with most positive effect in assessed communication skills (27.4 ± 5.4 vs. 16.3 ± 6.0 of 40 points; $p < 0.001$). Students' performance on the theoretical tasks was improved but unsatisfying in both groups considering the maximum score (12.1 ± 4.1 vs. 8.1 ± 3.2 of 30 points; $p < 0.001$). Of the students, 93% rated the course as practice-orientated, and 90% felt better prepared for patient contact. Many students suggested an extension of the course in the free text field of the survey.
Conclusion: The results suggest that the developed ward-based course provided significant learning benefits for clinical skills. Students' perception of the course was very positive. Since 2015, the course was extended to further medical fields.
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HP-CE013: Vedolizumab for inflammatory bowel diseases: proper use and efficacy

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Background and Objective: Vedolizumab (VDZ) is approved for the treatment of ulcerative colitis (UC) and Crohn's disease (CD). However, the lack of clinical efficacy evidence in CD led our drug committee to restrain its use for all UC, and CD patients with no alternative left. At the present time, VDZ is refunded only when used for UC treatment. Its cost is over 300,000€ per year in our hospital. The objective was to assess the clinical efficacy of VDZ in both indications after 2 years of use, and take a decision about the unrefunded ones.
Design: A retrospective observational study was carried out, including all the patients treated by VDZ from October 2014 to date. Indication, treatment duration, previous therapies, adverse events and clinical evolution were collected from the electronic medical records. Clinical efficacy was objectified using MAYO score for UC and Harvey-Bradshaw score for CD.
Results: Twenty patients were included: 13 were suffering from UC and 7 from CD. In each case, VDZ was initiated after at least 4 inefficient or not tolerated therapies (including at least one anti-TNFα). Ten UC patients are still treated with VDZ and amongst them 5 are in clinical remission, 2 have a UC with mild activity, 2 with a moderate activity and 1 has no clinical amelioration. For CD patients, VDZ was initiated around 10 years after the diagnosis. Three CD patients developed a resistance to VDZ after an average of one year of treatment despite the treatment optimization (VDZ every 6 or 4 weeks instead of 8 weeks). Four are ongoing treatment with a total clinical remission after an average of 6 months of VDZ. No adverse events were reported.
Conclusion: Despite its variable efficacy, VDZ demonstrated a clinical benefit for more than 50% of UC and CD patients with therapeutic failure. Ustekinumab could be an alternative therapy in CD, but its recommendation to use is conditioned by a VDZ failure. Considering its clinical benefit, VDZ is still approved in our hospital as a last chance treatment for CD patients.

HP-CE014: Assessment of chemotherapy-related educational needs of colorectal cancer patients

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Background and Objective: Aim of our study was to evaluate cancer patients' knowledge about their chemotherapy regimens in order to assess the educational needs of the patients. This presented data is preliminary and a part of an ongoing project, which aims to assess the effect of pharmacist-led patient education on medication knowledge of patients.
Setting and Method: Study was conducted on 58 colorectal carcinoma patients who were treated in an outpatient chemotherapy unit of a university affiliated state hospital. These patients had received a 2-page information pamphlet about their chemotherapy treatments before the commencement of treatment. During the first interview with patients, pharmacist collected demographic data and evaluated patients' knowledge about their medications using a standardized questionnaire.
Main outcome measures: Evaluation of the patients' knowledge about their medications using a standardized questionnaire.
Results: Mean age of the patients was 59.6 ± 1.3 years; 65.5% were male. Majority [77.6% (n = 45)] of the patients were graduates of primary school. Sixty-four percent of the patients had at least one comorbid disease. Median number of chemotherapy courses already received by the patients was 4 (min–max: 1-9). Fifty-nine percent of the patients reported that they didn't receive any patient education and 43.1% reported that they did not receive any informative document. Twenty-nine percent of the patients didn't know what actions to take in case of nausea-vomiting; while 53.4% didn't know how to react if their body temperature exceeded 38 °C and 25.9% had no idea about dietary necessities. About one third of patients didn't pay attention to oral care.
Conclusion: Our study showed that patients didn't understand (or remember) the basic points about their chemotherapy sufficiently, but remembered the adverse effects they experienced occasionally. Pharmacists will have the chance to increase the level of knowledge of the patients receiving chemotherapy by providing patient education and follow-up.

TDMP002: Evaluation and analysis of coagulation management services for patients attending the University Teaching Hospital in Southern Ireland

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Background and Objective: Warfarin is currently the most commonly prescribed oral anticoagulant for the prevention of stroke in patients with atrial fibrillation and prosthetic heart valves, and for the treatment and prophylaxis of venous thromboembolisms [1]. An estimated 1.5% of the Irish population are taking oral anticoagulation therapy and this is expected to increase by 10% year on year [2, 3]. The aim of this study was to evaluate and analyse the current Coagulation Management Services for patients attending the South Infirmary Victoria University Hospital (SIVUH) Anticoagulation Clinic.
Setting and Method: This was an observational, cross sectional study collecting quantitative data on warfarin patients partaking in an anticoagulation clinic in the SIVUH. A retrospective analysis of International Normalised Ratio (INR) results, target INR range, age, gender and return visits to the clinic was performed.
Main outcome measures: The analysis included all patient visits to the clinic between the periods of March and April 2016. The primary clinical outcome measures were INR control by the proportion of INR results within the therapeutic range for the two month period. Secondary outcome measures included extreme INR values and patient attendance to the clinic.
Results: A total of 414 patient records were analysed which included 779 individual patient visits. Of the total patient visits (n = 779) 49.95% were outside the target therapeutic INR range. Six hundred and forty nine (83.3%) of patient visits were within 0.5 units of target INR range, and 89.95% of patient visits were within 0.75 units of target INR range. One hundred and seventy nine (22.98%) of patient visits were late for their scheduled return appointment, with the median number of days late being seven. A total of 312 patients (75.36%) may have the potential possibility of switching from warfarin to Direct Oral Anticoagulant (DOAC) therapy.
Conclusion: Anticoagulation control in SIVUH clinic adhered to international standards. Recommendations to further improve the clinic include the introduction of a Computerised Dosage Support System (CDSS), increasing frequency of the clinic and the introduction of a system for late attendance to the clinic.

TDMP003: Could a Bayesian bicompartimental model be equivalent to a prediction mathematical method to estimate trough values for vancomycin monitoring?

Alvaro Caballero Romero[1], Carlos Lara Ramos[2], David Blánquez Martínez[1], Pelayo Nieto Gómez[*,1], Gonzalo Rodríguez Torné[1], Rocío Morón Romero[1], Patricia Moreno Raya[1]

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Background and Objective: Optimal trough concentration of vancomycin is established between either 10-15 mg/L to avoid development of resistance or 15–20 mg/L to improve penetration in complicated infections. Some articles have been published explaining the methodology to calculate an expected trough level in steady state [1]. Our aim was to compare the trough serum value estimated using the mathematical method with a two-compartimental Bayesian forecasting model.
Setting and Method: Observational retrospective study carried out from January to June 2016. Non obese adult patients (BMI < 30) with creatinine clearance (CrCl) < 120 ml/min and who have achieved steady state level were included. Vancomycin serum values were measured using a chemiluminescence's immunoassay (CMIA) and Bayesian analysis was performed with Abbottbase PKSystem® (Pks®). The statistical analysis was made with MedCalc Sofware®. Bland-Altmann plots and Passing-Bablok regression were used to compare both methods.
Main outcome measures: age, weight, vancomycin dose, creatinine clearance (CCL) and BMI were collected from clinical history. Serum trough values (CminS) were collected from CMIA. Trough values were estimated using two methods: mathematical method (CminM) and Bayesian calculations (CminB).
Results: 70 patients were included, with a mean age of 60.58 (SD 13.88) years. 54% were male and 46% female. They received a median dose per 24 h of 2000 (1000–3000) mg. Mean of CCL: 72.40 (95% CI 57.27–63.89). Mean of BMI: 25.43 (95% CI 24.66 – 26.21). The mean of CminS was 14.95 mg/L (95% CI 12.40–17.50), CminB 15.10 mg/L (95% CI 12.52–17.67), CminM 18.59 (95% CI 15.68–21.51). Correlation coefficients (CC) comparing both methods were significantly different: r between CminM and CminS was 0.66 (95% CI 0.50–0.77), as CC between CminB and CminS was higher: 0.99 (95% 0.98–0.99). Bland-Altmann plots analysis between CminM and CminR: mean difference 3.6, (22.3 to −15. Bland-Altmann plots

analysis between CminB and CminS: mean difference 0.1 (2.5 to −2.8). Bland- The regression equations estimated by Passing-Bablok regression were respectively y = −3.668840 + 1.473053x and y = 0.129238 + 0.989111x.
Conclusion: Bayesian method has demonstrated better correlation with real measures than mathematical method. Most part of our patients could be underestimated or overestimated using mathematical methods which could cause toxicity or lack of efficacy, so this method is unsuitable for clinical use. Bayesian estimation remains the best option for optimal dosing of vancomycin.

TDMP004: Could a Bayesian bicompartimental model be equivalent to a prediction mathematical method to estimate the area under the curve for vancomycin monitoring?

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Background and Objective: 24-h area under the curve/minimum inhibitory concentration (AUC/MIC) is actually the most useful pharmacokinetic/pharmacodynamic parameter to predict vancomycin efficacy. The Infectious Diseases Society of America (IDSA) recommended that vancomycin antibiotic exposure (AUC24/MIC) should be over 400. However, because of the difficulty about gathering the available information in the clinical setting in order to calculate AUC/MIC, some authors have published articles explaining the method to calculate AUC in steady state with mathematical equations [1]. Our aim was to compare the AUC estimated using the mathematical method with a two-compartimental Bayesian forecasting model.
Setting and Method: Observational retrospective study carried out from January to June 2016. Non obese adult patients (BMI < 30) with creatinine clearance (CrCl) < 120 ml/min and who have achieved steady state level were included. Vancomycin serum values were measured using a chemiluminescence's immunoassay (CMIA) and Bayesian analysis was performed with Abbottbase PKSystem® (Pks®). The statistical analysis was made with MedCalc Sofware®. Bland-Altmann plots and Passing-Bablok regression were used to compare both methods.
Main outcome measures: age, weight, vancomycin dose, creatinine clearance (CCL) and BMI were collected from clinical history. Area under the curve (24 h) was estimated using the mathematical method (AUCM) and Bayesian analysis (AUCB).
Results: 70 patients were included, with a mean age of 60.58 (SD 13.88) years. 54% were male and 46% female. They received a median dose per 24 h of 2000 (1000–3000) mg. Mean of CCL: 72.40 (95%CI 57.275–63.897). Mean of BMI: 25.43 (95% CI 24.661–26.212). The mean of AUCB was 553.65 mg/L*h (95% CI 483.08 to 624.22) and AUCM 669.51 mg/L*h (95% CI 600.14 to 738.87). Correlation coefficient (CC) between AUCM and AUCB was 0.64 (95%CI 0.47–0.76). Bland-Altmann plots analysis: mean difference = 115.9 limits of agreement: 374.4 and -606.1. The regression equation estimated by Passing-Bablok was y = 19.875865 + 1.088649x
Conclusion: This study reflects the different AUC estimated applying both a mathematical method and a two-compartimental Bayesian forecasting model. Furthermore, Bland-Altmann plots and Passing-Babloq regression showed the two methods may not be used interchangeably because the differences observed could have important clinical implications in the efficacy and toxicity of vancomycin, particularly as MIC > 1. So, Bayesian estimation remains the best option for optimal scheme of vancomycin.
Reference

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TDMP007: The inter-relationships between the plasma erlotinib metabolites, serum total bilirubin, and diarrhoea symptoms in non-small cell lung cancer patients

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Background and Objective: Erlotinib, a selective inhibitor of the epidermal growth factor receptor tyrosine kinase (EGFR-TK), is used for the treatment of non-small cell lung cancer. Erlotinib is converted primarily to its active metabolites, OSI-413 and OSI-420, by cytochrome P450 3A4. These metabolites with the inhibitory activity of EGFR-TK are biliary excreted, while their associations with diarrhoea symptoms remain to be clarified. This study aimed to evaluate the relationships between the plasma concentrations of erlotinib and its metabolites, serum total bilirubin, and diarrhoea symptoms in non-small cell lung cancer patients.
Setting and Method: Twenty-two Japanese patients treated with oral erlotinib once daily for non-small cell lung cancer at Hamamatsu University Hospital were enrolled. Blood specimens were collected at 24 h after the dosing at day 7 or later after starting the medication. The plasma concentrations of erlotinib, OSI-413, and OSI-420 were determined using an LC–MS/MS. The serum level of total bilirubin and incidence of diarrhoea symptoms were obtained from medical records.
Main outcome measures: The present study investigated the plasma concentrations of erlotinib, OSI-413 and OSI-420, serum level of total bilirubin, and incidence of diarrhoea symptoms in non-small cell lung cancer patients and evaluated their relationships.
Results: The plasma concentration ranges of erlotinib, OSI-413 and OSI-420 were 373-2354, 15.7-379, and 2.5-43.6 ng/mL, respectively. The serum level of total bilirubin ranged from 0.5 to 1.6 mg/dL in this study population. The plasma concentration of OSI-413 was higher in patients with diarrhoea symptoms than without diarrhoea symptoms ($p < 0.05$), while the plasma concentrations of erlotinib and OSI-420 were not. The erlotinib treated-patients with diarrhoea symptoms had the higher level of serum total bilirubin ($p < 0.01$). In addition, the serum level of total bilirubin was significantly correlated with plasma concentrations of erlotinib ($R^2 = 0.25$), OSI-413 ($R^2 = 0.61$), and OSI-420 ($R^2 = 0.39$).
Conclusion: The inter-relationships were observed between the plasma erlotinib metabolites, serum total bilirubin, and diarrhoea symptoms in non-small cell lung cancer patients. These data indicate that the plasma OSI-413 is associated with the serum total bilirubin and diarrhoea symptoms.

DI004: Spironolactone use in children: a survey in French hospitals

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Background and Objective: Spironolactone (SP) is a widely used potassium-sparing diuretic in children and adults.
In 2015, French health authorities conducted a national survey about hospital preparations (HP) made by hospital pharmacies. Sixteen hospitals answered they prepared HP of SP to be used in different pathologies.

The aim of this study was to assess clinicians and pharmacists' needs for SP use in children, in terms of pharmaceutical form and strength.
Setting and Method: The survey was conducted in January–February 2017 in 16 French hospitals, among pharmacists and clinicians from Neonatology, Intensive Care Units and Neurology wards.
Main outcome measures: Pharmacists and clinicians were interviewed using a standardized questionnaire with 8 closed and opened questions, on the use of SP in their hospital: indication, pharmaceutical form and strength, posology, age/number of treated patients.
Results: Fourteen hospitals (19 pharmacists and 1 clinician) answered the questionnaire.
Immediate-release SP preparations were used in the different paediatric ages, from preterm infants to teenagers. SP were used for the treatment of bronchopulmonary dysplasia (BPD) of premature infants (n = 11/14), heart failure (n = 11/14), high blood pressure (n = 9/14), sodium-water retention (n = 9/14) and hyperaldosteronism (n = 2/14).

Two pharmaceutical forms were used: hard capsules from 0.5 to 10 mg (n = 9/14) and oral suspension from 1 to 5 mg/mL (n = 8/14). For young or intubated child, hard capsules were opened by nurses who suspended the powder in water or glucose.

Bodyweight adjusted dosing were from 1 to 10 mg/kg/day in 1–3 intakes per day for BPD, cardiology and hyperaldosteronism.

All respondents associated SP with a satisfying efficiency and a good safety profile.

All hospitals (n = 13/13) considered oral suspension as the most appropriate form for SP use in children, regardless of the pathology treated. Hard capsule was also mentioned by 31% of hospitals (n = 4/13). Four hospitals mentioned the two forms because of the advantages/disadvantages of each form.

Oral suspension was said to allow an administration in young or intubated children and an accurate adjustment of posology. Hard capsule was said to bring an extended shelf-life, no taste problem and storage at room temperature.
Conclusion: According to this survey, hospital healthcare professionals confirmed the need for a preparation of SP in children.
Doses are coherent with those reported in the literature.

Given the user-friendly handling and the ease of posology adjustment, oral suspension appeared in this survey as the most appropriate pharmaceutical form for SP in children.

Multidisciplinary meetings will be necessary to choose the best pharmaceutical form and strength.

DI005: Implementation of a Medicines Information Service at the University Hospital Brussels: a Belgian pilot study

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Background and Objective: Medication errors are a major threat to patient safety and to a high degree caused by insufficient knowledge among healthcare professionals. Given limited clinical pharmacists' presence on Belgian hospital wards, a pharmacy-led Medicines Information Service (MIS) is an interesting option to efficiently provide fast, accurate and objective medication-related information. In this study, we implemented a MIS in a major tertiary care Belgian hospital.
Design: As no other MI services are available in Belgium, best practices were researched through literature review and site visit at the MIS of Charing Cross Hospital (London, UK). Secondly, in order to customize activities, all nurses and physicians were invited to participate in a survey on medicines information needs. Our MIS was set up to centrally (1 dedicated pharmacist, 1 phone number, 1 e-mail address) receive medication-related questions from all healthcare workers with the option to request additional clinical-pharmaceutical interventions (e.g. drug review). Implementation was accompanied by mailings, posters, business cards and presentations. All enquiries were registered in the M*i*Databank® (UKMi National Medicines Information). After 4 months, the MIS was evaluated by analysing enquiries and user satisfaction.
Results: 221 respondents (113 physicians, 103 nursing) to our survey found 'drug administration/dosing' (79.7%), interactions (69.6%) and 'tablet crushing' (49.7%) the major problematic topics for retrieving information. Physicians indicated that the MIS would also be useful for drug review, patient education/counselling and interactions while nursing preferred support on drug administration and tablet crushing. 96.8% of the respondents intended to use the MIS.
Between 09/01 and 09/05/2017, our MIS received 247 enquiries: 45.5% from residents, 34.0% nursing and 13.8% clinical staff members. Drug administration/dose-related questions (43.3%) was the most important category, followed by drug choice/indication (10.5%), interactions (9.7%), IV-compatibility (8.5%) and tablet crushing (7.7%). 80.2% of enquiries were answered within 1 h (median time: 11 min.). 81% of MIS users mentioned improved knowledge by contacting the MIS, with 59 and 56% reporting positive patient outcomes and time savings respectively. Our MIS was scored high on accessibility, timeliness, comprehensiveness and quality (mean score: 4.34, 4.29, 4.42 and 4.47 resp. on 5-point Likert scale). Regarding workload, current MIS activity corresponds to 0.4FTE pharmacist with the mean overall cost calculated at €15.4/enquiry.
Conclusion: Despite current efforts, there is still a great need for fast and reliable medication-related information. We succeeded to set up a well-running MIS with high user satisfaction and positive impact on knowledge, time consumption and patient outcome. Future plans are to extend and standardize our MIS activities.

DI006: Assessment of good use of new cephalosporins in a university hospital centre

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Background and Objective: In the current context of antimicrobial resistance, reducing the inappropriate use of antibiotics is a public health issue. Reserved for precise indications, with multi-resistant germs, the new antibiotics are the subject of national recommendations which call for a controlled dispensation. In addition, local recommendations have been put in place to clarify prescribing limits. A review of the use of these antibiotics was carried out to assess their different uses and efficacy, as well as compliance with the recommendations in force in a university hospital centre.

Design: A retrospective and comprehensive study assessing the prescriptions of ceftobiprole, ceftaroline and ceftolozane-tazobactam was carried out between January 2016 and March 2017. Sex, age, renal function, service, type of infection, bacteriological documentation, antibiotic susceptibility testing, infectious diseases specialist advice, dosage, duration of the treatment, associated antibiotics, revaluation of the treatment, patient's health status after treatment and compliance with nationals and locals therapeutics recommendations were noted.

Results: 24 prescriptions were collected exhaustively between January 2016 and March 2017, namely 8 prescriptions of ceftobiprole, 11 of ceftaroline and 5 of ceftolozane-tazobactam : 17 men and 7 women, with an average age of 59.9 years (22–90). The majority of patients were cared for in intensive care units (n = 20).

The prescriptions of ceftobiprole have been reserved for bronchopulmonary infections, 2 of which were documented MRSA infections. It was prescribed as monotherapy in 87.5% of the cases.

Ceftaroline has been established in osteoarticular infections (n = 6), skin and soft tissue infections (n = 4) and endocarditis (n = 1), all were documented MRSE infections (n = 7) or MRSA infections (n = 4). Another antibiotic has always been associated (daptomycin, rifampicin).

Ceftolozane-tazobactam has been prescribed in bronchopulmonary infections (n = 4) and in an osteo-articular infection; the target bacteria was Pseudomonas aeruginosa. Only one prescription was not documented in a patient with a history of identification of Pseudomonas aeruginosa multi-R. Another antibiotic has always been associated (tobramycin, anti-MRSA).

For the totality of the prescriptions, an infectious diseases specialist advice or an intensive care specialist has been taken. The effectiveness is 75%, 18 cures, with de-escalation after therapeutic revaluation for 9 patients. For 6 patients, the infection persisted (including 2 deaths).

Conclusion: These antibiotics have demonstrated an interesting efficacy rate in the treatment of 2nd line of severe infections with multi-resistant organisms. Good use was noted, with a restricted and controlled prescription in line with current recommendations.

DI007: Off-label use of Ruxolitinib: let's do a check in!

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Background and Objective: Ruxolitinib, a Janus Kinase inhibitor, has a market authorization for myelofibrosis and polycythemia vera. It may be used as off-label to treat inflammatory diseases such as dermatomyositis or steroid-refractory Graft Versus Host Disease (GVHD) following Allogeneic Hematopoietic Stem Cell Transplant (All-HCT). We performed a retrospective study to evaluate the use of Ruxolitinib in our hospital.

Design: From 2016 to 2017, we compiled the following data: population baseline, indication and for GVHD: type (acute or chronic), localization, previous GVHD-therapies (prophylactic and curative), dosage, side effects and clinical evaluation in the patient' file.

Results: 5 patients received Ruxolitinib in myelofibrosis, 1 in dermatomyositis et 11 in steroid-refractory GVHD [6 men; median age 63.4 years (16–68)]: 5 in acute GVHD (1 hepatic, 4 gastrointestinal including 2 with skin symptoms) and 6 in chronic GVHD (several localizations among cutaneous, gastrointestinal, hepatic, pulmonary, muscular, ocular and articular). The average number of GVHD localization was 2.5 per patient.

Following All-HCT, patients received immunosuppressive regimen: on average of 2.4 [1–4] for prophylaxis including ciclosporine (n = 9), anti-thymocyte globulin (n = 7), mycophenolate mofetil (n = 4) and methotrexate (n = 4). Before Ruxolitinib, the average number of immunosuppressive agents was 3.3 [5–2] for curative treatment among: corticosteroid (n = 11), ciclosporine (n = 6), mycophenolate mofetil (n = 3), infliximab (n = 3), immunoglobulin (n = 3), budesonide (n = 2), azathioprine (n = 2), tacrolimus (n = 2), sirolimus (n = 1), anti-thymocyte globulin (n = 1), methotrexate (n = 1) and etanercept (n = 1). Most patients (10/11) were treated with Ruxolitinib with a small dose (5–10 mg bid). Concerning adverse reactions, 3 out of 11 patients had cytopenia and 1 patient developed epidermoid carcinoma.

For GVHD patients: 3 died of infectious causes, 3 had a clinical benefit, 2 showed no improvement and 6 did not have a clinical evaluation yet. Treatment is still ongoing for 7 patients.

Conclusion: Janus Kinase inhibitors are emerging as a promising new treatment modality for many inflammatory conditions. Severe GVHD remains a challenge in haematology, leading to a high burden of morbidity in All-HCT patients. Ruxolitinib is a new rescue therapy for corticosteroid-refractory GVHD with some limiting toxicities. Several Phase 2 and 3 clinical trials are underway to evaluate the efficacy and safety of Ruxolitinib in steroid-refractory GVHD.

DI008: Description of the boxed warnings in package insert of prescription medicines in Japan

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Background and Objective: Pharmacists shall provide necessary information and guidance for the patient based on pharmaceutical knowledge and experience for ensuring proper use of the medicine dispensed in Japanese Pharmacists Act. The package insert is one of documents to be referred when providing those information and guidance. The boxed warnings in the package insert composed of caution and demand are the most significant parts. The aim of this study was to characterize the warning description in package insert of prescription medicine in Japan.

Design: Package inserts of prescription medicine listing in the National Health Insurance drug price list on April 1st 2015 were collected from the website of Pharmaceuticals and Medical Devices Agency (PMDA) in Japan. The boxed warnings were analysed dividing to caution and demand parts, and characteristics of them were compared between medicines. Adverse drug reactions described in caution parts were represented in System Organ Class terms of the Medical Dictionary for Regulatory Activities terminology version 18.1. Therapeutic practices described in demand parts were represented using International Classification of Health Interventions Alpha version 2015.

Results: The number of package inserts found in PMDA website was 15,828. There was 8.1% of package insert with the boxed warnings. Description of adverse drug reaction consisted of 81% of all cautions. Most of the cautions were observed in warning box of antineoplastic agents. Blood and lymphatic system disorders were most common caution. Demands in boxed warnings to the medical doctors, pharmacists, and other medical staffs accounted for 100, 80, and 10% of all package inserts with boxed warning, respectively. Explanation for patients were the second most frequent demands. Several warning descriptions had only either caution or demand and may be hard to be understood by medical staffs.

Conclusion: The most of the boxed warnings needed pharmacists to therapeutic contribution, and their descriptions were consistent in Pharmacists Act. The boxed warnings are useful for pharmacists in providing the patient with necessary information and guidance based on pharmaceutical knowledge and experience. Several boxed

warnings have only cautions part, and proper revision of package insert will improve the pharmaceutical intervention.

DI009: Effects of written medicines information on patient adherence to treatment in chronic conditions

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Background and Objective: Medicines information are important part of pharmacotherapy that can be successful only in sufficient informed patient about medicine and sufficiently adherent. The aim of the study was finding out the degree of adherence in patients with chronic disease and impact of medicine information on adherence.
Setting and Method: The methodology was based on anonymous online questionnaire survey. Part of questionnaire was validated tool for measuring adherence—MARS-SK, supplemented by socio-behavioural questions.
Main outcome measures: Respondents gained 23–25 points in MARS-SK were marked as adherent.
Results: 189 patients with chronic disease took the part in survey and average adherence was 18.6 ± 4.7 (non-adherence). 85.7% respondents claimed that they read patient information leaflet (PIL), less in group of patients > 60 years. Adherence of patients reading the PIL was 18.9 compared to patients non-reading the PIL (16.8). 86.3% of respondents consider PIL as understandable and legible and rate of their adherence was 19.1. Five percent of patients expressed problems with understanding (adherence 15.1) and 8.7% expressed worse readability (adherence 18,6). From different parts of PIL, 70.4% of respondents were concerned by possible adverse effects; they reached the adherence 18.97, similarly to patients not concerned by adverse effects (19.0). 9.3% respondents claimed that information about possible adverse reactions discouraged them from taking the pills and another 9.3% reduced dose without consulting health care provider. Alarming is the 35.4% of patients they thought, that not taking the pill according to doctor advice doesn't lead to medication risk (adherence 16.4). As a reason for altering the dose or skipping the dose of medication patients most often reported manifestations of adverse effects (26.5%) or think they don't need the medications (25.4%).
Conclusion: The results show, that medicine information and their risk and benefits can have effects on medication adherence of patients with chronic conditions. Important role of heath care provider is to appropriately inform patient about benefits, risks and need of prescribed pharmacotherapy.

DI010: Readability assessment of package leaflets of biosimilars authorised in the european union

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Background and Objective: The European Union (EU) approved the first biosimilar medicine ("biosimilar") in 2006, and, since then, the EU has pioneered the regulation of this type of human medicines [1]. The package leaflet contains information for patients on how to use the biosimilar properly, and it must be clearly legible in the official language or languages of the Member States [2]. The objective of this study was to determine the degree of readability and length of the package leaflets for authorised biosimilars up to 2017.
Setting and Method: In June 2017, there were 29 biosimilars authorised in the EU. Their package leaflets were downloaded from the European Medicines Agency [3], from which the readability and length were obtained using the whole text of all sections of the package leaflets (except section number 6: "Contents of the pack and other information"). The "annex" section was also analysed in the package leaflets where it appeared, because it provides information about instructions for use.
Main outcome measures: The readability of the package leaflets was calculated using two readability formulas: Flesch Reading Ease formula and Flesch-Kincaid formula. The length (number of words) of the package leaflets was also measured.
Results: Statistically significant differences were found in the readability scores ($p < 0.05$) and length ($p < 0.05$) among the six evaluated sections. None of the sections of package leaflets was easy to understand. The least difficult section to understand was the annex, and the most difficult section was number 1, which contains information related to the therapeutic indications.
Conclusion: The package leaflets for biosimilars need to improve their readability so that patients can use them. Pharmaceutical companies could be more conscious of the need to improve the comprehension of package leaflets as they contain important information for patients. This would increase the usefulness of package leaflets and access to this information.

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DI012: What information for rheumatology patients ? Satisfaction study of medication reconciliation

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Background and Objective: Since March 2016, Clinical Pharmacy Activities have been developed in Rheumatology ward with Medication Reconciliation (MR) at Admission and Pharmaceutical Analysis of Prescriptions (PAP).
To ensure medication continuity and prevent drug adverse events, the first objective was to implement MR at hospital discharge.

The second was to implement pharmaceutical interviews with the patients. Their involvement is vital to ensure that accurate and comprehensive medication information is communicated consistently across transitions of care

The third was to measure patients and practitioners satisfaction about information quality and pharmaceutical presence.

Design: From January to March 2017, MR was implemented at hospital discharge, in additional to MR at Admission and PAP. Patients were interviewed twice: 1 at admission to target the patient's actual medication use, their medication information needs within a structured process of interviewing the patient and 1 at discharge to communicate the resulting medication changes and verifying the patient's understanding of his treatment. A recap personal document was distributed for all patients after the discharge interview.
Between April and May 2017, the method was evaluated with satisfaction survey (SS). For all patients seen at admission and discharge, a SS was given. A SS was also distributed to all department practitioners having worked over this period. For both, response's possibilities were : not at all satisfied, not satisfied, satisfied or very satisfied.
Results: During this 5 months period, 128 patients among 260 admissions (49.23%) have benefited of these Clinical Pharmacy Activities.
59 SS have been recovered (all of evaluation period patients). 74.6% of patients answered to be very satisfied about interview's duration and clarity, of oral information and of the discharge document, whereas 25.4% patients were only satisfied. No patients have answered «not at all satisfied, not satisfied».

Concerning practitioners, 7/7 SS have been recovered. 100% practitioners were very satisfied about pharmaceutical relevance.

All patients and practitioners answered « yes » to the question of usefulness of pharmaceutical presence within the department.
Conclusion: Pharmaceutical presence in rheumatology department is appreciated by all patients and practitioners. This work allowed to demonstrate the relevance of patient information and that of communication with city health professionals. In a next step, the recap personal document will be included in the hospitalization report to be sent to general practitioner and will be communicated also to pharmacist.

DI013: Developing a paediatric drug formulary for the Netherlands

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Background and Objective: As many drugs in paediatrics are used of off-label, prescribers face a lack of evidence-based dosing guidelines. Current knowledge on paediatric pharmacotherapy is empirical, practice based, and seldom systematically collected and disseminated. The overall aim was to develop an openly accessible, web-based formulary containing best-evidence based, referenced and up-to-date drug-specific information, which was acceptable to paediatricians, hospital pharmacists and general practitioners.
Design: The work was done by a team of a coordinating paediatrician (0.2 fulltime equivalent (fte)), project manager (0.8 fte) and pharmacist (1.0 fte) and the multidisciplinary editorial board of 35 members. The overall budget on an annual basis was €250 000 in the first 2 years, and currently €220 000. The formulary started as a consensus-based formulary. From this point onwards, a dedicated pharmacist searched the available scientific literature following and assessed the risks and benefits of use in the paediatric population. The evidence is described in a risk analysis document and summarized in a drug monograph and reviewed by the editorial board before publication.
Results: A framework was developed to provide dosing guidelines based on best available evidence from registration data, published investigator-initiated research, guidelines, clinical experience and consensus. Dissemination of these dosing guidelines was established by developing an open-access online database (Ćwww.kinderformularium.nl). The development has resulted in the revision of many earlier consensus-based dose recommendations, clarified the scientific grounds of drug use for children, ensured uniformity in prescribing habits in the Netherlands and resulted in the timely translation of scientific research knowledge to daily practice. Also, additional projects to further improve the information and usability of the formulary were initiated, including dosing guidelines for renal dysfunction, a dosing calculator and parent/patient drug information leaflets.
Conclusion: We believe that the Dutch approach is a proof of concept in creating a knowledge-based national paediatric formulary and could be used as basis for similar initiatives world-wide, preferably in a concerted effort to ultimately provide children with effective and safe drug therapy. The successful nationwide implementation resulted in uniformity in prescribing and timely translation of scientific knowledge on (off-label) drug use in children to daily practice.

PE006: Power of antimicrobial stewardship

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Background and Objective: Carbapenem resistant Enterobacteriaceae (CRE) are of increasing concern and have rapidly spread globally. While epidemiological studies have shown a link between carbapenems and resistance in non-fermentative Gram-negative organisms, the contribution of antibiotic consumption to CRE incidence remains unclear. Consequently, it is not clear whether carbapenem restriction policies will have any effect on the incidence of CRE. The objectives of this study were to determine the amount of carbapenem antibiotics used in the intensive care unit (ICU) between 2016 and 2017 (first 5 months) and whether the policy of the carbapenem restriction committee, including the clinical pharmacist in the ICU would have an effect on the observed carbapenem resistance in Klebsiella.
Setting and Method: An carbapenem administration team was established in the Istanbul Medipol University Hospital hospital. Doctors in the intensive care unit (ICU), infectious disease doctors and clinical pharmacist were present on the committee. From the beginning of 2017, the clinic pharmacist has checked carbapenem consumption with daily intensive care visits and suggested alternative antibiotics to restrict the use of carbapenem.
Main outcome measures: The total use of carbapenem antibiotics in adult ICUs (40 beds total) were measured between 2016 and 2017 (first 5 months) by Defined Daily Dose (DDD) methodology, calculated as DDD/1000 ICU patient days and charted on a monthly basis. This data was then compared with the number of CRE recovered from any site of the ICU patients on a monthly basis.. This data was then compared with the number of CRE recovered from any site of the ICU patients on a monthly basis. Antimicrobial susceptibility testing for all isolates was performed with the Vitek 2 system using the AST-GN25 card by following the manufacturer's instructions (bioMérieux, St. Louis, MO). CRE were defined as isolates for which the carbapenem MIC was ≥ 4 μg/dL.

Results: There was a positive correlation between Carbapenem Resistant Klebsiella incidence and carbapenem consumption. As consumption of carbapenems decreased over months, a parallel decrease in the incidence of Carbapenem Resistant Klebsiella was also observed.
The importance of the clinical pharmacist in the multidisciplinary study group to reduce the number of resistant bacteria by limiting antibiotic consumption has emerged.
Conclusion: This small-scale study proves that carbapenem restriction policies may help reduce carbapenem resistance in Enterobacteriaceae. Hospital(s) scale studies may be necessary to further prove its effectiveness.

PE007: Oral antibiotics in Germany and the Netherlands in primary care from 2012 to 2016: A comparison

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Background and Objective: Overuse of antibiotics is of concern, but may differ between countries. This study compares the use of oral antibiotics in Germany and the Netherlands in primary care where the majority of antibiotics are prescribed, compared to the hospital sector.
Setting and Method: We performed a longitudinal drug utilization study for the years 2012–2016. In Germany, information was available from the DAPI database containing information on dispensing at the expense of the Statutory Health Insurance Funds (data on indication, treatment duration or dosages were not available), covering 80% of the community pharmacies. In the Netherlands, data were available from the Dutch Foundation for Pharmaceutical Statistics that collects dispensing data for nearly 95% of all community pharmacies.
Main outcome measures: Antibiotic use was estimated as defined daily doses (DDD/WHO) per 1,000 inhabitants per day (DID). National time trends were assessed with linear regression and compared for overall use, major antibiotic classes (penicillines, cephalosporins, tetracycline, quinolone antibacterial, macrolides and lincosamides) and individual substances.
Results: In 2016, 14.1 DID of oral antibiotics were dispensed in Germany compared to 9.6 DID in the Netherlands. Since 2012, these numbers showed a non-significant decrease of −2.2% in Germany and −6.9% in the Netherlands. Within the major antibiotic classes, only penicillin and cephalosporins increased (+9.9%/+ 10.2%) in Germany and lincosamides (+ 27.5%) in the Netherlands, respectively. In 2016, amoxicillin was the most frequent antibiotic in both countries, followed by cefuroxime and doxycycline in Germany and by doxycycline and amoxicillin with enzyme inhibitor in the Netherlands. Cephalosporins accounted for 37.6% of dispensed beta-lactam antibiotics in Germany, compared to 0.59% in the Netherlands. Fosfomycin, recommended in both countries to treat uncomplicated urinary tract infections, showed the highest increase from 2012 to 2016: 87% in Germany, 257% in the Netherlands.
Conclusion: Overall, between 2012 and 2016 outpatient antibiotic consumption in the Netherlands was substantially lower than in Germany, especially for cephalosporins.

PE008: Drug patterns of elderly, multimorbid patients in primary care

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Background and Objective: The population aged 65 and over deals with the problem of multimorbidity associated with increasing polymedication. MultiCare, a longitudinal cohort study, collected data (e.g. socioeconomic status, morbidities, drugs and risk factors) of 3189 multimorbid, elderly (65–85 years) patients in primary care in Germany. These patients use in mean 7.69 (± 4.10) drugs (women: 8.04 vs men: 7.58, $p = 0.002$) and have 7.0 (± 2.0) diagnosed chronic diseases. However, an exact characterisation of the medication in this cohort is lacking.
Setting and Method: Prescribed and over the counter drugs were classified using the anatomical therapeutic chemical classification system (ATC). Drug patterns were separated by gender and identified using exploratory factor analysis. We used screen plots to identify the number of factors we included into the analysis. Patients are part of a factor when they have at least two ATC 3rd level drugs of the pattern.
Main outcome measures: The aim is to find drug pattern of elderly multimorbid patients in primary care.
Results: We were able to detect five drug pattern for men (drugs for obstructive pulmonary diseases, drugs for coronary heart diseases and hypertonia, drugs for osteoporosis, drug for heart failure and drugs for pain) and four drug pattern for women (drugs for osteoporosis, drugs for coronary heart diseases and hypertonia, drugs for obstructive pulmonary diseases and drugs for diuretics and gout). The largest drug pattern is "drugs for coronary heart diseases and hypertonia" in both gender groups (836 men and 430 women). 973 (75%) men and 854 (45%) women can be assigned to at least one drug pattern. There is a high degree of overlap between the different patterns: For men, we found 33.8% of patients in two or more patterns, while 26.1% of the women could be assigned to two or more patterns.
Conclusion: Although patients used drugs from 35 pharmacological subgroups (ATC level 3), we were able to identify few distinct drug patterns. The overlapping of drug patterns reflects the polypharmacy in multimorbid elderly patients. The next step is to correlate the detected drug patterns to already published morbidity patterns in this cohort.

PE009: Evaluation of effectiveness and safety of hernia repair with Phasix®

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Background and Objective: This study aims to evaluate the effectiveness and safety use from Phasix® in abdominal wall hernia and incisional hernia repair in digestive surgery department.

Setting and Method: A descriptive retrospective study was lead from November 2015 to February 2017 including patients who benefited from Phasix®.
Main outcome measures: Were taken into account: demographic criteria, medical-surgical history and relative information concerning the appropriate use of Phasix® based on the guidelines of Ventral Hernia Working Group (VHWG). One month after hernia surgery side effects were reviewed and compared to literature data. Fisher's exact test was used for values of $p < 0.05$ considered significant ones.
Results: 23 patients were including. Medium age was 59.3. Sex ratio (M/F) was 0.8. BMI was 33.1 kg/m^2. 91% of patients had risk factors of occurring hernia. 95.7% of patients had comorbidities. Patients' hernia were grouped thanks to VHWG grading system, so there was 60.9% grade 2, 30.4% grade 3 and 8.7% grade 4. Refeeding time was 1.83 day which is in line with guidelines (refeeding before two days). Resumption of normal bowel function was obtained after 2.61 days which is in line with guidelines (recovery normal bowel movement in the first 3 days after surgical procedure). The average length of stay in hospitals was 4.39 ± 2.37 days vs 6.3 ± 4.2 days in literature ($p > 0.05$). In the month after surgical procedure, 8.7% of patients have presented a wound infection vs 12.5% in literature ($p > 0.05$). 4.4% of patients have presented a small bowel obstruction vs 2.5% in literature ($p > 0.05$). Rate of persistent pain was 8.7% which is in line with literature rate (0.5–12.5%). Complications are most frequently in male gender ($p < 0.05$). Medical-surgical history and comorbidities didn't affect the occurrence of complications ($p > 0.05$). 91% of Phasix® have been placed in grade 2 or 3 according to recommendations. There were no more complications when Phasix® was placed in grade 4.
Conclusion: This study proves that Phasix® can be recommended in grade 2 and grade 3 hernias, whatever comorbidities and medical-surgical history. However, these results must be tempered by the small sample size. A randomized comparative study have to be lead to confirm these results.

PE010: Actual versus recommended storage temperatures of oral anticancer drugs

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Background and Objective: Substantial quantities of unused drugs are returned by patients to the pharmacy each year. Re-dispensing of these drugs could reduce drug wastage and health care costs. However, not much is known about storage conditions of drugs stored at home. This study investigates the proportion of patients storing oral anticancer drugs according to the product label claim.
Setting and Method: Consenting adult patients from six Dutch outpatient hospital pharmacies were included if they used an oral anticancer drug (OAD) product during March 2014–January 2015. Home storage temperatures were assessed by inclusion of a temperature logger in the original OAD's packaging. Patients were asked to keep the temperature logger and package in the sealbag and to return the temperature logger(s) when the dispensed drug product had been used.
Main outcome measures: The primary outcome was the proportion of patients storing oral anticancer drug products as specified in the SmPC.
Results: Ninety (81.1%) of the 111 included patients [47.8% female, mean age 65.2 (SD; 11.1)] returned their temperature loggers to the pharmacy. None of the patients stored OAD products at a mean kinetic temperature above 25 °C, one patient stored an OAD requiring storage below 25 °C longer than 24 h above 25 °C. None of the patients using OADs requiring storage below 30 °C kept their medication above 30 °C for a consecutive period of 24 h or longer.
Conclusion: The majority of patients using oral anticancer drug products store their drug products according to the temperature requirements on the product label claim. Based on our results, most oral anticancer drug products are likely to be suitable for redispensing.

PEC003: Efficiency of individualised parenteral nutrition versus commercial parenteral nutrition in adults

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Background and Objective: To determine whether the establishment of individualised parenteral nutrition (IPN) in adults would be more efficient than the current commercial parenteral nutrition (CPN) in a tertiary level hospital.
Setting and Method: Retrospective observational study, during 3 months in 2016.
The CPN available are 2.5L13.5N (2.5 L and 13.5 g of Nitrogen) and 1,97L16 N (1.97 L and 16 g of Nitrogen) for central vein and 1.5L9.9N (1.5 L and 9.9 g of Nitrogen) for peripheral vein. Assuming a 10% deviation from the contribution of macronutrients, established equivalence between CPN and IPN are 2.5L13.5N for mild stress level and 1.97L16N for moderate stress level. Severe stress level is not substitute for not adjusted to 10% deviation established.
Main outcome measures: The number of patients/day on average, the type of CPN and supplements were recorded.
We also identified the quantity of nutritional products and technical staff costs that would be needed to develop the IPN.
Results: 1006 CPN were prescribed, 52 2.5L13.5N, 387 1.97L16N and 567 1.5L9.9N. There was an average of 13 patients/day with an average duration of CPN of 6 days.
The cost per patient/day of 2.5L13.5N is 34.34€ (52 × 34.34 = 1785.68€ in total), 34.33€ for 1.97L16N (387 × 34.33 = 13285.71€ in total) and 24€ for 1.5L9.9 N (24 × 567 = 13,608€ in total).

The cost for vitamins and trace elements (added alternately) was 3190.53€. Other supplements are not taken into account because the cost will be the same for both CPN and IPN.

The total cost of CPN was 31,869.92€.

The estimated cost for mild stress IPN is 21.04€ per patient/day and the total equivalent within 3 months of the study would be 1093.86€; moderate 25.71€ (9949.37€ in total) and no stress 15.16€ (8601.96€ in total).

Vitamins and trace elements will be added daily so the total cost would be 6381.06€.

Specialized technical personnel would cost 7200€/3 months.

Finally the total cost of developing the IPN equivalent to the current CPN amount to 33,226.27€.
Conclusion: The cost of the CPN and IPN is similar, so that the IPN could replace the CPN with the benefit it brings: contribution of individual nutrients and adapted to the specific needs of each patient, so that could reduce patients hospital stay reducing overhead costs. It would be necessary to develop a protocol and methods of working together with other services.

PEC004: Economic study of the diagnosed population of chronic migraine treated with botulinum toxin

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Background and Objective: To analyse health expenses generated when treating the diagnosed population of chronic Migraine and treated with Botulinum Toxin.
Design: Retrospective observational study in a third level hospital. An analysis of the clinical records of patients with chronic migraine and treated with Botulinum Toxin is carried out, through hospital applications and the registration of medicines extracted with prescriptions in a pharmacy office. A database is created in Excel® where the mean cut-off point is the first administration of Botulinum Toxin, collecting data from the previous year and year after the first administration of the drug. The variables to be studied are twofold, firstly the health expenditure related to visits to the primary doctor, specialist physician and emergency and secondly the expenditure on migraine medications (NSAIDs, triptans, beta blockers, antiepileptics, amitriptyline and flunarizine). Health expenses were obtained from BOJA 210, 27 October 2005, last modified on November 24, 2015.
Results: Fifteen patients were included in the study. of, the average expenditure on health care was € 386 (€ 168–1059 €) versus € 305 (€ 212–€ 843) in the subsequent year. The previous year there are more visits to the primary doctor and in the subsequent visits to the specialist increase since the treatment is followed from here. The average expenditure on drugs in the previous year was € 602 (€ 31–€ 4.014) versus € 516 (€ 7.2700) following administration of the botulinum toxin. It decreases the consumption of antiepileptics, flunarizine and NSAIDs and increases the use of triptanes and beta blockers.
Conclusion: Once the population is analysed, it cannot be concluded that the reduction of expenditure is significant. There is a difference of € 81 for spending on healthcare and € 86 for spending on medicines. We observed a limitation in this study, based in clinical histories, where we do not always find all the information we are looking for. We need to expand the number of patients to be analysed to demonstrate the results that other studies publish.

PEC005: Economic impact of the elaboration and dispensation of pre-filled syringes of aflibercept 2 mg/0.05 ml for intravitreal administration in the treatment of age-related macular degeneration (AMD)

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Background and Objective: To assess the economic impact of the preparation of pre-filled syringes for intravitreal administration of aflibercept instead of using the Eylea® 40 mg/ml vial for single use.
Setting and Method: In compliance with the "Guide to Good Practices in the preparation of medicines in hospital pharmacy services" published by the Ministry of Health, Social Services and Equality from Spain in June 2014, the preparation of pre-filled syringes of aflibercept was standardized in order to reduce the economic impact of the administration of one vial per patient, as indicated in the technical file.
Treatment with aflibercept 40 mg/ml is initiated with a monthly injection for the first three doses, followed by one injection every 2 months. The recommended dose is 2 mg, equivalent to 0.05 ml, administered as an intravitreal injection. Each vial of Eylea® contains 4 mg of aflibercept in 0.1 ml. Therefore, up to 2 pre-filled syringes of 0.05 ml could theoretically be made from each vial. In practice, however, usually with a vial, up to 4 pre-filled syringes can be made, given the excess contained in the vial. Since this is a medium level risk preparation, the validity period recommended by the Good Practices Guide and that we decided to assign to our preparation is 9 days with 4 degree storage recommended.

Therefore, since it was decided to use an Eylea® vial for several patients in order to maximize the use of the vials, the Ophthalmology service scheduled all the administration on the same day. The pre-filled syringes were prepared a few days prior the administration in a vertical flow cabinet, conditioned in 0.3 ml insulin syringes, and following good practice standards for the preparation of sterile mixtures to ensure the stability and efficacy of the drug.
Main outcome measures: the variables studied were actual cost and the number of preparations.
Results: In the period from June 2016 to February 2017, both inclusive, a total of 448 intravitreal preparations were performed corresponding to 211 patients, with a mean of 2.2 injections per patient. Assuming the use of each vial for a single use, the cost would have been of 288.753, 99 €. The total actual consumption during this period was 112 vials, which resulted in an economic cost of 72, 188.48€.The manufacture of pre-filled syringes of Aflibercept represents a saving of 216, 565.44€ (74.9%) in the period evaluated.
Conclusion: The preparation of pre-filled syringes of aflibercept by the Pharmacy Service is a process of fractionation and rationalization of the resources that provides several advantages. On the one hand, the final product is safe, effective and of high quality. On the other, it allowed us to optimize the use of the drug and therefore reduce the economic cost. However, in order to further optimize the use of aflibercept it would be wise to study first the microbiological stability of the final product.

PEC006: Economic saving of repackaging oral cytostatic adjusted to treatment cycles in a specialty hospital

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Background and Objective: To analyse the cost reduction that happens when dispensing to patients the accurate oral cytostatic treatment, instead of the regular presentation with multidose containers that contain more units than those applying in the cycle: abiraterone (Zytiga®), lapatinib (Tyverb ®), sunitinib (Sutent®) and pazopanib (Votrient®); the average period of treatment and extrapolation if they had been a year of treatment (48 weeks) in all patients with these treatments in 2016.
Setting and Method: Retrospective study duration of 12 months (January 2016–December 2016). Patients receiving abiraterone, lapatinib, sunitinib and pazopanib are analysed are included. In order to estimate the economic issues of each drug we made use of the counter (PVL) for each drug, we calculated the current cost of the cycle to give the exact number of doses attending to the theoretical cycle assuming that that had been dispensed in complete containers. Data were collected with the economic management module and outpatient module of Farmatools® program. Sunitinib cycles are 4 weeks with 2 weeks rest after, and abiraterone cycles pazopanib are 4 continuous weeks and lapatinib are cycles of 3 weeks, varying the dose if treatment is lapatinib with trastuzumab concomitant: 1000 mg/24 h or capecitabine 1250 mg/24 h.

Main outcome measures: The variables studied were actual cost, theoretical cost and average treatment cycles per year.
Results: Abiraterone per cycle, the exact treatment to save 113 €. The mean treatment for 22 patients was 4.45 cycles/year, so the average savings per patient/year was 502.85 €. Saving if a patient is one year of treatment (12 cycles) would be 1.356 €. Per cycle of sunitinib 50 mg, the exact treatment to save 366.82 €. The average treatment 10 patients was 2.5 cycles/year so the average savings per patient/year was € 917.05. Saving for a year with treatment (8 cycles) would be 296.56 €. Per cycle of pazopanib, the exact treatment to save 181.54 €. The mean treatment for 12 patients was 6.83 cycles/year so the average savings per patient/year was 1239.92 €. Saving for a year with treatment (12 cycles) would be 2178.48 €. For lapatinib cycle by giving exact treatment with trastuzumab saves 690.48 € and 345.24 € with capecitabine. The average treatment with capecitabine for 6 patients was 8.67 cycles/year, so the average savings per patient/year was 2071.44 €. Saving if a patient is one year of treatment (16 cycles) at a dose of 1250 mg would be 11,047.68 € and dose of 1000 mg would be 5523.84 €.
Conclusion: The accurate and properly adjusted to cycles dispensation of oral cytostatic rather than dispensing packages produces considerable savings in a section with high economic impact on the pharmacy due to the continuous updating of the section and the high price of new drugs.

PEC007: Economic saving of the use of reduced doses of tocilizumab in the treatment of rheumatoid arthritis

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Background and Objective: The use of biologic drugs as Tocilizumab for rheumatoid arthritis (RA) has a high economic impact. However, some observational studies and recommendations from guidelines (BBF) suggest the possibility of reducing the dose of biologics to the minimum effective dose in patients with good control of the disease.
The objective is to analyse the economic impact, measured as direct costs, of the use of reduced doses of tocilizumab for the treatment of RA in a tertiary hospital.
Setting and Method: Observational, descriptive and retrospective study with patients diagnosed with RA. We included patients who received low doses of Tocilizumab, because they had achieved remission or low disease activity with standard doses of Tocilizumab (8 mg/kg every 28 days).
Main outcome measures: The variables studied were actual cost and the weight of patients.
Results: 8 patients were included, all of them treated with Tocilizumab 6 mg/kg every 28 days. The average weight was 73 kg (53–98). The average annual cost per patient with a dose of 6 mg/kg every 28 days was 9.245€ (6.643–13.833). The average annual cost for the same patient in the previous year, with doses of 8 mg/kg every 28 days, was of 12.191€ (8.798–16.045). The average savings per patient/year were 2743€ (2.156–3.879). The use of reduced doses of Tocilizumab for these 8 patients resulted in annual savings for the hospital of 21.336€.
Conclusion: The use of reduced doses of tocilizumab in patients who have achieved remission or low disease activity being previously treated with standard doses of Tocilizumab provide direct savings for the hospital. Therefore, we are aware of the need to implement optimization strategies in relation to the treatment of RA with Tocilizumab in selected patients. However, more studies should be performed in order to determine the effectiveness of these dose reduction strategies and its economic impact on both direct and indirect costs.

PEC008: Impact of automated medication dispensing system in a hospital pharmacy

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Background and Objective: Due to massive increase of drug dispensed, automated medication storage and dispensing systems are recommended in hospital pharmacy in order to secure the medication supply chain. The aim of this study is first to evaluate the time dispensation decrease. We also check medication errors and measure their rates.
Design: Since December 2016, the hospital pharmacy of Mulhouse has a drug storage and dispensing robot put in (ROWA). Our study was conducted during 2 weeks: 1 week just before robot was set up, and 1 week 2 months after implementation. Data collected were: time spent on drug dispensation including interruptions patterns for the different departments. Conformity of dispensations was also checked and medication errors were noted.
Results: The mean time spent on dispensation decreased from 344 min to 244 min a day after robot was implemented. At the same time, the dispensation speed increased from 1.4 line per minute to 2 lines per minute. With implementation of automation, pharmacy reorganization allowed the creation of a new step of qualitative and quantitative assessment realized by pharmacy technicians. The time spent on validation increased from 33 min to 77 min a day. The interruption rate during dispensation decreased from 63 to 44% thanks to the automation and also to new organization. We also noticed fewer medication errors (1%) than before (2%). Qualitative medication errors were only found for drugs that were not stored inside the robot.
Conclusion: Medication storage and dispensing system allowed an improvement of productivity with a decrease of dispensation and interruption time. It also secured the drug supply chain by decreasing the error rate. By streamlining processes of storage and distribution, robot helps save time. This will allow us to develop other projects with more added-value for the pharmacy technicians such as drug management in the ward room.

PEC009: Cost study of an accepted pharmaceutical intervention

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Background and Objective: Clinical pharmacy has been developped in our university hospital for 12 years combining medication reconciliation at admission, review of prescriptions, and therapeutic education of the patient. Pharmacists, pharmacy residents and pharmacy students participate in the activity: students achieve medication history and a review of each patient file every morning. Relevant information are checked by the resident and the prescription is reviewed either by the clinical pharmacist or resident. At the beginning of the residency, the resident validates the prescriptions with the pharmacist until he is empowered to validate them. Then, the pharmaceutical validations are performed in turn by the pharmacist or the

resident. A participation in the review patient's file with physicians completes the activity and facilitates the transmission of pharmaceutical interventions (PI). This evaluation aimed to establish the cost of an accepted PI in our organization.
Design: From data provided by the directorate, the average hourly cost of students, residents and pharmacists was calculated. Prescription lines, PIs and PIs accepted were collected in the pharmaceutical computerized system. The time dedicated each day to clinical pharmacy was measured by the team members. These data allowed to calculate the average real cost in terms of human resources for a validated PI in each ward.
Results: 10,393 patients were followed between June 2016 and May 2017: 27,926 prescriptions and 205,138 lines of prescriptions were reviewed. 6217 PI were performed among its 73% were accepted. The actual cost of an accepted PI has been calculated on the four domains where clinical pharmacy is implanted: 34€ in orthopaedic surgery, 55 € in digestive surgery, 37€ in vascular surgery and 53€ in gastroenterology, or 46€ all wards combined.
Conclusion: Thus, this study showed that important human resources are needed to generate PIs which will be accepted by physicians, and to actively participate in the improvement and securing of the patient's medication management. These data make it possible to determine the means necessary for the development of a new clinical pharmacy activity.

PT016: Colistin use in critically ill patients with different renal functional state

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Background and Objective: Colistin is used in critically ill patients for treatment of severe infections caused by multi-drug resistant (MDR) Gram-negative (Gr-) bacteria. This drug is potentially nephro- and neurotoxic. Adjustment of dose is recommended in case of renal impairment or renal replacement therapies (RRT) but clear recommendations for critically ill patients are not available.
Setting and Method: Retrospective study using medical histories about adult patients admitted to Pauls Stradins Clinical University Hospital (PSCUH) intensive care units (ICU) in 2016 with diagnosed *MDR Acinetobacter baumanii* infection on colistin therapy.
Main outcome measures: Colistin doses and duration of therapy in different patient groups according to renal functional state: normal, impaired without RRT, with RRT and with declined renal function after starting colistin therapy.
Results: Forty medical histories have met of including criteria. MDR *Ac. baumanii* mostly was isolated from trachea aspirate (52.5% of cases) or blood and trachea aspirate together (22.5%). Mean duration of colistin therapy was 13.22 ± 10 (1–53) days. In 28 cases patients had normal renal function (estimated Glomerular filtration rate (eGFR) ≥ 60 ml/min) before starting colistin therapy. They mostly receive standard dose as 9 million units (MU) loading dose followed by 3 MU three times daily. In 5 cases, eGFR was less than 60 ml/min, and only two cases colistin dose was adjusted (e.g. 1 MU three times daily). In 7 cases patients were on RRT before and during colistin therapy. These patients received very variable doses of colistin (from 1 MU every 18 h till 4.5 MU every 8 h). In 7 patients serum creatinine level increased during colistin therapy more than 2 times. Colistin therapy mostly were continued with adjustment of dose in 5 cases. No one patient from this group needed RRT.
Conclusion: Colistin use in PSCUH ICUs depend on patient renal functional state but chosen doses in patients with renal impairment vary a lot. Clinicians should be aware about importance of monitoring of renal functional state during colistin therapy and adjustment of dose if necessary. Also introduction of Therapeutic Drug Monitoring for colistin in clinical practice could be beneficial to avoid potential toxicity and resistance.

PT019: Efficacy and safety of secukinumab in moderate to severe plaque psoriasis

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Background and Objective: Secukinumab is a fully human lgGl/K monoclonal antibody that selectively binds to and neutralizes the proinflammatory cytokine interleukin-1 7A, indicated for the treatment of moderate to severe plaque psoriasis (MSPP) in adults who are candidates for systemic therapy. The objective is to evaluate efficacy and safety of secukinumab in MSPP and compare the Psoriasis Area and Severity Index response (PASIr) with the ERASURE studies.
Setting and Method: Retrospective study that includes diagnosed patients with MSPP and for which the treatment with secukinumab has been evaluated (300 mg by subcutaneous injection with initial dosing at Weeks 0, 1, 2 and 3, followed by monthly maintenance dosing starting at Week 4), in treatment from January 2016 to June 2017.
Data were compared with the results of ERASURE trial for MSPP (week 12: 81.6% PASIr 75, 59.2% PASIr 90, 28.6% PASIr 100; week 16: 86.1% PASIr 75, 69.8% PASIr 9O, 41.6% PASIr 100; week 52: 74.3% PASIr 75, 60.0% PASIr 90,39.2% PASIr 100).
Main outcome measures: The variables were: age, sex, previous treatments, adverse effect (AE), PASIr 75, PASIr 90 and PASIr 100. Data have been obtained from the Electronic Health Record (SIAS®) and dispensation module (Abucasis®).
Results: The treatment has been requested for 11 patients.
The distribution of patients starting treatment was: 11 men, average age 50 years.

All patients who started treatment had previously received another line of therapy. The main treatments received were methotrexate, cyclosporine and ustekinumab.

During treatment 4 patients had AE. 18.2% of these patients had upper respiratory tract infections and urticaria and 9.1% diarrhoea.

Our results were:

- Week 12: 45.5% PASIr 75, 9.1% PASIr 90, 0% PASIr 100.
- Week 16: 63.3% PAS Ir 75, 36.4% PAS Ir 90, 6% PAS Ir 100.
- Week 52: 100% PAS Ir75, 81.8% PAS Ir9O, 54.5% PAS Ir 100.

Conclusion: Our results, compared with ERASURE trial, shows better PASIr at week 52 but a lower PASIr than the one obtained in this study, but we must take into account the limited sample size (n = 11). Regarding the safety profile reactions described in data sheet as common and very common.

PT021: Evaluation of polypharmacy and potentially inappropriate medication (PIM) use in older adults in a Tertiary care teaching hospital in South India

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Background and Objective: Polypharmacy and Potentially Inappropriate Medications (PIMs) are widely prescribed to elderly patients and can cause serious adverse effects; hence the quality and the safety of prescribing in the elderly is global health care concern. Older adults tend to use multiple medications and age-related physiological changes can make some medications inappropriate.
The aims of this study were to determine the prevalence of polypharmacy and PIM use for older patients admitted to a tertiary care teaching hospital; to identify the most frequently prescribed PIMs in this population using Beer's Criteria and to compare the frequency of use of PIMs in different acute care wards.
Setting and Method: A prospective observational study was carried out among elderly patients admitted between November 2016 to June 2017; in a 1000 bedded tertiary care teaching hospital, Warangal, India. Data on age, gender, diagnosis, duration of hospital stay, treatment, and outcome were collected. Prescriptions were assessed for the use of potentially inappropriate medications in geriatric patients by using American Geriatric Society Beer's criteria (2012). Patients were counselled regarding the use of medications and their disease condition. Data has been analysed using SPSS.
Main outcome measures: The prevalence of polypharmacy and Potentially Inappropriate Medications (PIMs) in hospitalised patients were measured.
Results: A total of1050 geriatric patients (75.04% males and 24.96% females) were admitted. The average age of geriatric patients was 71.69%. The prevalence of polypharmacy (measured as 5 and more medications) was 74% - and polypharmacy was most prevalent in Cardiology (38%), Department of Internal Medicine (24%) and in Surgery (12%). According to the Beer's Criteria, a total of 798 patients (76%) were prescribed at least one PIM independent of their diagnosis and condition, most often metronidazole (20%), metoclopramide (12.9%), diazepam (11%), diclofenac (10.3%).
Conclusion: Usage of inappropriate medications is highly prevalent in geriatrics and as the rate of hospitalisation is also high, it is essential for the health care professionals to follow the available guidelines and tools. Health care professionals are suggested to intervene through proper knowledge and awareness on PIM's to reduce the rate of hospitalisations and PIMs in the elderly.

PT023: Everolimus in lung transplantation: a dilemma?

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Background and Objective: Lung transplantation may be hampered by renal function decline, but also cancer onset, due to immunosuppressive therapy, especially calcineurin inhibitors such as tacrolimus or cyclosporine. mTOR inhibitors, especially everolimus, represent a useful alternative in this context. However, it has been shown that everolimus may lead to proteinuria over time in renal transplantation. Little is known in lung transplantation. The aim of this study was to evaluate the evolution of serum creatinine and proteinuria in lung transplant patients according to their immunosuppressive regimen.
Setting and Method: This observational monocentric retrospective study (36 months) included 20 patients divided in 3 groups: group A = patients without everolimus (n = 10); group B = patients with everolimus for nephroprotective effects with early introduction (≤ 1 year after transplantation, n = 4); group C = patients with everolimus for nephroprotective effects with late introduction (> 1 year after transplantation, n = 6).
Main outcome measures: The primary outcome was serum creatinine evolution and the secondary was proteinuria evolution over time.
Results: In the group A, a 41% increase in serum creatinine was observed in the 2 months following transplantation, with a stabilization until M + 24 (72 ± 14 µmol/L at M0 vs. = 97 ± 26 µmol/L at M + 24). Proteinuria remained stable during the study period (0.17 ± 0.05 g/L). In the groups B and C, serum creatinine decreased by 30 and 17% respectively in the 18 months following everolimus initiation (138 ± 26 µmol/L and 129 ± 35 µmol/L at M0 vs. 96 ± 28 µmol/L and 106 ± 14 µmol/L at M + 18, respectively). In the group B, an early increase in proteinuria was observed after everolimus initiation (0.14 ± 0.08 g/L at M0 vs. 0.86 ± 0.52 g/L at M + 12), which subsequently decreased over time (0.48 ± 0.36 g/L at M + 30). In the group C, an increase in proteinuria was also observed after everolimus initiation, but later and lasting (0.17 ± 0.09 g/L at M + 12 vs. 1.34 ± 0.76 g/L at M + 30).
Conclusion: Our preliminary results confirm that everolimus is an interesting therapeutic alternative to preserve renal function in lung transplant recipients. They suggest that its interest seems more important if everolimus initiation is early after transplantation, but a monitoring of proteinuria is needed to limit long-term adverse events. The analyses of the whole population (n = 100) are in progress.

PT024: New low-density lipoprotein cholesterol lowering therapies in clinical practice : alirocumab and evolucumab

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Background and Objective: To determine clinical efficacy and safety of Proprotein convertase subtilisin/kexin type 9 inhibitors (iPCSK9) in patients with heterozygous familial hypercholesterolemia (FH) or atherosclerotic cardiovascular disease (ACVD) who do not achieve low-density lipoprotein cholesterol (LDL-C) targets despite treatment with the maximal tolerated statin dose.
Setting and Method: We included all patients with FH and/or ACVD who were added a iPCSK9 because of not achieving the optimal LDL-C goal despite high-intensity statin therapy. Demographic data (age and sex), prescribing medical service, clinical data (cardiovascular risk factors (CVRF), heterozygous familial hypercholesterolemia (FH) and baseline lipid-lowering therapy) and biochemical parameters (total cholesterol(TC), HDL-c, triglycerides (TG), and fasting plasma glucose (FPG)) were assessed before and after treatment.
Main outcome measures: Total cholesterol (TC), HDL-c, triglycerides (TG), and fasting plasma glucose (FPG) before and after treatment.
Results: 26 patients (19 M and 7 W) with a mean age of 56.5 ± 8.4 years. 30.8% were intolerant of statin therapy. 46.2% on Atorvastatin 80 mg, 3.8% Atorvastatin 40 mg, 19.2% Rosuvastatin 20 mg and 76.9% plus Ezetimibe 10 mg. 34.6% were added Alirocumab 75 mg, 15.4% Alirocumab 150 mg and 50% Evolucumab 140 mg. 46.2% was prescribed by Cardiology Department, 38.5% by Internal Medicine Department, and 15.4% by Endocrinology and Nutrition Department. 50% had FH. 38.4% had hypertension (HTA), 17.9% Diabetes Mellitus (DM), 23.1% obesity, 5.1% active smoker and 15.4% had no other CVRF added to hypercholesterolemia. 61.5% had ACVD. At baseline, TC was 257.6 ± 57.1 mg/dl, LDL-C

175.7 ± 49.9 mg/dl, HDL-C 54.5 ± 15.3 mg/dl, TG 189.5 ± 108.9 mg/dl, FPG 100.7 ± 23.1 mg/dl. After 4.4 ± 1.9 months on iPCKS9, a significant reduction in CT levels (94.2 ± 79.3 ml/dl less ($p < 0.001$)), LDL-C (91.6 ± 72.8 mg/dl less ($p < 0.001$) (53.8% cLDL < 70 and 69.2% cLDL < 100)) and TG (46.96 ± 82.9 mg/dl less ($p = 0.008$)) was observed. No significant difference in HDL-C levels (1.1 ± 8.2 mg/dL less ($p = 0.49$)) and FPG (1.3 ± 11.3 mg/dL less ($p = 0.56$)) was observed. iPCSK9 were well tolerated without any adverse effects.

Conclusion: iPCSK9 are effective therapy for lowering the LDL-C level and preventing cardiovascular events for patients who cannot reach the target LDL-C level when taking the maximum-tolerated dose of a statin or are statin intolerant patients.

PT025: Metabolic profile in patients with prolactinoma treated with dopamine agonist

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Background and Objective: Hyperprolactinemia might be related to impaired metabolic parameters and normalization of prolactin (PRL) with dopamine agonists has been found to reverse these abnormalities. Our aim was to determine metabolic profile in patients with prolactinoma before and after dopamine agonist (DA) treatment.

Setting and Method: We included all patients with prolactinoma (microadenoma (81.1%) and macroadenoma (18.9%)) in treatment with DA. Demography data (age and sex), prolactin (PRL), gonadotrophin (FSH and LH) and metabolic parameters (Total cholesterol (TC), triglyceride (TG) and fasting plasma glucose (FPG)) were assessed before and after 3 years on DA. Statistical analysis (SPSS v.20.0): Paired-Samples T Test.

Main outcome measures: Prolactin (PRL), gonadotrophin (FSH and LH), total cholesterol (TC), triglyceride (TG) and fasting plasma glucose (FPG)) before and after 3 years.

Results: We evaluated 37 patients (4 M and 33 W) with mean age at diagnostic of 31.6 ± 12.7 years. Before treatment, PRL levels were 173.2 ± 256.7 ng/ml, FSH 5.6 ± 4.8 mmUI/ml, LH 5.1 ± 4.8 mmUI/ml. TC 178.65 ± 33.1 mg/dl, TG 94.11 ± 40.9 mg/dl and FPG 81.3 ± 9.8 mg/dl were normal. After 3.1 ± 3.1 years on DA (Cabergoline 86.5%, Bromocriptine 5.4% and Quinagolide 8.1%) PRL levels decreased [154.5 ± 249.3 ng/ml less ($p < 0.001$)], but no significant difference in gonadotropin levels, FPG (81.3 ± 14.9 mg/dl), TC (178.7 ± 34.8 mg/dl) and TG (95.32 ± 40.6 mg/dl) was observed.

Conclusion: Several studies[1,2,3] hypothesized that DA may be effective on improving metabolic parameters. However, we did not observe any difference in metabolic profile after treatment with DA, despite PRL levels normalized. We speculate that more studies are necessary to conclude whether this drug can interfere metabolic profile of patients with prolactinoma.

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PT026: Experience in the use of dopamine agonists in prolactinomas in a third level hospital

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Background and Objective: Prolactinomas can have significant endocrine, neurological and visual consequences. Dopaminergic agonists (DA) represent the most effective first-line treatment with few side effects at the recommended doses.

The aim of this study is to define and describe the profile of patients undergoing treatment with a DA and with a micro- or macroprolactinoma.

Setting and Method: Retrospective observational study. We included all patients with a micro- (81.1%) or macroprolactinoma (18.9%) in treatment with an DA from 2015 to the present. Demographic data (age and sex) and biochemical data (prolactin (PRL), follicle stimulating hormone (FSH), luteinizing hormone (LH), total cholesterol (CT), triglycerides (TG) and fasting plasma glucose (FPG)) were recorded at baseline.

Main outcome measures: PRL, FSH, LH, CT, TG and FPG at baseline.

Results: We evaluated 37 patients (4 M and 33 W) with a mean age at diagnostic (mean ± SD) of 31.6 ± 12.7 years. Before treatment, PRL levels were 173.2 ± 256.7 ng/ml (38.6 - 1609), FSH 5.6 ± 4.8 mmUI/ml, LH 5.1 ± 4.8 mmUI/ml, CT 178.6 ± 33 mg/dl, TG 94.1 ± 40.9 mg/dl and baseline GLY 81.3 ± 9.8 mg/dl. DA were: Cabergoline 86.5%, Bromocriptine 5.4% and Quinagolide 8.1%; in addition, 94.6% did not receive surgical treatment prior to DA treatment.

Conclusion: There are several studies that relate hyperprolactinemia with altered metabolic profile and its normalization after treatment with DA. After the analysis of our patients we observed that the DA of choice in most cases was cabergoline. The patients basal metabolic profile was not altered despite having high levels of prolactin. More studies are needed to evaluate the metabolic profile of these patients and the implications of treatment with DA in the control of this profile in patients with prolactinoma.

PT027: Insulin degludec in clinical practice: type 1 diabetes patients switched from their basal insulin to insulin degludec

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Background and Objective: The aim of this study was to analyse changes in daily insulin dose in type 1 diabetes mellitus (T1DM) patients on basal–bolus therapy when switching from basal insulin either glargine or detemir to degludec.

Setting and Method: Seventy-six T1DM patients treated with basal insulin either glargine (64.5%) or detemir (35.5%) were switched to basal insulin degludec due to poor glycemic control in a period from January to December 2016.
Main outcome measures: We have recorded glycated haemoglobin (HbA1c) and insulin dose before and after a mean follow-up period of 6 months.
Results: We included 76 patients (mean age 39.3 ± 14.4 years; mean diabetes duration 20.8 ± 11.05 years). After switching to degludec, HbA1c decreased from 8.4 ± 1.13% to 8.2 ± 1.09% ($p = 0.013$). The dose of both basal insulin and prandial insulin (lispro, aspart or glulisine) decreased significantly. Total insulin dose declined from 60.2 ± 33.4 UI to 48.4 ± 21.4 UI (19.7% reduction) ($p < 0.001$) with 15.3% reduction in basal insulin, from 34.9 ± 20.6 UI to 29.6 ± 15.1UI ($p < 0.001$) and 25.5% reduction in prandial insulin, from 25.32 ± 23.6 UI to 18.8 ± 11.2UI ($p = 0.013$).
Conclusion: Switching from basal insulin glargine or detemir to basal insulin degludec in T1DM patients led to an improvement in glycemic control with a significant reduction in daily insulin dose.

PT028: The role of proprotein convertase subtilisin/kexin type 9 inhibitors in clinical practice

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Background and Objective: Proprotein convertase subtilisin/kexin type 9 inhibitors (iPCSK9) have demonstrated to improve lipid profile when administered either as monotherapy or in combination with statins. iPCSK9 represent a new approach to achieving effective lipid lowering and cardiovascular risk reduction in a broader number of patients who do not achieve low-density lipoprotein cholesterol (LDL-C) targets despite treatment with the maximal tolerated statin dose. However, the cost of iPCSK9 is high so their use should be restricted to carefully selected patients.
Our aim was to determine patients who may benefit from iPCSK9 (Alirocumab (ALI) and Evolocumab (EVO)) in order to achieve LDL-C targets.
Setting and Method: We included patients who were added a iPCSK9 because of not reaching lipid targets despite treatment with the maximal tolerated statin dose. We determine demographic data (age and sex), prescribing medical service, clinical data (atherosclerotic cardiovascular disease (ACVD), cardiovascular risk factors (CVRF), heterozygous familial hypercholesterolemia (FH) and baseline lipid-lowering therapy) and biochemical parameters (total cholesterol(TC), HDL-c, triglycerides (TG), and fasting plasma glucose (FPG)).
Main outcome measures: Total cholesterol (TC), HDL-c, triglycerides (TG), and fasting plasma glucose (FPG)) at baseline.
Results: We evaluated 49 patients (31 M and 18 W) with a mean age 54.7 ± 10.7 years. 34.7% had statins intolerance. 42.9% were receiving Atorvastatin 80 mg, 4.1% Atorvastatin 40 mg, 14.3% Rosuvastatin 20 mg, 2% Rosuvastatin 10 mg, 2% Pitavastatin 1 mg and 65.3% were added Ezetimibe 10 mg. 38.8% were added Alirocumab 75 mg, 8.2% Alirocumab 150 mg and 53% Evolucumab 140 mg. 51% were prescribed by Cardiology Department, 30.6% by Internal Medicine Department and 18.4% by Endocrinology and Nutrition Department. 46.9% had FH. 34.6% had hypertension (HT), 16.7% Diabetes Mellitus (DM), 24.3% obesity, 10.2% were active smokers and 14.2% had no other CVRF added. 67.3% had ACVD (42.9% acute myocardial infarction (AMI), 20.4% Peripheral Arteriopathy, 2% stroke, 2% AMI + stroke). At baseline, TC was 249.7 ± 57.7 mg/dL, LDL-c 168.5 ± 51.7 mg/dL, HDL-c 52.8 ± 13.9 mg/dL, TG 187.1 ± 96.7 mg/dL and FPG 108.8 ± 43.5 mg/dl.
Conclusion: iPCSK9 represent a useful tool for achieving LDL-C targets in patients who do not achieve LDL-C targets despite treatment with the maximal tolerated statin dose and in those patients who are not able to tolerate high doses of statins. Moreover, given the high cost of PCSK9 inhibitors, their use should be restricted to carefully selected, very high risk patients.

PT029: Ramucirumab, a therapy option for treatment of metastatic HER2-negative cardia gastric adenocarcinoma?

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Background and Objective: Cardia gastric adenocarcinoma (ADK) is associated with an increasing incidence and with poorer prognosis compared to non-cardia (body, antrum) gastric ADK. Treatment recommendations are the same for both locations. Ramucirumab, an anti-angiogenic monoclonal antibody, was recently approved for use as 2nd line therapy in combination with paclitaxel in advanced or metastatic gastric cancer. No data (outside of clinical trials) was found about ramucirumab use in gastric cancer in routine clinical practice. In this report, we describe 7 cases of metastatic or advanced HER2-negative cardia gastric ADK treated with ramucirumab in combination with paclitaxel.
Setting and Method: Case reports from Oncology department. Data were collected from CHIMIO® software and medical records. Efficacy and safety of ramucirumab in combination with paclitaxel in metastatic or advanced HER2-negative cardia ADK are presented.
Main outcome measures: Efficacy evaluation : stability or tumor progression, based on clinical and radiological outcomes. Safety evaluation : occurrence of adverse events (grade ≥ 3 or which lead to cessation of treatment).
Results: 7 patients (4 men, 3 women, mean age 60 years [39–73], performance status 0–1) with HER2-negative cardia ADK were treated (6 metastatic, 1 unresectable advanced ADK) between December 2014 and May 2017. Ramucirumab was prescribed at 8 mg/kg (days 1 and 15) and paclitaxel 80 mg/m^2 (days 1, 8 and 15). 4 patients maintained stable disease: 1 patient decided to stop the treatment (2nd line) for personal reasons after 2.4 months and 3 patients (1 received treatment in 1st line, 1 in 2nd line, 1 in 3rd line) had respectively a duration of stable disease of 9.8 months, 7.1 months and 17.3 months. 2 patients were in progression after less than 4 months of treatment in 2nd line. 1 patient stopped treatment due to multiple adverse events (grade < 3). Regarding safety, the most common adverse effects were due to paclitaxel: asthenia, neutropenia (1 patient grade ≥ 3) and neuropathy. Paclitaxel was discontinued or prescribed at reduced dose for 4 patients but ramucirumab was maintained at 8 mg/kg.
Conclusion: Our data suggest that ramucirumab could be an interesting therapy option for patients with metastatic HER2-negative cardia ADK for whom median survival time is less than a year and progression-free survival is only 5–7 months in 2nd line.

PT030: Use of hyaluronidase to treat extravasations of taxanes

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Background and Objective: Hyaluronidase is an enzyme that degradates hyaluronic acid, improving the absorption of extravasated drugs such as taxanes and vinca alkaloids. However, the current reviews and clinical practice guideline do not provide clear scientific evidence about what extravasated drugs can be treated with hyaluronidase. The main objective was to review the scientific literature on the management of taxanes extravasations treated with hyaluronidase. The secondary objective was to compare the found information with some current clinical practice guidelines.
Setting and Method: The literature was searched using the Pubmed database. The review was conducted using taxoids extravasation, paclitaxel extravasasation and docetaxel extravasation as keywords respectively. The inclusion criteria were publications in English or Spanish. No time limit and human filter were applied. Reviews were excluded. The information was compared with several clinical practice guidelines of health agencies: European Society of Medical Oncology (ESMO), British Columbia Cancer Agency (BC) and National Health System (NHS).
Main outcome measures: Analysed articles and included guidelines.
Results: 159 publications were found. After eliminating duplications, only 5 articles met the study eligibility but only four were analysed because it was impossible to access to the full text of one article. 2 publications referred to animals and four to humans. Paclitaxel was injected subcutaneously in the animal studies and hyaluronidase were found effective to treat ulcers produced by this drug. 2 publications referred to human studies reporting on a total of 5 patients. Only 1 patient suffered a extravasation of docetaxel and hyaluronidase 150 UI subcutaneously was administered obtaining a bad outcome. Hyaluronidase and cold packs was applied in 2 of 4 patients who suffered from paclitaxel extravasation obtaining a worse outcome than patients treated with exclusively local cold packs.
The most recent practice guideline of ESMO recommends using hyaluronidase to treat taxanes and vinka alkaloids extravasations. However, BC and NHS do not recommend use hyaluronidase for taxoids extravasations. In addition, ESMO specifies the dose of hyaluronidase could be 150-900 administered subcutaneously around the area of extravasation.
Conclusion: The extravasation of cytostatic agents is one of the main challenges for oncologists, haematologists, and nurses in patients undergoing cancer treatments. The dose of hyaluronidase used in most of articles of this review was unsuitable. So, this job finds a scarcity of scientific evidence to develop an optimal management for taxoids extravasation. That is why, a strict acceptance of the information published in the clinical practice guidelines should not be the answer to a lack of scientific evidence. Establishing protocols to treat extravasations should be a priority of oncological teams where pharmacists can play an important role by providing a critical view of available literature taking into account the maximum security for patients.

PT031: Probiotics and prevention of necrotizing enterocolitis of the newborn

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Background and Objective: Necrotizing enterocolitis (NEC) is the most frequent cause of acquired gastrointestinal disease and surgical emergency in the neonate. It affects predominantly preterm infants with very low birth weight (10%). The pathogenesis of NEC is multifactorial and although it is not clearly defined, one has the theory that the integrity of the gastrointestinal tract is compromised as a result of the interaction of intestinal immaturity, microbiota alteration, enteral feeding and ischemia. Infants affected by this pathology may have short- and long-term complications and sequelae, such as sepsis, cholestasis, extra uterine malnutrition, short bowel syndrome, and altered growth and neurodevelopment (35%). Mortality is high (20–50%). The preventive measures used, including the administration of probiotics, have shown a great impact on the incidence and morbidity of the NEC.
The aim of this study is to determine the efficacy and proper management of probiotics for the prevention of NEC in preterm infants
Setting and Method: In order to find the maximum number of studies associating the use of probiotics with the prevention of NEC, a thorough search was conducted in MEDLINE, the Central Register of Controlled Trials and EMBASE. The MeSH descriptors used were "neonate", "infant", "new-born", "probiotic" and "necrotizing enterocolitis". Studies carried out between January 1980 and March 2017 were considered.
Main outcome measures: -The use of probiotics should be strongly considered in the care of premature < 32 weeks of gestation and/or < 1500 g.

- Although the benefit-risk-cost balance is clearly favourable with current data, the routine use of probiotics would require close monitoring.

Results: Based on the randomized clinical trials performed to date, it is possible to give the following recommendations as to type of strain, dose, start and duration:

- What strain?: A combination of Bifidobacterium and Lactobacillus is preferable.
- What dose: 3×109 CFU/day, preferable in single dose. In < 1000 grams start with 1.5×108 CFU/day until reaching enteral of 50 ml/kg/day.
- When to start: when you can start enteral feeding, preferable in the first 7 days of life.
- How long to continue?: up to 35 weeks of postconceptional age or until discharge.
- Any precautions?: Do not offer the supplement with probiotics if acute illness such as sepsis, NEC or perinatal asphyxia.

Conclusion: After reading the various meta-analyses and clinical trials, it can be stated that probiotics may lead to an improvement in NEC, although it is important to note that there are few available studies related to the safety and effect of probiotics in preterm infants with extreme low birth weight (< 1000 g), as well as economic studies to determine their cost-effectiveness in health systems.
In this way, the most reasonable thing is to have a cautious attitude in the introduction of probiotics in the preterm one of routine to determine better the safety and to evaluate the effects in the long term.

PT032: Use of benznidazol for chagas' disease: an approach to clinical practice

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Background and Objective: *Trypanosoma cruzi, which causes* Chagas' disease, is one of the most common parasites in tropical areas. Nowadays, the treatment of such parasite is based on Benznidazole. However, Benznidazole is not commercialized in Spain. The treatment for chronic Chagas' disease is highly controversial

because of the difficulties involved in assessing its therapeutic efficacy and the different side effects of the treatment. Hospital pharmacists are responsible for applying this treatment to patients, only after the elaboration of an exhaustive report. In this article, we have reviewed all the reports as well as classified the information in order to improve the knowledge of the clinical practice in our hospital. The objective is to improve the understanding of the clinical practice regarding the treatment of the *Trypanosoma cruzi*.

Setting and Method: Observational descriptive study from January 2013 to September 2016. Dates of patients were obtained from their clinical history. Examined variables: age, sex, nationality, symptomatology of the disease, coinfections, doses and side effects of Benznidazole.

Main outcome measures: The side effects related to Benznidazole (49,48% patients): injuries cutaneous (itchy skin lesions (36 patients),headache(17 patients), *gastrointestinal symptoms* (epigastric pain, anorexia, nausea, pyrosis, diarrhoea)(5 patients),distal neuropathy(3 patients), dizziness(3 patients), oedema of lips(3 patients), muscle pain(2 patients), cramps(2 patients),weight loss(1 patient). Three patients stopped taking the drug and five patients had to decrease the dose of Benznidazole because of the appearance of such a serious adverse effects.

Results: A total of 97 patients were analysed—41 men and 56 women. The average age was 37.27 ± 7.73. Nationality: all the patients were from Bolivia. Only 41.24% of the patients had some symptomatology of the disease(constipation, dyspnoea, fatigue, cardiomyopathy). Coinfections: 42 patients (43.29%):strongyloidosis, syphilis,toxocariasis,tuberculosis,BHV,intestinal amoebiasis, uncinariasis, himinolepis and schistosomiasis. Posology:7 mg/kg/day during 60 days.

Conclusion: Benznidazole is an etiological treatment commercially available for the Chagas' disease. However, this drug involves in the appearance of a wide range of side effects which could lead to stop taking it. Therefore, pharmacists could play an important role in both recognizing of adverse effects and proposing an individualized dose adjustment of Benznidazole to each patient in order to avoid the treatment discontinuation and ensure the no-development of cardiomyopathy and transmission by blood transfusion, congenital and organ transplants of this disease.

PT033: Impact of "Medications to Be Used with Caution in Older Adults" in 2015 updated beers criteria

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Background and Objective: Beers criteria were always considered an explicit method to identify potentially inappropriate medication (PIM), however the 2012 and the 2015 Updated Beers Criteria included a list of "Medications to Be Used with Caution in Older Adults" (the Table 4), which may have impact in computerized clinical decision support systems (CDSS). We aimed to assess the impact of considering or ignoring the 2015 Updated Beers Criteria Table 4 to identify PIMs.

Setting and Method: All the patients institutionalized in a charity nursing home in Central Portugal in May 2015 were included and their complete medical records appraised. The 2015 Updated Beers Criteria were applied twice: considering and ignoring the Table 4 ("use with caution"). Results were compared using non-parametric paired tests. Ethics approval was obtained from the University of Coimbra Medical School (106-CE-2015).

Main outcome measures: Number of PIMs considering and ignoring 2015 Updated Beers Criteria Table 4.

Results: A total of 32 patients with a mean age of 86.3 years (SD = 8.9; range 64–99) with a majority of female (68.8%) were studied. Considering 2015 Beers Table 4, 82 PIMs were identified, with only 1 patient with no PIMs (PIMs per patient median = 2; IQR 1–3). Ignoring Table 4, 44 PIMs appeared with 6 patients with no PIMs (PIMs per patient median = 1; IQR 1–2). Significant difference existed in the number of PIMs per patient considering and ignoring Table 4 (Wilcoxon signed-rank $p < 0.001$). Differences in PIM identification were mainly due to furosemide (n = 8), amlodipine (n = 4) and acetylsalicylic acid (n = 4). Differences were found in 18 other drugs.

Conclusion: One of the main characteristics of Beers Criteria, being explicit criteria, may have resulted compromised after the inclusion of Table 4. Considering the medicines to "use with caution" results in significant differences in PIM identification, which may be an obstacle for the use of these new version in CDSSs.

PT034: Evidence-based evaluation of the recommendation and use of raspberry leaf preparations to facilitate parturition

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Background and Objective: Raspberry leaf has been recommended and used to facilitate parturition. Animal studies provide contradictory results, suggesting a potential effect of raspberry leaf on uterine tissue without clinical significance; scant human data exists. Despite limited data, numerous surveys have reported raspberry leaf use rates among pregnant participants as high as 82%, with rates of health care practitioner-recommended use as 17-50%. This analysis assessed all primary literature related to raspberry leaf use in pregnancy and evaluated the discordance between published results and professional recommendations for use.

Setting and Method: A comprehensive search strategy seeking literature regarding the efficacy and safety of raspberry leaf was applied to Medline, Embase, and International Pharmaceutical Abstracts. The search resulted in 191 publications, which was limited to human studies and primary literature: six results were relevant. A bibliographic search of resultant tertiary literature, professional compendia, and herbal texts confirmed the comprehensive rigor of the search.

Main outcome measures: This analysis reports on studies evaluating the effects of raspberry leaf in pregnant women using any of the following outcomes: gestation period; medical augmentation of labour; length of labour; maternal blood loss and blood pressure; adverse effects; meconium-stained amniotic fluid; new-born Apgar score at 5 min; birth weight; and intensive care admission.

Results: Six reports of five studies assessed the effects of raspberry leaf on multiple parturition outcomes: one prospective randomized controlled trial; two retrospective observational studies; one case series; and one case report. Efficacy results consistently demonstrated no statistically significant effects on labour, maternal, or foetal outcomes. The case series described that raspberry leaf inhibited and diminished uterine contractions but no quantitative data was reported. The case report noted maternal hypoglycaemia in a patient with gestational diabetes using raspberry leaf. Adverse effects included gastrointestinal complaints; headache; heartburn; uterine tightening or contractions; dizziness; and rash. Four of the six reports, though, promoted raspberry leaf as a safe and possibly effective agent.

Conclusion: Raspberry leaf is used internationally despite a lack of supporting evidence. This practice is inconsistent with evidence-based medicine principles. While data suggests that raspberry leaf is safe, ineffective agents should not be recommended simply because they are non-toxic or merely promote patient autonomy in health care decision-making. Common practice is to introduce as few medicinal agents as possible during pregnancy to limit exposure due to risks for adverse events: recommending an ineffective agent, such as raspberry leaf, directly contradicts this evidence-based principle. No professional guidelines recommend raspberry leaf for parturition. Raspberry leaf preparations should not be recommended to or used by pregnant women to facilitate parturition due to a lac of supporting efficacy data.

PT035: Evaluation of the hospital transition in intensive care unit patients after the implementation of a pharmacist

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Background and Objective: At admission and discharge from ICU (intensive care unit) to other services, information concerning the correct medicines has to be transferred between health professionals. If this information is incomplete or lost, the correct pharmacological treatment is at risk; so it's necessary to analyse adverse events at the inpatient interface in order to optimize the medical treatment at these critical steps.
The objective of this report is to compare the pharmacological errors and inconsistencies that occur in medical orders of transferred patients in order to optimize the medical treatment before and after the implementation of a pharmacist in the ICU.
Design: The prescription and administration of medicines for patients who were transferred during one month were recorded prospectively. This data was compared with a study carried out the year before during two months (May–June 2016). After this first study, the clinical pharmacist was established in the ICU one day a week to evaluate the prescription in transitions.
During the one-month rotation of the pharmacist resident (April 2017), the medical orders and nursing administrations were evaluated and collected. We analysed the resulting dataset in terms of frequency and severity of medical errors and regarding the acceptance of the clinical pharmacist's interventions.
Results: 94 patients were included during May–June 2016 and 46 patients in April 2017. A total of 64% (94) errors were detected in 2016 and 48% (22) in 2017.
The ICU discharge report information, concerning post-discharge medicines, was only available in 60% (56) of patients in 2016 at the time of transfer and 41.3% (19) in 2017. The most frequent types of errors were: error of omission 28% (44.2) in 2016 and 40% (15) in 2017, no administration for more than 24–36 h 21% (33) in 2016 and 24% (9) in 2017, medication not needed 20% (31.6) in 2016 and 10%(4) in 2017, double administration 19% (30.2) in 2016 and 16% (6) in 2017 and error of dose 12% (19) in 2016 and 10% (4) in 2017. The average number of errors per patient was 2.6 in 2016 and 1.7 in 2017.
Conclusion: The pharmacist plays an important role in the task of detecting and avoiding errors in prescriptions and admistrations in hospital transitions. Its implementation has reduced the number of errors but although it is still necessary his daily presence.

PT036: The impact of a multidisciplinary team in antibiotic treatments in clinical practice

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Background and Objective: We created a multidisciplinary team to optimize the use of antibiotics. This was a good tool for promoting its rational use in our hospital. The objectives of this team were to assess the suitability of antibiotic treatments prescribed and to promote a savings policy.
Design: A prospective study was conducted for one month (February 2017). During this period, all the prescriptions of antibiotics were evaluated. The treatments prescribed in medical intensive care units, paediatrics and haematology were excluded. An internal medicine physician specialized in infectious diseases and a resident of the pharmacy service assessed the adequacy of the antibiotic treatments according to the patient's clinical situation. The team made recommendations about the change or suspension of antibiotics, the administration route and the duration of the treatments. All these interventions were recorded for a posterior statistical analysis.
Results: During the study period 268 patients with antibiotic prescriptions were evaluated (100%). We have optimized 21% (57) of these treatments: 74% were surgical patients (25% Vascular surgery, 16% General Surgery, 11% Otorhinolaryngology and others) and 26% were medical patients (11% Nephrology, 7% Gastroenterology and others). The most common infections were: 14% (8) skin and soft tissue infections, 12.3% (7) abscesses, 8.8% (5) urinary tract infections, 7.7% (4) diabetic foot syndrome and others. The antibiogram showed no growth in 15.8% (9), multiple microorganisms in 31.6% (18) and only one microorganism in 52.6% (30).
The recommendations made were: 36.8% (21) de-escalation of an antibiotic treatment, 35.1% (20) treatment suspension, 17.5% (10) sequential therapy, 5.3% (3) posology adjustment and 5.3% (3) initiation of an antibiotic treatment. All the recommendations made were accepted. The average duration of the treatments was 13.8 ± 8.7 days (1–40 days) but the estimated ideal duration was 11.7 ± 7.6 days (0–30 days).

Comparing February 2017 (the intervention period) with February 2016, the saving achieved was 9.610,9 € which represents the consumption of 1.875 less units of antibiotics.
Conclusion: The evaluation of antibiotic prescriptions allows to optimize the treatments and to adjust them to the clinical situation of the patients as well as to reduce the costs.

PT037: Therapeutic management of multiple myeloma in routine clinical practice: which place for carfilzomib ?

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Background and Objective: Multiple myeloma (MM) is the second most common haematologic malignancy. The introduction of new therapeutic agents has improved MM prognosis but relapse remains common. Carfilzomib, a 2nd generation proteasome inhibitor, is approved in Europe combined with dexamethasone ± lenalidomide for patients in progression after at least one prior therapy. To our

knowledge, no data is available on the use of carfilzomib in actual practice outside of clinical trials. The aim of our study was to assess in routine practice the use of carfilzomib and its place in our therapeutic strategy for treatment of MM.
Setting and Method: This Retrospective study included patients who received carfilzomib from 31/03/2016 to 15/06/2017 in Haematology department. Clinical data were collected and analysed from the hospital software (Chimio®, Orbis®).
Main outcome measures: Clinical and Efficacy evaluation: age, line of treatment, number of cycles, disease evolution (response, progression). Safety evaluation: occurrence of adverse events.
Results: 18 MM patients received carfilzomib in combination with another drug after 1–7 prior lines of therapy. Except for 1 patient, all received bortezomib in 1st line and have been autografted before. In patients ≥ 65 years old (n = 8), 7 had partial (PR) or complete response (CR) (median number of prior lines = 3 [1–5]; mean number of cycles = 7.5 [3–13]), 1 had progression disease (PD) (3rd line; number of cycles = 5). In patients < 65 years old (n = 10): 6 had PR or CR (median number of prior lines = 1 [1–3], mean number of cycles = 5 [4–9]), 4 had PD (median number of prior lines = 3.5 [1–7], mean number of cycles = 3.3 [3–4]). No grade 3 ≥ adverse events were reported.
Conclusion: Carfilzomib seems to be beneficial for elderly MM patients. It is effective and well tolerated even when administered for a prolonged period of time. Our younger patients who have progressed under carfilzomib presented an aggressive form of MM which were chemotherapy resistant. Our data showed that carfilzomib is more effective when it is prescribed early in therapeutic strategy and it is less effective for salvage therapy. Its efficacy and limited toxicity profile may be particularly suitable for combination strategies with new drugs, such as daratumumab.

PT038: Long term use of ustekinumab in clinical practice

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Background and Objective: Ustekinumab (UST) is a human monoclonal antibody that bins IL-12 and IL-23 authorized for the treatment of psoriasis and arthritic psoriasis with very good results in the randomized clinical trials, but with lack of experience in long-term use. The aim of this study was to describe the patterns of prescription and assess the effectiveness of UST.
Setting and Method: Observational, descriptive, and retrospective study in a University Hospital. We assessed all patients older than 18 years, treated with more than one dose of UST from 2009 to 2017. Data were collected from medical record. Statistical analysis was performed using SPSS v.18.0.
Main outcome measures: Age, gender, disease, months of treatment with UST, previous treatments, Psoriasis Area Severity Index (PASI), Dermatology Life Quality Index (DLQI).
Results: 115 patients were evaluated, 50.4% (58/115) female, mean age was 48.5 (range 18–82) years. Ninety per cent (103/115) were diagnosed of Psoriasis, and only 8% (9/115) were treated with the higher dose of 90 mg. The 53% (61/115) of patients were naïve to biological treatments, in 30% (35/115) UST was used as a second-line and in 17% (19/115) as a third-line or higher. The 17% (19/115) used UST in combination with a conventional disease-modifying antirheumatic drug (DMAR), nevertheless the 98% (113/115) had previously used a conventional DMAR. Patients who discontinued UST were treated a mean of 28.0 months (SD 36.7) while those who continued on treatment had a mean of 39.7 months (SD 2.70). Nowadays, 61 patients are being treated with UST, mean PASI score 1.32 (SD 1.6), mean DLQI score 0.85 (SD 1.2). UST is optimized (administration every 13-16 weeks) in the 67.2% (41/61) of patients.
Conclusion: UST has been prescribed almost exclusively for the treatment of psoriasis. Most patients were naïve, and only a 17% used concomitantly DMAR. Very low DLQI and PASI scores were observed after a mean of 39.7 months of treatment, which confirmed long-term effectiveness. In the current study, the optimization of the therapy is safe and ensures the maintenance of effectiveness.

PT039: Potentially inappropriate prescribing in nursing home residents in the czech republic: study in the shelter project

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Background and Objective: Potentially inappropriate medication use (PIMs) present frequent problem of geriatric prescribing. Analyses of the EU SHELTER project (Services and Health in the Elderly in Long-TERm care, 7th FP of the EC, 2009-2014) focused on description of prescribing practices in more than 4100 long-term care residents in 7 countries - the Czech Republic, Italy, Germany, Netherlands, Finland, UK, France and Israel. This work presents results on PIM prescribing in nursing home residents in the Czech Republic using Beers 2012 criteria, Czech national criteria (national tool on PIMs) and STOPP/START criteria.
Setting and Method: 490 Czech nursing home residents from geographically different areas were assessed in long-term care facilities during the EU SHELTER project. For prospective assessment, the RAI-LTCF comprehensive geriatric tool was applied including different domains, mainly demographic characteristics, functional, clinical characteristics and prescribed medications. Results have been analysed using descriptive statistical methods by SPSS Software vers. 12.
Main outcome measures: Prevalence of PIMs according to Czech national criteria, Beers 2012 criteria and STOPP/START criteria.
Results: The highest prevalence of potentially inappropriate medication (62.3%) has been documented when applying Czech national criteria (CNC) on PIMs, then by Beers 2012 criteria (60.2%) and STOPP/START criteria (44.5 and 52.9%, respectively). The most prevalent prescribing problems were (according to CNC): long-term use of benzodiazepines (BZDs) in depressive patients (7.8% in total sample), untreated constipation caused by opioids (7.4%), long-term use of BZDs in patients suffering from syncopes/falls (6.3%), long-term use of NSAIDs and ACE-I without clinical monitoring (6.1%), use of verapamil in patients with chronic constipation (3.9%) and use of doxazosine in older patients having urinary incontinence (2.9%). The most prevalent problems according to Beers 2012 criteria were: long-term use of BZDs in patients with recent falls and in cognitively impaired older patients (6.3 and 5.1%), use of zolpidem in cognitively impaired patients (4.3%) and long-term use of ASA or clopidogrel with NSAIDs without gastroprotection and monitoring of the treatment (3.7%). Among problems of undertreatment (START criteria) were documented: no anticoagulation treatment in atrial fibrillation

(7.1%), no ACE-I or sartane use in chronic heart failure (4.5%) and no antidepressive treatment for moderate to severe depression (3.9%).
Conclusion: Application of Czech national consensus (CNC) on PIMs in older patients yielded the highest prevalence of prescribing problems compared to Beers 2012 and STOPP/START criteria in nursing home residents in the Czech Republic. The CNC is a specific tool created for conditions of the Czech pharmaceutical market, including both Beers and partly STOPP/START criteria.

PT040: Drug-drug interactions in intensive care unit: A point prevalence study

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Background and Objective: The patients in intensive care unit have multiple diseases which may require many drugs and drug interactions occur consecutively. The success and cost of treatment and patient's quality of life are adversely affected unless drug interactions and drug-related problems are resolved. The aim of this study was to determine drug–drug interactions in intensive care units during one day.
Setting and Method: A point prevalence study was conducted in three medical intensive care units (ICUs) of a university hospital on June 18th, 2017. The daily drug orders of patients were examined and possible drug–drug interactions were analysed using the Micromedex online database by clinical pharmacists for its clinical significance.
Main outcome measures: To determine the frequency of drug–drug interactions in intensive care patients.
Results: A total of 21 patients (61.9% female) hospitalized in medical ICUs were included; the mean (± standard deviation) age of the patients was 63.7 ± 22.0 years. Majority of patients were admitted due to respiratory failure (n = 13, 61.9%) and sepsis (n = 5, 23.8%). The most common chronic comorbidities were hypertension, chronic obstructive pulmonary disease, congestive heart failure, kidney failure and diabetes mellitus. The patients used a total of 185 drugs (median: 6, range: 3–15) and drug–drug interactions were identified in 12 (57.1%) patients. A total of 57 drug–drug interactions were identified, of those 38 (22 major and 16 moderate) were considered clinically significantly. The most commonly interacting drugs were clarithromycin, midazolam, fentanyl and rifampin.
Conclusion: Drug-drug interaction is common in ICUs, therefore clinical pharmacists might have an important role in detecting and evaluation of clinical significance of drug interactions in order to maintain rational drug therapy for these patients.

PT041: Evaluation of potential drug–drug interactions on antiretroviral treatment

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Background and Objective: In general, more than one disease exist in aging population therefore, one or more medications may be required for treatment of each disease. It is well-known that the risk of drug interactions increases by number of drugs used.
Setting and Method: This prospective study was carried out in a university hospital on infectious diseases outpatient clinic between September 2015–September 2016. Potential drug–drug interactions were identified using Micromedex® Solutions Drug Interactions, Drugs.com Drug Interactions Checker and Medscape Drug Interaction Checker online databases.
Main outcome measures: To identify the frequency of and the risk factors for Drug–Drug Interactions (DDIs) in people living with HIV/AIDS.
Results: A total of 200 patients with HIV/AIDS (81% male) were included in the study. The mean (± standard deviation) age of the patients was 41.16 (± 12.91) years. A total of 63, 122 and 171 potential interactions identified in 200 patients by using the Micromedex, Medscape and Drugs.com online databases, respectively. The number of identified drug interactions were higher in older patients compared to younger patients ($p < 0.001$ according to Medscape, Drugs.com, Micromedex). The risk factors leading to DDIs with antiretroviral drugs were identified as number of concurrent chronic disease ($p < 0.001$ according to Medscape, Drugs.com, Micromedex) and polypharmacy ($p < 0.001$ according to Medscape and Drugs.com). Drug interactions with antiretroviral drugs are more likely to occur in patients who have concurrent endocrine diseases ($p < 0.001$ according to Medscape, Drugs.com, Micromedex).
Conclusion: The management of drug–drug interactions is the biggest challenge in HIV treatment. The use of drug information databases and consultation with a clinical pharmacist or HIV specialist should be considered if any conflicts arise about possible drug interactions in antiretroviral drugs.

PT045: Analysis of usage profile and safety of statins in the elderly

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Background and Objective: Statins constitute the most effective treatment to decrease cholesterol levels and consequently reduce cardiovascular risk. However, there is controversy over the use of statins in elderly people because the balance of risks and benefits is not always positive.
Our objective is to analyse the usage profile and safety of statins in a Residence for the Elderly with 251 patients older than 65.
Setting and Method: Observational descriptive study of all patients treated with statins in a Residence for the Elderly with 251 patients older than 65.Data sources: electronic medical records and prescription program.
Main outcome measures: Sex, age, primary/secondary prevention, statins dose, LDL cholesterol levels.
Results: There are 68 patients (27.5%) treated with statins: 12 men, mean age: 82.2 ± 7.9 years old. Among these 68 patients, there are 55 (90.9%) older than 75. In the elderly, there is no direct evidence to demonstrate the efficacy of statins in primary prevention. In our case, 46% of patients have statins prescribed in primary prevention.
In our study, 39 patients (57.4%) are treated with atorvastatin, 29 patients (42.6%) with simvastatin and 3 patients (5.2%) with pravastatin.

Patients treated with atorvastatin 40-80 mg (17 patients) are considered to be treated with high-intensity therapy, it causes reductions of 50% in LDL cholesterol and higher risk of adverse reactions.

There is no agreement on target levels of cholesterol in people older than 65. The average of LDL cholesterol after starting statins was 85.05 mg/dL.

The main adverse effect observed was gastrointestinal discomfort followed by headache, insomnia and rash. It is necessary to monitor liver function and creatine phosphokinase (CPK) levels after starting treatment because statins are associated with myopathies. 85% of patients had transaminases measures after beginning statins treatment but only 8% had CPK levels.
Conclusion: In the elderly, statins have to be restricted to patients who can obtain a positive balance of risks and benefits. The adverse effects incidence is higher in these population group because of the comorbidity, polymedication and the increased possibility of liver function deterioration. It is fundamental to monitor liver function and CPK levels to prevent possible adverse effects. Consequently, deprescription must be considered in patients who do not benefit from therapy.

PT046: Lipid emulsion based exclusively on omega-3 fatty acids for abnormal liver functioning assocciated with total parenteral nutrition

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Background and Objective: Home parenteral nutrition (PN) allows the recovery or maintenance of the nutritional status of patients with chronic intestinal failure (CIF). Emulsions enriched with fish oil, high in omega-3 fatty acids, have been associated with improvement and even resolution of liver disease.
Objective: To describe the case of an adult patient with hepatopathy associated with parenteral nutrition (PN), with data of analytical improvement with this type of lipid emulsion.
Design: Case Description:
47 year old patient with IF due to short bowel syndrome due to extensive surgical resection, being the underlying pathology a mesenteric ischemia. She was discharged from the hospital with a weight-adjusted PN that was infused for 12 h a day through a Hickman catheter. She entered for fever associated to catheter and the analytical showed abnormal hepatic tests (total bilirubin 3.39 mg/dl, direct bilirubin 3.18 mg/dl, GOT 143 U/I, GPT 146 U/I, GGT 335 u/I, alkaline phosphatase 276 U/I), thus PN is reformulated by reducing the supply of carbohydrates and lipids and replacing the lipid emulsion initially used, based on soybean and olive oil (Clinoleic®), by a third generation based on a blend of soybean oils, TCM, olive and fish (SMOFlipid®).

The patient has lost weight, the flow rate by ileostomy is 4–5 L and she is very thirsty and compensating hyperphagia. Presents jaundice of skin and mucous membranes, analytical parameters have risen; Total bilirubin in 7.12 mg/dl, direct bilirubin 3.63 mg/dl, GPT 269 U/I, GGT 148 u/I, alkaline phosphatase 134 U/I, total cholesterol 347 mg/dl, TG 426 g/dl,/Dl, albumin 3.2 g/dl.

The possibility of using an exclusive emulsion of omega-3 fatty acids (Omegaven®) is requested from the Endocrinology Service which has to be ordered as foreign medication because it is not marketed in Spain. In the case of our patient, it was initially used at 50% with SMOFlipid, but, because of no analytical improvement was obtained, the month was used as the only source of lipids.
Results: After the first month of exclusive use of Omegaven®, we observed a decrease in bilirubin and lipid levels, and after three months the normalization (total bilirubin 1.62 mg/dl, direct bilirubin 0.79 mg/dl, GPT 105 U/I, GGT 193 U/I, 200 U/I alkaline phosphatase, total cholesterol 240 mg/dl, TG 141 mg/dl)
Conclusion: Although home PN allows the survival of patients with irreversible FI, the appearance of complications, mainly due to prolonged use of this type of nutritional support, such as liver disease, may decrease this survival if it is not possible to suspend PN or to undergo an intestinal transplant.
Lipid formulations enriched with omega-3 fatty acids appear safe and effective, but more experience is needed to define the optimum omega-6/omega-3 ratio and the dose to be delivered.

PT047: Expanded access of trifluridine/tipiracil (tas-102) in metastastic colorrectal cancer. Experience in a third level hospital

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Background and Objective: Trifluridine/tipiracil has been approved for patients who have already been treated or are not considered candidates for chemotherapy based on fluoropyrimidine, oxaliplatin and irinotecan, anti-VEGF agents and anti-EGFR agents.
Objective: To describe the use of trifluridine/tipiracil in colorectal cancer (CRC) in a third level hospital.
Setting and Method: A longitudinal descriptive study in which were included all patients treated with trifluridine/tipiracil in a third level hospital from February 2016 to February 2017. The following variables were collected from the Diraya Clinical History program and the APD-ATHOS program: age, sex, KRAS mutational status, previous cycles, duration of treatment, previous chemotherapy regimens and adverse effects. Inclusion criteria for receiving trifluridine/tipiracil were: adults with colon or rectum metastatic adenocarcinoma histological or cytological confirmed, known KRAS (mutated or native) and good general condition (ECOG 0-1) who had received at least 2 previous regimens of standard chemotherapy for metastatic CRC and been refractory or have progressed to these treatments
Main outcome measures: age, sex, KRAS mutational status, previous cycles, duration of treatment, previous chemotherapy regimens and adverse effects.
Results: 13 patients were analysed during the study period, 53% were male with an average age of 70 years and with an average of ECOG 1. The KRAS gene was mutated in 6 patients and 7 in the native state. The average of the initial dose based on body surface area was 32.30 mg/m2. 53% of patients received 2 prior lines, 31% received 3 and 16% received 5. There was no dose reduction by 62% of patients (8 patients), while 5 patients had to reduce the dose in the middle of treatment, 4 patients (80%) due to neutropenia and 1 patient with diarrhoea. Median received cycles was 6. 5 patients (38%) were exitus during treatment, the treatment was suspended in 7 patients (54%) for disease progression and only one patient (8%) continuous treatment. The most common adverse reactions were asthenia (61%), nausea (30%) and diarrhoea (15%).
Conclusion: In our experience, this drug is an option in patients with mCRC who do not respond to currently available therapies and who have limited therapeutic options. More experience is needed to obtain more accurate data on effectiveness and safety.

PT048: Longitudinal study of the pharmacotherapeutic treatment in schizophrenic patients

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Background and Objective: The schizophrenic patient is one of the most difficult to treat. It is unknown how the illness develops yet and which is the best way to treat it (1, 2). The aim of this study was to analyse the treatments and the changes of medication in relation to the guidelines as well as the treatment when the patient went home.
Setting and Method: A 3-month longitudinal and descriptive study was carried out of the pharmacotherapeutic treatment plan in schizophrenic intern patients of a university hospital. The data collection was done in two psychiatric units of the hospital and then was analysed in order to study the accomplishment or not according to the international guidelines established.
Main outcome measures: Medicines prescribed, duration of use of the medication, combination of medicines, time of hospitalization, changes in medication during hospitalization and when patients go home, maximum dosages of medications.
Results: Among the thirty-one patients included in this study, 29.0% used only one antipsychotic, pertaining to the second generation, during their stay; paliperidone being the most used one (33.0% of patients). On the other hand, 42.0% of patients required first as well as second generation antipsychotics during their hospitalization; haloperidol for the first generation antipsychotic (92.0% of patients) and clozapine for the second generation (62.0% of patients) were the most prevalent drugs for this group. 67.7% of patients used in some moment of their stay two antipsychotics combined for more than seven days duration. Apart from the antipsychotics, most of the patients required also a co-adjuvant medication for their treatment. Benzodiazepines were commonly used in 80.7% of all patients included. In specific, clonazepam, prescribed in fifteen patients and lorazepam, in nine patients, were the most predominant benzodiazepines. Finally, seventeen patients overcame the maximum dosages recommended in the established guidelines and the home medications were also analysed, being quite similar to the hospitalization medication with only small differences.
Conclusion: Most patients used medications not following the actual international guidelines and because of that, it would be adequate to do more follow-up studies in specific for these patients.
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PT049: Study of the impact of treatment with alirocumab on the lipid profile in patients with primary hypercholesterolemia or mixed dyslipidemia

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Background and Objective: Statin intolerance limits many patients from achieving optimal low-density lipoprotein cholesterol (LDL-C) concentrations. Current options for such patients include using a lower but tolerated dose of a statin and adding or switching to ezetimibe or other non-statin therapies like Alirocumab.
Objective: Efficacy and safety of alirocumab on the lipid profile in patients with primary hypercholesterolemia or mixed dyslipidemia.
Setting and Method: Quasi-experimental design between July 2016 and March 2017. Patients older than 18 years with primary hypercholesterolemia or mixed dyslipidemia were treated with alirocumab. Patients with insufficient analytical data for the study were excluded. The information was obtained from the clinical history and Outpatients´prescription program. The variables collected were sex, age, dose, concomitant lipid-lowering treatment and plasma levels of total cholesterol, LDL-C, HDL-C, triglycerides (TG) pre-onset and after 4 weeks of treatment with alirocumab. In order to describe the qualitative variables we used the absolute and relative frequency, and for the quantitative variables the mean and standard deviation. We performed a Student´s t test to compare means in the quantitative variables, with statistically significant differences when the value of $p < 0.05$. Data analysis was performed using the SPSS statistical package (SPSS Inc, Chicago, Illinois, version 18.0).
Main outcome measures: A statistically significant reduction in median LDL-C and total cholesterol levels was observed at pre-post-alirocumab levels: 54.3 mg/dl ± 45.9 SD, 95% CI (23.4–85–1), $p = 0.003$ and 64.7 (mg/dl) ± 64.5 SD, 95% CI (25.7–103.7), $p = 0.004$ respectively.
Results: 13 patients were included, of whom 11 (84%) were men with a mean age of 53 years, ± 7SD, who received alirocumab at doses of 75 mg (N = 11) or 150 mg (N = 2) each 2 weeks. Concomitant lipid-lowering therapy with alirocumab was: 7/13 ezetimibe, 8/13 statins (6 Atorvastatin, 1 Rosuvastatin and 1 Pitavastatin). A statistically significant reduction in median LDL-C and total cholesterol levels was observed at pre-post-alirocumab levels: 54.3 mg/dl ± 45.9 SD, 95% CI (23.4–85–1), $p = 0.003$ and 64.7 (mg/dl) ± 64.5 SD, 95% CI (25.7–103.7), $p = 0.004$ respectively. Not so for C-HDL or TG ($p = 0.432$ and $p = 0.192$). 43.6% achieved an LDL-C < 70 mg/dl.
Conclusion: Alirocumab has shown a substantial reduction in cholesterol levels at the expense of LDL-C levels in our cohort of patients with primary hypercholesterolemia or mixed dyslipidemia. After 4 weeks of treatment, 43.6% achieved LDL-C < 70 mg/Dl. Therefore, it is a good alternative in patients who do not reach the target of LDL-C with the maximum tolerated dose of statins, or in those with intolerance or contraindication of these.

PT051: Ginkgo biloba extract EGb 761: A meta-analysis of adverse event rates from randomized, placebo-controlled, double-blind clinical trials

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Background and Objective: To compare incidences of adverse events (AEs) listed in the package insert of *Ginkgo biloba* extract EGb 761® as possible adverse drug reactions (ADRs) with placebo.
Setting and Method: Meta-analysis of randomized, placebo-controlled, double-blind, Good Clinical Practice (GCP) standard clinical trials (RCTs) of oral forms of EGb 761® conducted since 1990.
Main outcome measures: Weighted odds ratios (ORs) and 95% confidence intervals (CIs) for all AEs representing possible ADRs (gastrointestinal symptoms, headache, dizziness, allergic skin reactions, hypersensitivity reactions or bleeding), and for those events for which a causal relationship could not be ruled out at the time of conducting the trials (ADRs), using a logistic regression model with fixed effects.

Results: AE data from 3,332 patients treated with EGb 761® and 3,083 patients taking placebo from 44 RCTs were available. There were no statistically significant differences in AE incidences under EGb 761® compared to placebo, with 95% CIs of ORs for all AEs and suspected ADRs including 1. ORs for AEs of dizziness [EGb 761® 3.8% vs. placebo 4.6%; OR 0.77, 95% CI (0.60; 0.99)] and nausea [EGb 761® 1.4% vs. placebo 2.0%; OR 0.65, 95% CI (0.44; 0.96)] were significantly < 1.
Conclusion: Overall, the findings suggest that AEs causally related to the oral intake of EGb 761® (i.e. ADRs) are on placebo level. The incidence rates of suspected ADRs even in the placebo groups indicate that in RCTs the frequencies of ADRs tend to be overestimated.

PT052: Reduction of calculation errors with the dutch pediatric formulary's web-based paediatric dosing calculator

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Background and Objective: Calculating a paediatric dose is complex due to a variety of parameters influencing the dose and therefore error prone, ultimately resulting in incorrect dosing, lack of efficacy and/or adverse effects. The development and implementation of a paediatric dosing calculator could reduce calculating errors.
Objectives: 1. To develop a clinical decision tool for calculating an individual paediatric dose, using the comprehensive Dutch paediatric formulary as dosing reference.

2. To show a 50% reduction of calculation errors by establishing an individualized paediatric dose through a paediatric dosing module.
Setting and Method: The Paediatric Dosing Calculator consists of a calculation interface which integrates the dosing recommendations of the Dutch paediatric Formulary with clinical patient variables, thus resulting in an individual recommended dose. After establishing the functional requirements and risk minimization measures the dosing calculator was developed by using a test- retest approach. Two groups of healthcare professionals were presented with 14 cases for which they were asked to calculate a dose. One group ($n = 37$) was instructed to calculate with conventional tools i.e. a mathematical calculator and the dosing recommendations as listed in the Dutch Paediatric Formulary. The second group ($n = 36$) was instructed to use the integrated paediatric dosing calculator interface. The time for the calculating tasks was limited to 2 min per case as to mimic the stressful circumstances of daily practice.
Main outcome measures: The % of calculating errors per group
Results: Manual calculation resulted in a 50% erroneous calculations compared to 27% erroneous calculations in the calculator group. The OR for *correct* calculation using the calculator compared to manual calculation is 2.7 ($p = 0.001$; CI 95%: 1.50–4.80).
The number of erroneous calculations in the calculator group is caused by careless entry and selection of parameters in the calculator interface resulting in the incorrect calculation outcome.
Conclusion: We successfully developed a web-based dose calculator. The use of this calculator reduces calculation and medication errors.
Healthcare providers may benefit from using the calculator interface provided that they carefully enter and select the parameters required.

PT053: Developing evidence-based recommendations for safe drug use in patients with liver cirrhosis

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Background and Objective: Liver cirrhosis can strongly influence pharmacokinetics and pharmacodynamics of drugs, but guidance for prescribing is lacking. The aim of this study is to develop evidence-based recommendations for the safe use of drugs in patients with liver cirrhosis.
Design: A systematic literature search was combined with expert opinions from a panel of ten experts. Advice was categorized as: drug can be used in liver cirrhosis; preferably use a safer drug; or avoid using this drug in patients with liver cirrhosis. Recommendations on dose adjustments were based on pharmacokinetic studies. If applicable, advices were sorted by severity of liver cirrhosis (Child–Pugh classification). The advices were implemented in all relevant clinical decision support systems in the Netherlands and on a website.
Results: A total of 209 drugs were evaluated and 218 advices formulated. For nine drugs, two advices were formulated for different indications or administration routes. In 73% ($n = 159$) of 218 advices an action is needed by the prescriber or pharmacist. This involves to preferably use a safer drug in 42 advices (19%), to avoid the use of a drug in 30 (14%) and depends on the severity of liver cirrhosis in 70 (32%). Large alterations in pharmacodynamics were the main reason for advising to avoid a drug. In 67 advices (31%) a dose adjustment was recommended.
Conclusion: Over 200 evidence-based recommendations were developed for safe drug use in patients with liver cirrhosis. In almost three quarters of the advices, an action is needed by the healthcare professional.

PT054: Drugs and renal impairment or dialysis

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Background and Objective: Renal impairment can influence the pharmacokinetics of renal excreted drugs. The use of an inappropriate dose can cause adverse reactions or ineffectiveness. Evidence-based dosing guidelines contribute highly to the improvement of patient care.
We describe the development of practical guidelines for drugs prescribed in patients with varying degrees of renal impairment. These guidelines contain advice for dose adjustment or the use of alternative medicines. Recently we also developed guidelines for drugs prescribed in patients on dialysis.
Design: We collected data on the influence of renal impairment on the pharmacokinetics of drugs from a systematic PubMed search, and from the registration files such as SmPC's (Summary of Product Characteristics). Based on these data, a data sheet for risk analysis and

concise advice were created for each drug. The advice was assessed by a multidisciplinary expert group.
Results: Evidence based guidelines for drugs prescribed in patients with renal impairment were assessed for approximately 650 drugs. The guidelines are graded into two groups: 'intervention is required' and 'intervention is not required'. If the pharmacokinetics of the drugs are affected in a clinically relevant way by renal impairment, intervention is required. An alert is generated. The advice is to adjust the dose, or to monitor the patient, or to choose an alternative medicine. If the pharmacokinetics of the drug are not clinically relevant affected or are not affected by renal impairment, an intervention is not required. An alert is not generated.

The guidelines are integrated in the Dutch national drug database, G-Standaard. This database contains decision support information and is incorporated in electronic prescribing systems and pharmacy information systems in the Netherlands.

Follow up:

Recently the KNMP started a project developing practical guidelines for drugs prescribed in dialysis patients.

This Dialysis project is funded by ZonMw (an independent self-governing organisation) and Nierstichting (a health charity).

We started with the drugs from the group 'intervention is required in case of renal impairment'. For these drugs (approximately 235) we collected data on the influence of haemodialysis (intermittent haemodialysis and continuous haemodialysis) or peritoneal dialysis on the pharmacokinetics. We used the same method as explained earlier.

Over the project period the guidelines will be gradually integrated in the G-Standaard.
Conclusion: The concise guidelines and the accessibility during electronic medicine prescribing and dispensing are an important step forward in evidence based adjustment of therapy for patients with renal impairment or dialysis patients.
The guidelines also create transparency. The advices describe when intervention is necessary, but also when intervention is not necessary. The evidence and considerations, on which the guidelines are based, are described in data sheets for risk analysis. The risk analysis are available online for the healthcare professional.

PH003: The Evaluation of Parents Attitude Towards Antibiotic Use In Children In The Age of Primary School

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Background and Objective: The objective of this study is to evaluate the attitudes of parents regarding antibiotic use in their children aged between 6 and 11 years.
Setting and Method: The study was conducted between December 15, 2016 and January 15,2017 at a primary school located in Istanbul, Turkey. 28-item questionnaire was used in the survey. According to sample size calculation 254 of the parents joined to this study.
Main outcome measures: Parents response to the questionnaire.
Results: 81.50% of parents were female and 51% of them were unemployed. Of all the parents 25.70% stated that they used antibiotics to their children with common cold in the last 6 months. 95.30% told that they read instructions, 72.80% of them found directions for use clear. 78.70% stated that they wanted to be informed by pharmacist about antibiotics. In order to prepare antibiotic suspension 61.80% used boiled then cooled tap water and 90.50% of parents added water in two steps. 99.60% stated that they shook the drug bottle before used. 57% of parents told that they stored suspension in refrigerator. About dose administration 65.40% considered plastic spoon as the most accurate tool for dose administration. 63.50% of parents claimed that they tried to persuade their children to go on the treatment if they dislike taste of antibiotic. 2% told that they gave left over antibiotic to another child or someone else. 25.50% of parents stated that they did not report any antibiotic-associated side effects to a doctor or to a pharmacist. 5.90% said that they used antibiotic without prescription. 30.60% of parents omitted treatment when their children were well though duration of treatment wasn't completed.
Conclusion: As a conclusion, as if this study shows good percentage about parents attitude about using antibiotic in their children and acting according to the instructions, pharmacists should be more responsible for increasing this awareness, reducing to use antibiotic improperly and without prescription.

PH004: Community pharmacists' perceptions of and recommendations for improving antibiotics use in Saudi Arabia: A qualitative study

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Background and Objective: The sale of antibiotics without prescription has turned to be a global public health problem. Over-the-counter (OTC) sale of antibiotics is increasingly recognised as a source of antibiotic overuse and misuse which may lead to adverse effects of treatment, recurrent infections, antibiotic resistance, and increase treatment cost. Despite the increasing trend of non-prescription sale of antibiotics in Saudi Arabia, there have been no qualitative studies to explore the perceptions of community pharmacists towards antibiotics utilisation among general public and their recommendations for promoting safe and rational use of antibiotics.
Setting and Method: A qualitative study was conducted with a convenience sample of 20 community pharmacies in Eastern province of Saudi Arabia. One pharmacist from each pharmacy was interviewed face-to-face using unstructured open-ended interview guide. Participants aged over 18 and were able to speak Arabic or English. Interviews were audiotaped, transcribed verbatim and analysed thematically using Nvivo 10 software.
Main outcome measures: Exploring the perceptions of community pharmacists towards antibiotics utilisation among general public and their recommendations for promoting safe and rational use of antibiotics.
Results: All participants reported that antibiotics were frequently dispensed without medical prescription. The findings indicated that the non-prescription sale of antibiotics were common for Augmentin®, followed by amoxicillin and azithromycin. The most common indications for antibiotics sold without a prescription were sore throat, cold/flu, cough and fever. The main reasons for dispensing antibiotics without a prescription were found to be related to difficulty accessing healthcare services, customer's pressure and cultural beliefs and practices, trust in and satisfaction with pharmacist's experience, weak regulatory enforcement, and owner's influence to increase revenue. Some pharmacists suggested a need to expand their role from drug seller to more effective healthcare professional in order to improve use of antibiotics. Others requested strong regulatory enforcement and community awareness campaign to limit OTC sale of antibiotics.
Conclusion: The study indicates that OTC sale of antibiotics was common practice in Saudi Arabia. The findings of this study will provide insight when designing future interventions to improve rational, safe and effective use of antibiotics.

PH005: Self-medication with antibiotics among the general public in Eastern Province, Saudi Arabia

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Background and Objective: Antibiotic resistance is a globally alarming public health threat that has a substantial impact on health and the economy. In Saudi Arabia particularly, the emergence of antibiotic resistance has been increasing exponentially in recent decades, which may be exacerbated by the use of antibiotics without prescription and other factors. However, there have been no studies on non-prescription use of antibiotics among the general public in Saudi Arabia using a mixed method approach. Thus, the aim of this study was to identify the frequency of self-medication with antibiotics (SMA), explore a broader range of factors influencing self-medication behaviour, and provide a more comprehensive picture of such behaviours and the circumstances in which they occur in order to promote effective and rational use of antibiotics.
Setting and Method: The study was a cross-sectional study. The data were collected using semi-structured interviews with a snowball sample of 40 participants in Eastern Province, Saudi Arabia. Participants were aged over 18, had self-medicated with antibiotics in the past 2 years, and were able to speak Arabic or English. Interviews were audiotaped, transcribed verbatim and analysed thematically using Nvivo 10 software.
Main outcome measures: To identify the frequency of self-medication with antibiotics, explore a broader range of factors influencing self-medication behaviour, and provide a more comprehensive picture of such behaviours and the circumstances in which they occur.
Results: Participants (80% female) had a mean (SD) age of 30 (10.2). The frequency of self-medication with antibiotics among participants was high and it was associated with different inappropriate antibiotic use practices and negative outcomes. Interviews revealed that various reasons contribute to the rise of SMA, ranging from difficulty accessing healthcare services, participant's cultural beliefs and practices, and weak regulatory enforcement. Participants highlighted the need for educational intervention and stricter governmental regulation concerning antibiotic use and sale in retail pharmacies as well as the need to strengthen the role of pharmacists from traditional drug seller to more effective healthcare professional in order to improve the use of antibiotics.
Conclusion: The study indicates that SMA is common practice in Saudi Arabia. The findings of this study will provide insight when designing future interventions to promote rational, safe and effective use of antibiotics.

PH006: Community knowledge on tuberculosis and its treatment in a Brazilian health unit after a pharmacy-led project

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Background and Objective: Patients with tuberculosis (TB) may have insufficient information about the disease and its treatment, which can resul tin poor adherence and discontinuation of drug-therapy1. A pharmacy-led TB educational project was set up, as part of the pharmacists' day celebration in Recife, Brazil (January 20th, 2016). This paper describes the educational project and the assessment of knowledge about tuberculosis and its treatment in users of a public health unit after the pilot project implementation.
Setting and Method: An information leaflet on TB and its treatment was developed by undergraduate pharmacy students. The 170 words leaflet was written in simple language and supplemented with images. The leaflet was distributed to a convenience sample of 134 adult users of the healthcare unit, after obtaining their verbal consent to participate. The leaflet content was then explained on an individual basis to participants by pharmacists and undergraduate pharmacy students. After the intervention, an anonymous questionnaire with nine dichotomous closed questions (yes/no) was administered. The first five questions intended to assess the understanding about the information provided (e.g. "Is there a treatment for tuberculosis? Is tuberculosis curable? Is there a vaccine to prevent this disease?"). The remainder questions pertained to users' perceptions of understanding and on the existence of further doubts, their views on the relevance of the information and their intention of transmitting the information to others.
Main outcome measures: Percentage of "yes" and "no" answers.
Results: On average the proportion of correct answers was 98.8% (132). Whether smoking and alcoholic beverages were allowed during TB treatment had the maximum percentage of incorrect answers (4.48%; 6). All users regarded the information given as important and expressed the intention of passing it to other people. In spite of the unanimous perception of understanding (100%; 134), 31 users (23.1%) claimed to have further doubts.
Conclusion: Users had a good understanding of the information provided. The intention of transmitting information on TB and its treatment to others can contribute to increase awareness about these topics in the community. Future steps in this project should include fine-tuning the intervention, the assessment of knowledge about tuberculosis and its treatment before and after the intervention and education to address additional needs of some users. Engagement of pharmacy students in TB education may help to fill gaps and contribute to success in treatment.
1-De Oliveira, J. F.; Antunes, M. B. De C. Abandono Anunciado Ao Tratamento Da Tuberculose Em Uma Unidade De Saúde Da Família Do Recife - A Perspectiva Do Usuário. Revista de APS, v. 15, n. 1, p. 4–13, 14 fev. 2012.

PH007: Association between adolescents' and their parents' attitudes toward the use of medicines

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Background and Objective: Our previous research had shown that adolescents and their parents have not enough knowledge about medicines and do not perceive the risk of the use of medicines adequately. The aim of this study was to find out how parental attitudes toward medicines are associated with adolescents' ones.
Setting and Method: The method used in the study was questionnaire. The questionnaire was focused on knowledge and risk perception of the use of medicines. There were distributed 930

validated questionnaires for adolescents aged from 12 to 18 at secondary schools in all regions of Slovakia and the same number for their parents. Response rate of both groups was 70.3%. The differences in the distribution of categorical variables between these groups were evaluated using the Pearson's Chi squared test (χ^2). Variability of average differences was compared using pared *t* test. SAS 9.4. was used as statistical software.

Main outcome measures: To determine the relation between parents' and their adolescents' knowledge of medicines in terms of efficacy and safety of medicines there were used paired questionnaires with the same questions.

Results: Parents claimed that their children take prescription medicines under their supervision in 71% (n = 466) vs. 57% (n = 373 claimed by children), $p < 0.001$, over the counter medicines in 67.3% (n = 440) vs. 48.6% (n = 318 claimed by children), $p < 0.001$. Parents influenced their adolescents' trust in effectiveness of prescription medicines ($p < 0.001$) and OTC medicines ($p < 0.002$), knowledge about the use of cough medicines ($p < 0.005$), antihistamines ($p < 0.001$), nasal drops ($p < 0.001$), combination of medicines with alcohol ($p < 0.001$), antibiotics ($p < 0.001$), painkillers ($p < 0.001$) or interaction of medicines ($p < 0.001$). There is no association between parents and adolescents in term of knowledge about the safety of therapy.

Conclusion: Questionnaire analysis pointed out that parents influence their adolescents according to the knowledge of medicines and it is necessary to educate both parents and adolescents in the Slovak republic in terms of knowledge about the proper use of medicines, efficacy of medicines and about risk perception of medicines.

PH008: Effects of an Education Program on the Medication Knowledge of the Community and School

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Background and Objective: The lack of medication usage and the safety of medicines by the general public has long been a problem in Taiwan. One of the reasons responsible for the phenomena might be the lack of an active role of pharmacists in large scale health education program.

This research aimed to understand the community residents and the junior high school students' health literacy on medication and medication conceptions in Taiwan. And designed a program to change the medication knowledge among the participants.

Setting and Method: First, collected the correlations of knowledge, attitude and behaviour regarding correct medication use of residents and students by interview at a campus activities. The interview questionnaire was composed by 10 questions, including medication storage, the usage of medications and drug safety. Second, according to the results of the interview, designed an education program. The general medication knowledge of the participants was evaluated before and after the course. SPSS was used as statistical software.

Main outcome measures: To determine community residents and the junior high school students' health literacy. To evaluate the effects of education program, and to improve the general medication knowledge of the public.

Results: The first interview was 62 community residents and students. The average age was 40 years old, there was 15 people under 20 years old. Most participants were female (72.58%). Long-term use of drugs in family was 61.29 and 69.35% agreed that to have the knowledge of medication is important. However, participants didn't understand the release of prescriptions (accuracy is 85.71%), the categories of the medicines (accuracy is 75.00%), and the dangerous of drugs(accuracy is 66.67%). According to the result, we designed an education program of addiction and misuse of medication. To evaluate the effects of the lessons, this study was a single group pre- and post-comparison. The final evaluation of this study included 96 students and 60 residents who participated in the education program. Most participants were female (57.70%). All participants showed significant improvement in general medication knowledge ($p < 0.05$) after the program.

Conclusion: Through the investigation of public awareness of medication, and arranged medication education program can effectively deliver the knowledge of medication usage and general medication to the public. It is therefore suggested that pharmacists be more active in participating in the public education on drug usage and related health information.

PH009: Opinions of Czech physicians on generic drugs and substitution

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Background and Objective: In developed countries, the health care costs increase each year. Among the reasons of this fact belong aging population, continuously ongoing innovations in medical technology as well as demands for early initiation of pharmacotherapy in chronic diseases. One of the tools decreasing the costs is the rational use of generic drugs and generic substitution (GS), in which the attitudes of both healthcare professionals and patients are essential. The aim of this survey was to analyse physicians´ opinions of, attitudes towards and experiences with generic drugs and GS in the Czech Republic.

Setting and Method: The representative cross-sectional survey was conducted in November 2016 using face-to-face interviews. The questionnaire consisted of items concerning socio-demographic characteristics (3 items), medical specialty (3 items), physicians´ opinions on 10 statements related to brand name drugs, generic drugs and GS, physicians´ attitudes towards GS performing in pharmacies, understanding of legislative rules for GS and experiences with drug-related problems of generic drugs and GS providing to patients.

Main outcome measures: Descriptive statistics of the responses, expressed as absolute and relative frequencies were performed. Categorical variables were analysed by Pearson Chi Square test.

Results: 1551 randomly allocated physicians were asked to participate; 304 (19.6%) physicians refused to participate in the survey; 1237 physicians agreed with the interview including general practitioners (28.5%), paediatricians (17.8%), obstetricians and other medical specialists (53.7%); 43.6% were men. The median age was 48 ± 11.6 years. Approximately half of respondents (51.9%) were private physicians. Most of them (83.1%) had completed specialised qualification. Only 53.5% of physicians agreed that the generic drug is bioequivalent to the respective original band name drug. Physicians from outpatient facilities agreed with it more often ($p < 0.05$). On the other hand, 56.4% of physicians agreed that each generic drug is therapeutically equivalent compared to other generic drugs and 67.5% of physicians felt the need for more information on bioequivalence results. 28.5% physicians agreed that generic drugs have more adverse effects than band name drugs. This attitude was reported mainly by physicians with specialised qualification ($p < 0.01$). 35.1% of physicians evaluated the possibility of GS providing in the pharmacy positively, especially physicians without specialised qualification ($p < 0.01$). Most physicians have not experienced any problem with generic drugs and GS in their patients in last 3 months. If any negative experience was reported, mostly by physicians being 40-59 years old ($p < 0.05$).

Conclusion: The study has shown the need to raise awareness of the issue of generic drugs and GS among Czech physicians, which also play an important role in the patient safety.

PH011: Inappropriate over the counter medicines for older people available in Slovakia

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Background and Objective: There are several known lists of inappropriate medicines for older people over the age of 65 which focus mainly on prescription medicines, but there is just little attention given to the over the counter medicines (OTC) available for older people.
Setting and Method: We investigated the availability of the potentially inappropriate medicines (PIMs) in the market of the Slovak Republic. Medicines were split into prescription only and OTC medicines which are dispensed in the Slovak Republic only in pharmacy. PIMs for older people were identified through the American and European tools on PIM used in COST Action IS1402 WG1B. Database of State Institute for Drug Control and Ministry of Health was used to find out availability of these medicines in the Slovak Republic.
Main outcome measures: To find out exact number and accessibility of PIMs for older people available as OTC in the Slovak Republic.
Results: Out of the 486 PIMs mentioned in at least one of the lists, in the Slovak Republic there are 177 (36.4%) medicines available. Of these, 20 (11.3%) are OTC medicines; 7 are available for older people without prescription independently of the strength or size of package. Laxatives (bisacodyl and sennosides) or dimenhydrinate or even phenyramine are directly available for older people according to their opinion or feeling on demand. Remaining 14 are available without prescription under defined conditions as lower amount of the substance in medicine is included (20 mg of diclofenac) or smaller package of the medicine is used (7 tablets of antihistamines). However, these medicines are available practically in unlimited amount.
Conclusion: According to our results 20 OTC medicines without prescription are available in the Slovak market as PIMs. Some of them are limited by size of package or amount of substance in medicine included, but there is no restriction for higher age. Further review is necessary to evaluate the real life use of these medicines by the people over the age of 65.

PH012: Iatrogenic risk factors associated with hospital readmission of elderly patients: a matched case control study using a clinical data warehouse

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Background and Objective: Hospital readmissions within 30 days after patient's discharge have become a standard to judge the quality of hospitalizations. Elderly are defined by people over 75 years old or 65 years old with comorbidities. It was estimated that 14% of elderly are at risk for readmissions and 23% of these readmissions are avoidable. Our hypothesis is that we can identify elderly patients at risk of readmissions, in order to implement interventions to reduce avoidable readmissions.
The aim of this study was to search for iatrogenic risk factors of readmission.
Setting and Method: We conducted a retrospective matched case–control study.
The study included patients hospitalized between September 1st, 2014 and October 31st, 2015 at a the George Pompidou European Hospital.

We included patients aged 75 and over. Cases were emergency readmitted within 30 days after the index discharge. Controls were not readmitted in emergency within 30 days. Cases and controls were matched by draw on sex and age.

After a comparison, for each variable, of the mean (quantitative variables) or the percentage (qualitative variables) between the cases and the controls, we conducted a conditional logistic regression.
Main outcome measures: The outcome of the study was to identify iatrogenic risk factors of readmission for elderly patients, in order to spot the patients who need interventions.
Results: In this study, we included 422 cases and 422 controls forming 844 pairs. The risk factors identify were an emergency admission at the index hospitalization (OR 1.919, 95%CI 1.384–2.660), returning at home after discharge (OR 1.899, 95% CI 1.350–2.672), history of unplanned readmissions (OR 1.692, 95% CI 1.155–2.478) and prescription of nervous system drugs (OR 1.679, 95% IC 1.191–2.363).
Conclusion: In this matched case–control retrospective study, we managed to design a typical profile of patients at risk of readmission. These patients have an emergency admission at the index hospitalization and a prescription with nervous system drugs, including antidepressant at discharge of the index admission. Furthermore, they have history of unplanned readmission at 30 days, and they return home after discharge.

PH013: Influenza vaccination uptake among Czech physicians

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Background and Objective: In the Czech Republic there are currently no data available regarding the uptake rate of influenza immunisation among healthcare professionals. The aim of this survey was to determine vaccination coverage in Czech physicians and their attitudes towards influenza vaccination.
Setting and Method: The cross-sectional survey was conducted in November 2016 using face-to-face interviews. The questionnaire consisted of 12 items concerning socio-demographic characteristics (3 items), items related to the medical specialty (3 items), the employers' policy on influenza immunisation (1 item), vaccination coverage and reasons for accepting or declining the seasonal influenza vaccination (5 items).
Main outcome measures: Descriptive statistics of the responses, expressed as absolute and relative frequencies were performed. Categorical variables were analysed by Pearson Chi Square test.
Results: 1551 randomly allocated physicians were asked to participate; 304 (19.6%) physicians refused to participate in the survey (due to lack of time mostly); 1237 agreed with the interview including general practitioners (28.5%), paediatricians (17.8%), obstetricians and other medical specialists (53.7%); 43.6% were men. The median age was 48 ± 11.6 years. Approximately half of them (51.9%) were private physicians. Most of them (83.1%) had completed specialised qualification. Only 22.2% of the physicians confirmed to have a regular annual seasonal influenza immunisation. More than half of the physicians (53.4%) have never been vaccinated against flu. Private

practice ($p < 0.001$), higher age ($p < 0.05$), specialised qualification ($p < 0.001$), and atheist belief ($p < 0.05$) were factors leading to higher vaccination uptake rates. Hospital-based physicians were significantly less often vaccinated (only 18.0%; $p < 0.001$). 23.2% of respondents have already received vaccination in autumn 2016, while 45.6% responded that they are not vaccinated and do not wish to do so during the ongoing season 2016–2017. The risk minimisation of transmission to patients was reported as the most frequent reason to accept flu vaccination (34.4%). However, more than half (52.9%) of the physicians believed there is no reason to be vaccinated. The medical field of expertise and whether the physician was a qualified specialist influenced the attitude to flu immunization. About 6.5% of employers required influenza vaccination for their employed physicians and the vaccine expenses were fully covered.
Conclusion: The study demonstrated low seasonal influenza vaccine coverage among Czech physicians. There were significant differences in vaccine uptake and attitudes towards influenza vaccination with regard to medical specialty, setting, age, and level of qualification received.

RD002: Social media guidelines: recommendations for the development of undergraduate pharmacy student guidelines

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Background and Objective: The ubiquitous nature of social media (SoMe) involves merging of personal-professional personas. Healthcare organisations publish guidance on how to use social media responsibly. However, inappropriate use of social media continues to be evident amongst undergraduate pharmacy students with potential implications for their fitness to practise. There is evidence of a lack of understanding of how online behaviour, or e-professionalism, relates to the student code of conduct. There remains a need within the pharmacy undergraduate student population for guidance which will be similarly acceptable and directly applicable to their context. Objective: to develop peer-group designed recommendations for pharmacy student SoMe guidelines.
Design: Qualitative, activity-based focus groups were conducted based on a topic guide informed by existing literature and a previous study by the research team. The topic guide also formed the framework for thematic data analysis. The study was approved by university Ethical Review Committee.
Results: Focus groups were conducted across four Master of Pharmacy (MPharm) stages (S1: n = 10; S2: n = 5; S3: n = 8; S4: n = 6). All except one participant (n = 29) were aged under 24 with near equal male:female ratio (n = 15:14). The majority of participants did not use SoMe guidelines despite daily SoMe use, but rather used personal judgement to decide on appropriate SoMe content. Some elements of existing guidance were seen as valuable but lacked balance of content/tone and examples of appropriate SoMe behaviours. There was no agreement on 'appropriate behaviours' however general concerns emerged around guidance impinging personal personas and impacting perceptions of e-professionalism.
Conclusion: Social media guidelines for undergraduate pharmacy students should address concerns surrounding eprofessionalism. These should include examples of good practice, yet should contain clear 'points for practice' in a simple, user-friendly format alongside a lecture or video presentation. Whilst students were aware of profession-specific guidance, student-specific guidance was viewed as beneficial to support undergraduate students, in particular with the blurred boundaries between personal-professional personas. The results of this study have been used to inform the delivery of SoMe support for students within the MPharm course. Further work is being undertaken to explore the definition of appropriate online behaviours and provision of guidance as part of doctoral studies.

RD003: Does health service offer persons with psychosis evidence-based treatment?

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Background and Objective: New knowledge about evidence-based practice appears quickly, but we do not know to which extent this knowledge is adopted into clinical practice today. Objective of this study was to identify whether evidence-based practice is implemented in the treatment of persons with psychosis at Sørlandet Hospital in South Norway, and to invent a tool to assess this.
Setting and Method: Data included in this abstract represents a part of a multi-centre study in Norway, which aims to reach higher level of fidelity to evidence-based practice through implementation support and education of healthcare personnel.
This abstract discloses the assessment of seven treatment teams for persons with psychosis at Sørlandet Hospital. Two trained persons performed independently assessments by using self-invented tool based on national and international evidence-based guidelines.
Main outcome measures: The assessment tool comprises 15 items, each on a 1-5 scale where 1 means "guidelines not implemented" and 5 means "guidelines implemented to a very high degree". The items include both system information obtained from written politics and interviews, and information on patient level obtained from medical records. The score from every item makes an overall mean, which will be in the same range (1–5). The psychometric properties of the assessment will be investigated.
Results: Assessment seven treatment teams showed partial fidelity to guidelines, with mean rating of 2.2 (range 1.8–2.9) on a 1–5 scale.

Properties of the tool will be further analysed by combining results from Sørlandet Hospital with results from the remaining hospitals included in the study.
Conclusion: Even if the guidelines is considered known throughout the healthcare service, the actual treatment and supervision of the patients only partly satisfies evidence-based practice given as recommendations in guidelines.
Further analysis will show whether the assessment tool is applicable.

RD004: Assessing the quality of report in network meta-analysis: a systematic review

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Background and Objective: Network meta-analysis (NMA) became an important evidence-gathering technique, but further investigation on its methodological quality is needed. We aim to determine the quality of report of NMAs on pharmacological interventions using PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) and PRISMA-NMA recommendations.
Setting and Method: We performed a systematic review of NMAs comparing any pharmacological intervention. Searches in Medline

and Scopus along with manual search were conducted (updated April 2017). The main characteristics of NMAs were collected by two independent reviewers. We applied PRISMA and PRISMA-NMA checklists to all NMAs. Both checklists were converted into quantitative scores with maximum values of 27 and 32 points, respectively. To normalize the values between these two checklists, a third score (PRISMA-SCORE) with values of 0–1 was created. The association of these scores with the NMA's publication year, journal impact factor, and most productive countries were calculated.
Main outcome measures: PRISMA and PRISMA-NMA checklists scores.
Results: We identified 477 NMAs published between Jan-2003 and Dec-2016. Almost half of the articles were published after PRISMA-NMA publication (June 2015). Only 36% of studies followed PRISMA statements. The median of PRISMA and PRISMA-NMA scores were 21 (interquartile range 19–23) and 23 (interquartile range 19–26), respectively. The normalized PRISMA-SCORE median was 0.73. Several problems were noted including: lack of study protocol, issues in literature searches, flaws or biased assessments in the primary studies, lack of raw data, statistical methods and results descriptions (e.g. geometry, inconsistency assessment). NMAs from the most productive countries United States of America and China have similar quality. Correlation analyses revealed a positive but weak correlation for the PRISMA-SCORE and journal impact factor (Spearman's $\rho = 0.193$; $p < 0.001$). NMAs poor quality remain steady over the years.
Conclusion: The increase of the publication of NMAs was not associated with better reporting quality. Editors, peer-reviewers, researchers, and funding agencies should ensure that these problems are solved before publication.

RD005: Stakeholders' Views and Experiences of Pharmacist Prescribing: A Systematic Review

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Background and Objective: While prescribing has been traditionally been the domain of physicians, prescribing by pharmacists has been implemented successfully in countries across the world. Developments are supported by evidence of effectiveness and safety. To facilitate further development and implementation, there is a need to review the evidence of views and experiences of stakeholder groups both pre- and post-implementation.
The aim of this review is to critically appraise, synthesise and present the available evidence on the views and experiences of stakeholders pre- and post-implementation of pharmacist prescribing globally.
Setting and Method: A systematic review protocol was developed according to the PRISMA_P standards and registered on the PROSPERO database at the Centre for Reviews and Dissemination. Search databases were MEDLINE, Cumulative Index to Nursing and Allied Health Literature (CINAHL), International Pharmaceutical Abstracts, PsychArticles, and Google Scholar with no date limits. Studies selection, quality assessment and data extraction were conducted independently by at least two reviewers. A narrative approach to data synthesis was undertaken due to heterogeneity of study outcome measures.
Main outcome measures: Views and experiences around pharmacist prescribing as well as the facilitators and barriers to its development and implementation.
Results: Sixty-three studies were included in the review. The UK was the main country studies (n = 34) compared to Australia (n = 13), USA (n = 5), Canada (n = 5), Nigeria (n = 3), New Zealand (n = 1), Ireland (n = 1) and India (n = 1). In addition, different stakeholders were researched. The majority of papers investigated perceptions and views of pharmacists (n = 25) while few discussed patients (n = 12), general practitioners (n = 6), the public (n = 4), nurses (n = 1), policy makers (n = 1) or had multiple stakeholders (n = 14).
Positive findings were reported by the majority of studies. The main benefits described were improved access to healthcare services and patients' outcomes, better utilisation of pharmacists' skills and knowledge, improved job satisfaction and reduced physicians' workload. Lack of support for this role reported was mainly due to liability issues, poor pharmacists' diagnosis skills and access to medical records and lack of organizational and financial support.
Conclusion: There is an accumulation of evidence around improving healthcare delivery and patients' outcomes with the introduction of competent pharmacist prescribers. While there may be issues to resolve such as liability and financial considerations, these findings may support developments of pharmacist prescribing.

RD006: Experiences from a pharmacist-led RCT in a hospital setting in Norway

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Background and Objective: A pharmacist-led randomized controlled trial (RCT) was conducted in an internal medicine ward at a university hospital in Norway. We aim to describe our experiences from running this trial.
Design: Patients in the intervention group had a clinical pharmacist as a part of their multidisciplinary treatment team during the hospital stay. Patients in the control group received standard care—without a pharmacist involved. The pharmacist intervention consisted of medicines reconciliation on admission, medicines reviews repetitively during the hospital stay and ensuring oral and written medicines information to the patient and the next care level at discharge. Six clinical pharmacists participated in the conduct of the trial in a period of 1.5 year, combined with operating as clinical pharmacists in other hospital ward units.
Results: To cover both tasks in the RCT as well as clinical pharmacist operating tasks, a detailed schedule had to be developed and followed. To achieve high quality and complete all trial-related tasks, management commitment to prioritize the trial was crucial. Working as a part of the multidisciplinary treatment team and following the patient close throughout their hospital stay, the pharmacists experienced to be a continuity, facilitating information flow within the team. The patient was found to be a crucial source of information on drug related issues, as the pharmacists were interacting with the patients more actively compared to earlier. Pharmacists in our hospital had no previous tradition for participating in the discharge process. Hospital staff in the multidisciplinary team welcomed the pharmacists' involvement in this new role, and many experiences were gained.
The pharmacists experienced the discharge process to have a huge improvement potential and struggled to find the most effective way of working. However, they experienced different ways to contribute to improve seamless treatment during the transition of care, both with providing medicines information and to ensure access to medicines. The study pharmacists found it unsatisfactory to end the pharmacist follow-up without being sure what happened in relation to medicines after discharge.

Conclusion: Performing a large research project in a clinical setting demands both continuous dedication and priority. Commitment from the management is crucial. To perform data collection as part of daily operations is a possibility; however, conducting research projects will require additional resources. In order to improve drug treatment clinical pharmacists should routinely interact close with patients. They are an essential source of information. Further cooperation at discharge between clinical pharmacists, other hospital staff, patients and care givers following discharge may be favourable to ensure continuity of care and patient safety.

RD007: Validation of the Medication Adherence Rating Scale in patients with diabetes in Slovakia—MARS-SK

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Background and Objective: Medication adherence is an essential part of the successful treatment of diseases, especially the chronic ones. The detection of medication adherence level can be carried out in several ways. The most common and an easily applicable method in clinical practice is using of validated questionnaires. The aim of the study was to validate the Slovak version of Medication Adherence Rating Scale (author: prof. R. Horne).
Setting and Method: The study was set in three ambulatory diabetes care centres in Slovakia. The methodology was based on anonymous questionnaire survey in 107 respondents—patients with *diabetes mellitus*.
Main outcome measures: Psychometric properties of the MARS-SK were verified by modified Morisky score (mMMAS-8), to confirm the convergent validity. Divergent validity was assessed by correlation between MARS-SK and questionnaires that measure the quality of life (EQ-5D-5L); and by correlation between MARS-SK and Visual Analogue Scale (VAS), which is a part of EQ-5D-5L. The correlation between adherence by MARS-SK, glycosylated haemoglobin (HbA1c) and cardiovascular risk was measured in order to confirm the criterion validity.
Results: The results have confirmed the good psychometric properties of MARS-SK. The acceptable value of internal consistency was confirmed (Cronbach's $\alpha = 0.69$, ICC = 0.691, 95% CI 0.59–0.77; inter-item correlation = 0.32). Using the method of test–retest analysis ($n = 72$), Pearson $r = 0.83$ was achieved. The value of Cronbach's α was 0.67 (ICC = 0.67, 95% CI 0.54–0.78). Moderate to good correlation between MARS-SK and mMMAS-8 was detected by convergent validity (Pearson $r = 0.59$ at $p < 0.001$). Divergent validity confirmed low to any correlation between the MARS-SK and EQ-5D-5L (Pearson $r = 0.15$; $p = 0.121$). Negative value was achieved by correlation between the MARS-SK and VAS (Pearson $r = -0.49$; $p = 0.613$). Criterion validity tested by Goodman–Kruskal gamma test confirmed a very good correlation between the low adherence and high cardiovascular risk (1.00 at $p < 0.05$). The correlation was not statistically significant between the achieved level of adherence and HbA1c values.
Conclusion: Based on results, the Slovak version of the MARS-SK questionnaire can be considered as validated and suitable for detecting the level of the medication adherence in patients.

RD008: Development of a tool to identify intensive care patients at risk of meropenem therapy failure

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Background and Objective: Severe infections remain a major issue in intensive care unit (ICU) patients due to high prevalence and high mortality rates [1]. For meropenem, a frequently used antibiotic in ICU patients, attainment of the pharmacokinetic/pharmacodynamic (PK/PD) target $100\%T_{>MIC}$ (meropenem concentrations exceeding the minimum inhibitory concentration during 100% of the dosing interval) was found to correlate with an increased clinical success [2]. The objective of the present work was to identify risk factors for PK/PD target non-attainment and to ultimately translate the scientific results into a tool for practical application.
Setting and Method: A prospective observational study was performed in 41 ICU patients with severe infections. Patients received standard doses of meropenem (1000 mg: $n_{patient} = 40$, 2000 mg: $n_{patient} = 1$) as 30-min i.v. infusion every 8 h. Meropenem serum concentrations ($n = 1237$) and creatinine clearance values estimated according to Cockcroft and Gault (CLCRCG) were determined over a period of 4 days. Various patient-specific factors were assessed for influencing measured meropenem concentrations using R 3.3.2.
Main outcome measures: Qualitative and quantitative impact of patient-specific factors on meropenem concentrations and on attainment of the PK/PD target $100\%T_{>MIC}$.
Results: $CLCR_{CG}$ (determined based on sex, age, body weight and serum creatinine; 25–255 mL/min) as marker of renal function was identified as dominant determinant of meropenem serum concentrations at the end of dosing intervals and consequently target attainment. Based on the quantified relation an easy-to-use tool was developed in Microsoft Excel™ 2016 using Visual Basic™ for Applications. The result was the 'MeroRisk Calculator', a graphical interface, allowing to interactively assess the risk of target non-attainment when treating an ICU patient with standard dosing of meropenem (1000 mg every 8 h as 30-min infusion; [3]).
Conclusion: Our results indicate that the dosage of meropenem can be adjusted depending on the patient's renal function. The current beta-version of the 'MeroRisk Calculator' is already applicable in the clinical research and training setting. As next step, prospective evaluation of the risk assessment tool is warranted. Ultimately, the newly developed tool shall support clinical pharmacy practice for decision-making in ICU patients.

References

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