

CONFERENCE ABSTRACTS

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Hospital pharmacy

Nursing home residents' attitudes towards deprescribing: A Danish survey

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Introduction: The use of medication with questionable benefits is common in nursing home residents and is associated with a number of harms, including adverse drug reactions, hospitalisation, and mortality. To ensure optimal care among this population, continuous reconsideration and adjustment of medication use are essential. Such reconsideration and adjustment could include deprescribing, the process of proactively reducing or discontinuing a medication where the potential benefits no longer outweigh the potential harms. Successful deprescribing requires insight into patients' attitudes towards deprescribing.

Objectives: To explore attitudes towards deprescribing among Danish nursing home residents.

Methods: We included nursing home residents from 27 nursing homes in The Region of Southern Denmark. Nursing home residents were eligible for participation if they spoke and understood Danish, and had an Orientation-Memory-Concentration (OMC) score of ≥ 8 . To explore attitudes towards deprescribing we used a translated and validated version of the revised Patients' Attitudes Towards Deprescribing (rPATD) questionnaire. Each question was read aloud to the residents in their home at the nursing home and the response options were presented to them on paper in a large font. We reported attitudes descriptively.

Results: A total of 162 nursing home residents were included from 27 nursing homes. The median age was 84 years (interquartile range [IQR] 75-91) and 67% (n=108) were women. Almost half of the residents (49%) took between 5-9 regular medications, while 27% took between 10-14 regular medications and 6,2% took 15 or more regular medications. More than half of the residents (55%) believed they took a large number of medications but, at the same time, 88% were satisfied with their medications. 81% of the residents like to know as much as possible about their medicines, but at the same time, only 51% know exactly what medicines they are currently taking. About 72% answered that they always ask their doctor, at the pharmacy or the nursing staff if there is something they don't understand about their medicines. Further, 35% would like to try stopping one of their medications on their own, while 85% would be willing to stop one of their regular medications if their physician said it was possible. Only 31% would like their physician to reduce the dose of one or more of their medicines, while 27% would be worried about missing out on future benefits if one of their medicines was stopped, and 13% think that one or more of their medicines may not be working.

Conclusions: Overall, we found that nursing home residents are open towards deprescribing, particularly if it is proposed by the physician.

Pharmacy and oncology clinic hazardous neoplastic drugs surface contamination testing in Canadian hospitals

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Introduction: Exposure of healthcare workers to hazardous drugs can lead to negative health effects. Guidelines recommend the safe handling of neoplastic drugs and regular surface sampling as contributing to worker safety. The results of routine samplings in several Canadian centres were compiled to determine the locations most likely to be contaminated with hazardous neoplastic drugs.

Methods: Surface contamination with such cancer drugs as 5-FU, methotrexate, cytarabine, dacarbazine, DOXOrubicin, epirubicin, gemcitabine, melphalan, cyclophosphamide, DOCETaxel, etoposide, ifosfamide, irinotecan, methotrexate, pACLitaxel, PEMETrexed, topotecan, vinBLASTine and drugs from platins group was tested at 26 Canadian centres (oncology clinic and pharmacy sterile room) from March 25, 2019, to January 10, 2022. The pharmacy location tested were: the floor under the Bio-Safety cabinet (BSC), BSC, checking counter, storage shelf, transport bin, and various clinic locations.

Results: In total, 347 samples were collected and analysed. Overall, chemotherapy agent contamination was detected in 15.2% (53 /347) of the sample. In pharmacy, 15.4% (47/305) of the samples were detected contaminated. Samples in the oncology clinic were contaminated in 14.3% (6/42). The most frequently contaminated pharmacy area samples were: floor under BSC (28.6% (12/42), within BSC 18.3% (13/71). The chemotherapy agents most frequently detected in pharmacy were: cyclophosphamide on 23 occasions, 5-Fluorouracil on 14 occasions and platin on six occasions.

Conclusions: Despite all the precautions taken by pharmacy staff to prepare oncology products in a safe environment, a high proportion of their work areas get contaminated with cytotoxic products. Similarly, the clinic area contaminations were routinely contaminated. More frequent testing and proper decontamination protocols should be implemented to ensure senior management offers a safe work environment to the pharmacy and nursing staff.

Impact of COVID-19 on the clinical and angiographic profile in patients with coronary artery disease

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Introduction: Myocardial Injury is a frequent complication in COVID-19 patients with predisposing factors, such as - angina, cardiomyopathy, acute coronary syndrome, myocardial infarction, and acute heart failure.

Objectives: In this study, we investigated the impact of COVID-19 on the clinical and angiographic characteristics of CAD patients.

Methods: A Prospective Cohort Study was carried out in a tertiary care hospital from January 2021 to January 2022. The included patients were grouped into COVID-19 and Non-COVID groups. The Angiographic details, clinical biomarkers like Troponin-T, CPK-MB, CRP, serum creatinine, lymphocytes, neutrophils, WBC, liver functions and all angiographic parameters obtained through invasive CAG were collected and analysed from the patients. The study has been approved by the Institutional ethics committee St.Peter's-IEC/2021/1/11.

Results: We have included 92 patients with Coronary Artery Diseases (CAD) such as stent thrombosis (n=12), STEMI (n=21), ACS (n=14), NSTEMI (n=15), LVF (n=19), Stable Angina (n=13). 51 Patients had a history of COVID-19 infection in the last 12 months and 41 patients were in the non-covid group. On data Analysis Troponin-T ($p=0.0521$), CRP ($p=0.0621$), and AST ($p=0.0516$) did not show significant variation in patients with a history of COVID-19. Whereas TIMI Score ($p<0.0001$), SYNTAX score ($p=0.0009$), Neutrophil and Lymphocyte ratio ($p<0.0001$), Serum Creatinine ($p<0.0001$) showed a significant decline in the COVID-19 patients. Furthermore, on a 12-week follow up COVID-19 patients (OR= 1.921) had increased incidences of cardiovascular events.

Conclusions: COVID-19 is one of the important risk factors for coronary lesions and major cardiovascular events. COVID-19 increased the risk for an immediate Cardiac event by two-fold elevated in patients with COVID.

Effectiveness of pharmacist clinic in a medical centre in Taiwan

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Introduction: In Taiwan, pharmacists now have the opportunity to sit down with patients in the clinic room setting to solve their medication problems.

Objectives: This rapport will enhance patients' understanding of the importance of the pharmacist's role.

Methods: In this retrospective analysis, we used the pharmacist clinic data from September 2019 to September 2021 (two visits per week in 2020, three visits per week in 2021), and statistical analysis services on polypharmacy, medication reconciliation, counselling on anticoagulants, drug use evaluation, and patient counselling. The referral can be made via doctors from an outpatient clinic, and the pharmacists or patients can schedule an appointment online or at the hospital. The selection criteria for referral to a pharmacist clinic were established in this study.

Results: A total of 344 clinic patients were included. The mean age of the study was 70.5 years (\pm 13.2 years) and 26.7% of those older than 80 years, 50.3% were men. Most of the referral source was Cardiology (260/344, 75.6%), and most of the Drug-therapy problems (DTPs) was medication evaluation and education (295/412, 71.6%). Statistics of pharmacist interventions, the most common intervention was medication evaluation and education (336/388, 86.6%). Patients' overall Satisfaction was 89.1% (Cronbach's alpha=0.784), and 14.5% of patients had to notify their doctors to change their original prescriptions.

Conclusions: Through pharmacist assistance, these potential pharmaceutical issues can be solved. This would increase patient compliance, ensure drug efficacy, and prevent side effects.

Streamlining pharmacy discharge processes for COVID-19 patients in a paediatric hospital

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Introduction: Increased hospitalisation in children due to Covid-19 infections have been observed during a community outbreak of new variants in Singapore. However, there is a

lack of strategies for improving work efficiency in handling the spike in pharmacy operational workloads related to prolonged disease outbreaks.

Based on the baseline data evaluated, the average cycle time for processing prescriptions for Covid-19 patients was 1 hour 49 minutes. This has exceeded the departmental key performance indicator (KPI) of one hour.

Objectives: This study aims to streamline the operational pharmacy processes involved in the handling of discharge prescriptions for Covid-19 patients to achieve reduced cycle time and reduced prescription reworking.

Methods: Lean six sigma thinking were both applied in the review of relevant operational work processes in the Pharmacy. Refer to **Figure 1** for baseline work processes and **Figure 2** for the revised work processes.

Patients from two isolation wards were recruited from January to March 2022.

The primary outcome was cycle time which was defined as the time taken from receiving of prescription to completion of dispensing.

Secondary outcomes were the number of prescription reworking to evaluate the percentage of prescription reworking prevented in the study group and the pharmacy staff survey to evaluate staff acceptance of the revised work process.

Paired t-Test was applied to compare the mean cycle time between the control and study groups. A *p*-value below 0.05 is required to prove a statistically significant difference. The null hypothesis is rejected if the t-statistic value is larger than the t-critical value.

Ethics approval was not required as data collection did not involve any patient-sensitive data

Results: A total of 162 participants were recruited for the study. The average cycle time in the study group was statistically significantly shorter compared to the control group (1h 34m vs 2h 02m; *p* = 0.018). The t-statistic value is larger than the t-critical value, hence, the null hypothesis is rejected.

Based on 83 discharged patients from the study group, 36 patients have requested either additional or rejection of medications during pre-discharge counselling. Hence 35.12% of potential prescription reworking has been avoided in the study group.

All 17 staff survey entries received agreed that the revised work process has reduced workload, rush and stress as a dispenser, as well as allowing the dispenser to focus on addressing caregiver's questions during counselling. Exactly 15 out of 17 entries supported rolling out of this work process to all isolation wards.

No medication error was reported from the study group.

Conclusions: Revised work process has been proven to reduce cycle time in processing isolation ward patients' discharge medications and preventing prescription reworking. The majority of pharmacy staff have supported the roll-out of the revised work processes to all isolation wards.

Study metrics should be evaluated in 3-6 months to check for its sustainability. Future collaboration with nursing and physicians in the revision of isolation work processes should be considered for better a holistic approach to the improvement of service quality and efficiency.

A case of central nervous system adverse reactions caused by using Scopolamine injection to soften the cervix for vaginal delivery

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Introduction: Prolonged labour increases the risk of maternal and fetal complications. The active management of labour has been proven effective in lowering neonatal and maternal morbidity by shortening the duration of labour. Scopolamine may result in cervical dilation by blocking the activity of the parasympathetic cervical-uterine neural plexus. It has been reported to shorten the first stage of labour for primigravid women by approximately 30%. Since 2004, several studies have evaluated the use of scopolamine in the active phase of labour, but there is still no definite efficacy and safety.

Objectives: The purpose of this case is to share an experience of Scopolamine to soften the cervix but followed by agitation, drowsiness and central confusion adverse reactions.

Case report: The pregnant woman is 38 weeks pregnant. She was admitted to the hospital at 4:00 pm on April 20th due to intermittent abdominal pain. At 6:00 p.m., Cervical dilation: 3+ cm, give Dinoprostone (PGE2) 3mg/Vaginal tab 1#. At 8:00 p.m., due to pain, give Nalbuphine 10mg/ml/amp 1amp. At 10:00 p.m., Duration/Interval: 10" ~15"/5~6min., Cervical dilation: 7+ cm; Cervical effacement: 80%. Because the mother will involuntarily exert force and pain, the doctor ordered Scopolamine 20mg/ml/amp 1amp in D5W 500ml run 60ml/hr & Scopolamine 1amp IV push. She became confused and restless about ten minutes after receiving Scopolamine (blood pressure: 118/86 mmHg; body temperature: 37°C; pulse: 114 beats/min; respiration: 20 beats/ min); Cervical dilation: 10 cm; Cervical effacement: 90%. Continue to observe and stop the intravenous infusion of Scopolamine. At 10:30 p.m., Cervical dilation: 10 cm; Cervical effacement: 100%; Station: +1 ~ +2, and the mother is tired, and sleepy but restless. So on EKG monitor, and ready for production. Fortunately, within an hour after delivery, the situation gradually improved.

Discussion: Prostaglandin E2 and Prostaglandin E1 are used to soften the cervix, but they may occur excessive uterine contractions and the drugs are expensive. Scopolamine is safe and cheap. It's often used clinically. In this case, using Scopolamine caused agitation, lethargy and central confusion. It

will lead to prolonged delivery time, which may be fatal. The dosage is equivalent to the study (20~40mg). Although the incidence of this adverse reaction is low, it occurred immediately after the drug was given. Fortunately, the adverse reaction gradually improved after delivery. Based on the Naranjo Adverse Drug Reaction scale, it is probable that the central nervous system (CNS) adverse reaction was induced by Scopolamine, as the Naranjo probability score was calculated to be five.

Conclusions: The study said Scopolamine can soften the cervix and is also associated with pain relief and reduction of postpartum blood loss. Although Scopolamine for cervical softening is not an approved indication, it is a good choice in consideration of the economy due to its low price. This drug does not pass the brain barrier and should not cause CNS adverse reactions, so this case report will help keep physicians vigilant about the current adverse reaction. More research is needed on its safety in the future.

The experience of sublingual use of atropine eye drops in the treatment of clozapine-induced sialorrhea

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Introduction: Clozapine is a second-generation antipsychotic drug for patients with drug-resistant schizophrenia. However, it may cause some adverse effects, such as sialorrhea. 30-97% of patients treated with clozapine will have hypersalivation. Sialorrhea tends to be especially bothersome at night, which causes sleep disturbances, and aspiration pneumonia. The current evidence suggests that the sublingual 1% Atropine eye drops are effective rapidly for clozapine-induced sialorrhea (CIS).

Objectives: This case report aims to discuss the safety and efficacy of 0.3% Atropine eye drops for CIS.

Case report: Mr Wang, a 33-year-old man diagnosed with treatment-resistant paranoid schizophrenia of 17 years' duration, was treated with clozapine 100-200 mg/day. At that dose, he had persistent sleep-related sialorrhea. He had tried to use Biperiden 4mg/day, but the symptom is only slightly improved. Therefore, it was replaced with clonidine 75mcg/day. Unfortunately, due to the side effects of Hypotension, these were discontinued. The patient refused to take clozapine in concern of drooling which seriously affected daily life and social interaction, resulting in repeated episodes of the disease that were difficult to control. Therefore, the sublingual 0.3% Atropine eye drops 1 ~ 2 drops/hs was started for sialorrhea instead. Within a week of treatment, the patient stated condition had substantially improved. Because of the immediate stop of sialorrhea and better sleep, compliance with clozapine greatly

improved. The disease is therefore under stable control. This patient has been using Atropine eye drops for three months, and no adverse drug reactions have been reported so far. No side effects have been reported. The case shows that sublingual 0.3% Atropine eye drops may be a rapid and effective CIS treatment that is both safe and practical.

Conclusions: Atropine blocks the muscarinic receptors in the salivary glands, resulting in reduced sialorrhea. Atropine eye drops are being used off-label in a non-FDA-approved way. It is not covered by National health insurance in Taiwan. Because Atropine eye drops are easy to use and cheap, it is a good choice if the patient experiences treatment failure of CIS. This case supports the sublingual 0.3% Atropine eye drops as a fast and effective CIS treatment. The psychiatrist can refer to the experience of the prescription for similar cases. Pharmacists play an important role in educating people about the correct use of this medicine. Sublingual use of 0.3% Atropine eye drops is safe and effective in the short-term treatment of sialorrhea; In the future, more research is needed to explore the safety and tolerability of long-term use, and whether it can be used in the treatment of sialorrhea caused by other psychiatric drugs.

Validated stability studies for 40 paediatric extemporaneously compounded oral solutions and suspensions (Suspendit)

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Introduction: The pharmacological treatment of children is often challenging because most commercial medications are solid dosage forms (tablets and capsules) indicated for adults. There is a general lack of age-appropriate formulations, and the extemporaneous preparation of compounded oral liquids represents a key therapeutic alternative for the paediatric population.

Objectives: Oral solutions and suspensions may be rapidly prepared, allow dosing flexibility and are easy to administer. However, hospital pharmacists need standard operating procedures and validated stability studies to compound with assured quality and safety. A total of 40 paediatric oral liquids commonly prescribed for children were extemporaneously compounded by adding the active substance(s) and, when applicable, additional excipients (e.g. flavours and sweeteners) to the sugar-free, paraben-free and gluten-free vehicle Suspendit. The standardised concentrations were based on the "Standardise 4 Safety" initiative by the ASHP, as follows: acetazolamide 25 mg/mL, amphotericin B 100 mg/mL, atenolol 2 mg/mL, baclofen 5-10 mg/mL, budesonide 0.1-4 mg/mL, buspirone hydrochloride 2.5 mg/mL, captopril 1-5 mg/mL,

clonazepam 0.1 mg/mL, dipyridamole 10 mg/mL, fluconazole 50 mg/mL, fluoxetine 1-10 mg/mL, gabapentin 25-100 mg/mL, hydrochlorothiazide 5-10 mg/mL, hydroxychloroquine sulphate 25 mg/mL, hydroxyurea 100 mg/mL, lamotrigine 1 mg/mL, lansoprazole 3-10 mg/mL, melatonin 5 mg/mL, metoprolol tartrate 1-10 mg/mL, mexiletine hydrochloride 10 mg/mL, nadolol 10 mg/mL, omeprazole 2-10 mg/mL, pantoprazole 2 mg/mL, phenobarbital 1-50 mg/mL, phytonadione 1 mg/mL, prednisolone 1-10 mg/mL, propylthiouracil 5 mg/mL, pyridoxine hydrochloride 1 mg/mL, ketoconazole 20 mg/mL, sildenafil 2.5 mg/mL, spironolactone 5 mg/mL and hydrochlorothiazide 5 mg/mL, sulfasalazine 100 mg/mL, terbutaline sulphate 1 mg/mL, theophylline 25-100 mg/mL, thiamine hydrochloride 25 mg/mL, topiramate 5-25 mg/mL, tramadol hydrochloride 5 mg/mL, trazodone hydrochloride 10 mg/mL, verapamil hydrochloride 50 mg/mL and zonisamide 10-50 mg/mL.

The corresponding Beyond-Use Dates (BUD) were determined by testing the physicochemical stability of the oral liquids at one or two temperatures (5°C and/or 25°C).

Methods: The physical characterisation consisted of observing all samples for appearance/colour and testing for pH. The chemical characterisation consisted of assay testing employing a stability-indicating Ultra-High Performance Liquid Chromatography (UHPLC) method (Waters Acquity) developed and validated by Eagle Analytical Laboratories (Texas, USA) or Professional Compounding Centers of America (Texas, USA). Samples were tested at baseline and subsequently at pre-determined time points for a total of 90 or 180 days.

Results: The BUD for acetazolamide, amphotericin B, atenolol, baclofen, budesonide, clonazepam, gabapentin, hydrochlorothiazide, hydroxychloroquine, hydroxyurea, metoprolol, prednisolone, theophylline, thiamine, topiramate, tramadol, trazodone, verapamil and zonisamide is six months, and for melatonin is three months, at room temperature only; whereas for fluconazole and phenobarbital is six months at both refrigerator and room temperature. On the other hand, the BUD for buspirone, captopril, dipyridamole, fluoxetine, lamotrigine, lansoprazole, mexiletine, nadolol, omeprazole, phytonadione, propylthiouracil, pyridoxine, ketoconazole, sildenafil, spironolactone and hydrochlorothiazide, sulfasalazine and terbutaline is six months, and for pantoprazole is four months (ongoing study), at refrigerator temperature only.

Conclusions: Standardised, palatable compounded oral liquids were developed and tested to facilitate extemporaneous preparation in the hospital setting. It was concluded that all 40 active substances are physically and chemically stable in the vehicle Suspendit for at least 90 days.

Patients' satisfaction with pharmaceutical care activities in a hospital ward setting

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Introduction: The provision of quality healthcare services in the hospital requires the active participation of pharmacists in direct patient care. For pharmacists to have their services valued, there must be an assessment of pharmacists' contribution to patient satisfaction. The result from the assessment will provide feedback on the quality of performance and will serve as an indicator for services to be sustained and the services to be improved upon, thereby helping the pharmacists to develop appropriate patient-focused service. A lot of focus has been on patient satisfaction in the out-patient hospital setting but none of these surveys has assessed patient satisfaction in an in-patient setting.

Objectives: The objective of this study is to assess the level of patient satisfaction with pharmaceutical care activities in a hospital ward setting.

Methods: The study is a descriptive cross-sectional study that was conducted on patients admitted into the MBA wards of the National Orthopaedic Hospital Lagos. Systematic random sampling was used to determine the sample size. A self-completing questionnaire that employed a Likert-type scale was used. The respondents were requested to state their level of agreement with questions using the five-point Likert scale with one and five indicating the lowest and highest level of satisfaction respectively. Inferential and descriptive statistics were completed and data were analysed using the statistical package for Social Sciences version 25 (SPSS V.25).

Results: The study revealed a positive significant relationship between patient satisfaction and pharmacists monitoring therapy ($p = 0.000$). A positive significant relationship was observed between patient satisfaction and pharmacist management medication therapy ($p = 0.000$). The study also revealed a positive relationship between pharmacists showing respect and empathy with general patient satisfaction ($p = 0.001$) however, there was no significant statistical relationship between overall patient satisfaction and the general expectations of patients from their pharmacists ($p = 0.104$).

Conclusions: The general patient expectations are not being met in this study so this provides an opportunity for pharmacists to seek strategies that work to increase patient satisfaction with pharmaceutical care activities.

Clinical outcomes of teriflunomide and polypharmacy in relapsing multiple sclerosis: A retrospective case-series

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Introduction: Teriflunomide is a high-priced oral disease-modifying therapy (DMT) indicated for the treatment of relapsing multiple sclerosis (MS). In addition, prescribing requires prior review by the National Health Insurance Administration in Taiwan. Therefore, a medication utilisation review is compulsory. Not only for disease progression and safety concerns, but evidence has also shown patients with MS are susceptible to polypharmacy due to supportive symptomatic treatments. The extent of polypharmacy should be evaluated. Given MS is a rare disease, regional outcomes are not well investigated.

Methods: Patients who received teriflunomide were retrospectively selected from October 2019 to March 2022. A medication utilisation review was conducted using medication history, patient-reported outcomes, and clinical information. Effectiveness was evaluated as relapse episodes identified by MRI and patient-reported symptoms. Disability progression measured by EDSS was not available due to inconsistent records between physicians. Potential adverse events were examined.

Results: A total of six patients were included. Five patients were female. The average age was 37 years old (28-50). Teriflunomide was administered at 14mg daily. The average treatment duration was 15.8 months (5-28 months).

Two patients (33.3%) experienced relapse episodes confirmed by MRI. Both suffered from one relapse episode. No patients reported new symptoms. Symptoms were mostly related to the nervous system (54.5%). The average number of symptoms was reduced by 33.3% ($n=3.3$). Chest tightness and constipation were entirely resolved, whereas diplegia and depression remained persistent.

Prior to therapy, all patients were absent of latent infection and received baseline sampling. Neither hepatic nor hematologic toxicity was observed during therapy. Hair thinning (83.3%), insomnia (33.3%) and nausea (33.3%) were reported, compared to 13%, 25.8% and 14% from current studies, respectively. A 31-year-old male patient switched to interferon- β due to an itchy skin lesion. A 28-year-old female patient switched to interferon- β due to intolerant hair loss. A 34-year-old female patient was given charcoal activated 61.5g daily for 14 days due to a recent pregnancy plan. Another 34-year-old female patient confirmed incidental pregnancy seven months after the last dose and later received an abortion.

Four patients (66.7%) suffered from polypharmacy, with or without teriflunomide. Before teriflunomide, the average number of types of medications per day was 4.67, which declined to three types per day after therapy. A five-type reduction was

observed in one patient. The average tablets ingested daily were reduced from 11 to 7.3 tablets. Maximum daily ingested tablets were reduced from 26 to 12. Routine use of prednisolone was halted in four patients.

Conclusions: The extent of utilisation is consistent with previous evidence. No severe adverse effects were noted, while most reported adverse effects were of mild intensity and self-limiting. Higher rates of adverse events may be due to the small sample size. Polypharmacy is likely to be alleviated by adding DMTs, but hardly eradicate. Long-term steroids were avoided. Patients dropped out due to pregnancy plans, intolerant hair loss, or suspected skin allergy. Patient medication guidance and shared-decision making are vital, particularly under child-bearing age, to avoid teratogenicity or unintended consequences. As per, DMTs utilisation in MS management should be aligned with compliance and quality of life.

Validating the 'student-obtained medication histories' program: The accuracy of pharmacy students compared to pharmacists

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Introduction: Transitions of care have been identified as vulnerable points for medication continuity. The World Health Organisation reports that up to 97% of adult patients had at least one medication discrepancy upon hospital admission, with a quarter of these medication-related adverse events being considered preventable. Medication reconciliation is an effective strategy to prevent medication errors upon admission and requires obtaining a patient's best possible medication history (BPMH). However, this process is time-consuming and pharmacy students may assist pharmacists in obtaining BPMHs. This study aims to compare pharmacy student-obtained BPMHs to pharmacist-obtained BPMHs.

Objectives: The aim of this study was to evaluate the proportion of patients who had a high-risk medication discrepancy from the pharmacy student-obtained BPMHs compared to the pharmacist-obtained BPMHs. The secondary objectives were to evaluate the total, type, and severity of the medication discrepancies; and the factors that affected the number of medication discrepancies with a high risk of harm.

Methods: This was a prospective observational study across two tertiary hospitals. Eleven final-year pharmacy students were trained to obtain BPMHs. Each pair completed one 8-hour shift weekly for eight weeks. Students obtained BPMHs for patients taking five or more medicines. A pharmacist then independently obtained and cross-checked the BPMH from the same patient within 24 hours. Medications with either no discrepancy or a consequence insignificant or minor were classified as a no-or-low risk; and those with a moderate, major, or catastrophic consequence were classified as high risk.

Results: Out of the 11 students, eight were female (73%), seven (64%) were undertaking a Bachelor of Pharmacy degree, seven (64%) were working in a community pharmacy and six (55%) indicated that they had prior experience obtaining BPMHs in hospitals. On average, each student pair completed 15 BPMHs (SD=1.562) over the eight weeks.

There was a total of 91 complex patients. The mean number of home medications reported was 13 (SD=5). Twenty-six patients (28.6%) had a high-risk medication discrepancy. From the 1029 medicines documented by students, there were 439 discrepancies, of which 52 (5.1%) were deemed high-risk (i.e., 0.6 high-risk medication discrepancies per patient). The total number of medicines significantly affects the accuracy of BPMHs (aOR: 1.151; 95% CI 1.023–1.294; $p=0.019$). Furthermore, when students have BPMH experience and use two types of sources for the BPMH, the accuracy of medicines documented significantly increases (aOR: 1.443; 95% CI 1.036 – 2.011; $p=0.030$, and aOR 1.572; 95% CI 1.213 – 2.036; $p<0.001$ respectively). However, when there is a medication discrepancy, its severity is only significantly associated with "blood and blood-forming organs" and "antineoplastic and immunomodulating agents" medicines (aOR: 10.436; 95% CI 3.381–32.217; $p<0.001$ and aOR: 8.863; 95% CI 1.609 – 48.823; $p=0.012$ respectively).

Conclusions: From the student-obtained BPMHs, 11.8% had a high-risk medication discrepancy. Literature reports that pharmacist-obtained BPMHs had a 14.8% high-risk medication discrepancy. Thus, pharmacy students represent a viable option to facilitate medication reconciliation upon hospital admission.

Prevalence and predictors of opioid use before orthopaedic surgery in an Australian setting: A multicentre, cross-sectional, observational study

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Introduction: Opioid analgesics are commonly used by patients awaiting orthopaedic surgery and preoperative opioid use is associated with a greater burden of postoperative pain, suboptimal surgical outcomes and higher healthcare costs.

Objectives: This study aimed to examine the prevalence of total opioid use before elective orthopaedic surgery with a focus on regional and rural hospitals in New South Wales, Australia.

Methods: This was a cross-sectional, observational study of patients undergoing orthopaedic surgery conducted between April 2017 and November 2019 across five hospitals that included a mix of metropolitan, regional, rural, private and public settings. Preoperative patient demographics, pain scores and analgesic use were collected during pre-admission clinic visits, held between two and six weeks before surgery.

Results: Of the 430 patients included, 229 (53.3%) were women and the mean age was 67.5 years (standard deviation 10.1 years). The overall prevalence of total preoperative opioid use was 37.7% (162/430). Rates of preoperative opioid use ranged from 20.6% (13/63) at a metropolitan hospital to 48.8% (21/43) at an inner regional hospital. Multivariable logistic regression showed that the inner regional setting was a significant predictor of opioid use before orthopaedic surgery (adjusted odds ratio, 2.6; 95% confidence interval, 1.0-6.7) after adjusting for covariates.

Conclusions: Opioid use prior to orthopaedic surgery is common and appears to vary by geographic location.

Glycemic control and treatment with iSLGT-2 drugs in type 2 diabetic patients in an urban population attended at a primary care centre

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Introduction: Type 2 diabetes mellitus is a chronic disease with a high prevalence. Clinical trials have shown that iSLGT-2 antidiabetic drugs reduce cardiovascular adverse events. However, a low hypoglycaemic effect in the glycaemic control of diabetic patients has been described.

Objectives: To evaluate changes in iSLGT2 prescription in type 2 diabetic adult patients in a primary care centre during 2015-2021. To assess the glycaemic control and to explore the impact of the Covid-19 pandemic on the glycaemic control of these patients.

Methods: A retrospective study of type 2 diabetic patients in a primary care centre in Barcelona, Spain. Analysed included type 2 diabetic patients of both sexes followed up during the years 2015, 2020 and 2021. Patients under 18 years old were excluded. Socio-demographic data (sex and age), analytical values (Hb1Ac) and prescribed antidiabetic drugs that were effectively dispensed were registered for each selected patient.

Results: The number of diabetic patients registered was 1587 in 2015, 1184 in January 2020 and 1682 from January to October 2021. There was an increase in the use of iSLGT2-type antidiabetics from 2015 when they were barely prescribed (0.69%) to 2021 (6.54%). Glycaemic metabolic control remained stable over the assessed years, with mean HbA1c values of 7.50 %, 7.66 % and 7.92 % in the years 2015, 2020 and 2021 respectively. During the Covid-19 pandemic, percentages of total Hb1Ac determinations above 8% increased in 2021 (32.56%) compared to January 2020 (30.99%). However, this increase was not statistically significant ($p > 0.05$).

Conclusions: The prescription of iSLGT2 increased 10-fold between 2015 and 2021. However, this change did not lead to a significant change in Hb1Ac control values. Thus, it is crucial to monitor the use of antidiabetic drugs for type 2 diabetes and to assess their adequacy to the recommendations of clinical guidelines.

Analysis of antibiotic consumption in an intensive care unit

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Introduction: The follow-up of antibiotics and especially those of restricted use against multiresistant bacteria is one of the pharmacist's main activities as a member of the Program for Optimising the Use of Antibiotics (PROA) in the hospital where the study conducted.

Objectives: To analyse the evolution of antibiotic consumption in the Intensive Care Unit (ICU) of a university hospital.

Methods: Retrospective and comparative study of antibiotic consumption (Groups ATC J01-J02AX06) during 2017-2021. The data were obtained from the APD management program. The variables collected were: overall antibiotic expenditure, global Defined Daily Dose (DDD) ATC J01-J02AX06 per 1000 stays, and consumption is broken down by active principles. Excel Microsoft Office 2010 was used for statistical data processing.

Results: During the study period, the overall antibiotic expenditure was € 1,052,684 (2017), € 840,854 (2018), € 776,603 (2019), € 769.679 (2020), and € 892.645 (2021).

The global DDD/1000 stays were 2390.24 (2017), 2540.72 (2018), 2563.02 (2019), 2715.5 (2020), and 2585.21 (2021). In ICU were 1746.1 (2017), 1618.3 (2018), 1569.2 (2019), 1701.04 (2020), and 1679 (2021).

In 2021, 45 different active principles of antibiotics were dispensed in the hospital. Out of the total DDD consumed in the hospital, 65% was in ICU. Main prescribed antibiotics in ICU expressed in DDD/1000 stays: meropenem (DDD 175.14), erythromycin (DDD 153.09), piperacillin-tazobactam (DDD 120.14), amoxicillin-clavulanic (DDD 104.44), linezolid (DDD 99.53), levofloxacin (DDD 93.26), caspofungin (DDD 83.89), cloxacillin (DDD 74.67), ceftriaxone (DDD 72.87), ciprofloxacin (DDD 65.23) and vancomycin (DDD 51.2), being similar in the other periods studied.

Conclusions: Although there is a tendency to reduce the overall consumption of antibiotics, this consumption is high. During the COVID-19 health emergency, clinical management has been exceptional, however, the consumption of antibiotics in the ICU has been slightly higher than in the rest of the periods.

PROA teams contribute to improving the management of antibiotics (especially broad-spectrum), therefore, their implantation in ICU could optimise the pattern of antibiotic use and the quality of care.

Secukinumab for the treatment of plaque psoriasis and psoriatic arthritis

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Introduction: Pivotal phase III randomised controlled trials have demonstrated the promising efficacy and safety of secukinumab for the treatment of moderate-to-severe plaque psoriasis (PP) and psoriatic arthritis (PA). However, trial results might have limited external validity in daily practice so real-life studies are commonly performed to confirm the results.

Objectives: To assess the effectiveness and safety of secukinumab in adults with moderate-to-severe PP or PA.

Methods: A cross-sectional study was carried out in a tertiary-level hospital, which included patients treated with secukinumab for moderate-to-severe PP or PA.

The following data were collected from the electronic prescribing software and health records: sex, age, indication, treatment regimen, previous treatment and reason for discontinuation, and Psoriasis Area and Severity Index (PASI). The effectiveness endpoint was PASI75 at 12 weeks. Adverse drug events (ADE) were registered to evaluate safety.

Results: Forty patients (62.5% men) with a median age of 46 (19–87) years were included. 57.5% were treated for PA and 42.5% for moderate to severe PP. The treatment regimen consisted of secukinumab 300 mg for PA (78.3%) and PP (100%), or secukinumab 150 mg for PA (21.7%). The frequency of administration was monthly (95.0%) for maintenance therapy except in two cases of dose optimisation in PA.

Secukinumab was first (20.0%), second (35.0%), or subsequent biologic treatment line (45.0%). Previous treatments were adalimumab (52.5%), etanercept (45.0%), ustekinumab (22.5%), infliximab (17.5%), golimumab (10.0%) and certolizumab (5.0%). Discontinuations of previous treatments were due to lack of efficacy (95.0%) or ADE (5.0%).

PASI could be evaluated in 14 patients (five with PA and nine with PP). At baseline, the median PASI value was 10 for PA and PP. At week 12, the median PASI value was 6 for PA and 5 for PP. Seven (50.0%) patients achieved PASI75, two (40.0%) with PA and five (55.6%) with PP.

No ADE was reported.

Conclusions: According to PASI75 at 12 weeks, secukinumab was an effective treatment in approximately half of the patients evaluated. This study's data showed a PASI improvement worse than in clinical trials which could be due to most patients presenting prior biological treatment failure. Secukinumab was well-tolerated in the population of this study.

Effectiveness and safety of nab-paclitaxel in metastatic breast cancer

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Introduction: Pivotal phase III randomised controlled trials have demonstrated the promising efficacy of nab-paclitaxel for the treatment of metastatic breast cancer. However, trial results might have limited external validity in daily practice so real-life studies are commonly performed to confirm the results.

Objectives: To analyse nab-paclitaxel effectiveness and safety in a tertiary-level hospital.

Methods: A retrospective observational study was conducted. Patients treated with nab-paclitaxel from 2014-2020 were included.

The following variables were recorded: age, number of cycles, duration of treatment, progression-free survival (PFS), number and type of previous chemotherapy regimens, reported adverse events (AEs), dose reductions and dose delays between cycles. We obtained data from the electronic clinical records and the software where the chemotherapy treatments are registered (Oncogest®).

Results: Thirty-five patients were included, with a median age of 57 years (range 29-70). The median duration of the treatment was 2.9 months (5 cycles, range 1-6). Patients had a median of one previous chemotherapy line in the metastatic stage, in the range of 0-4. About 94.3% of the patients received nab-paclitaxel as metastatic therapy in the second line or later. The most common regimens used before nab-paclitaxel in metastatic disease were: paclitaxel + bevacizumab (31.4%), non-pegylated liposomal doxorubicin (25.7%), epirubicin + docetaxel (20%), vinorelbine (14.3%), paclitaxel monotherapy (11.4%), docetaxel monotherapy (11.4%), eribulin (11.4%), pegylated liposomal doxorubicin (8.6%), and cisplatin + gemcitabine (5.7%), being other regimens less frequent. The median PFS was 3.4 months. 62.8% of the patients had any AE during treatment. Most frequent were: neuropathy (59.1%), asthenia (54.5%), sickness (36.4%), alopecia (27.3%), mucositis (18.2%), constipation (18.2%), diarrhoea (9.1%) and anorexia (9.1%). 1 patient interrupted the treatment due to AEs. There were 2 delays and 6 dose reductions due to toxicity.

Conclusions: In the patients in this study, nab-paclitaxel median PFS was lower than the PFS obtained in the phase III trial. It could be explained because the patients received previous regimens of chemotherapy with taxanes for metastatic disease. In addition, this study's sample size was smaller.

Regarding safety, nab-paclitaxel was well tolerated and in most cases, the AEs didn't force to interrupt treatment.

The dos and don'ts of administrating the COVID-19 vaccine to children aged 5-11

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On October 29, 2021, The Pfizer-BioNTech pediatric COVID-19 vaccine received Emergency Use Authorisation for children aged 5-11 years in the United States. With this action, pharmacists faced a new set of challenges. The new vaccine had a different concentration and beyond use date (BUD) as well as dose. Risk reduction strategies need to be implemented. Pediatric patients also created new challenges as their level of injection fear needed to be overcome with trust and distraction techniques.

Through experience, a list of Dos and Don'ts was developed to assure a smooth and less stressful experience for the child and the parents.

The topics included "storage separation" to prevent selecting adult products accidentally, BUD which is different for the pediatric dose, needle size which is different for the child based on weight, and anatomy safety needles which are essential when children jump around during vaccinations, vaccine temperature which needs to be at room temperature, syringe preparation and syringe selection are all important and can be different from adult vaccinations.

The vaccination environment was also especially important as well as the appearance of the health care practitioner, (HCP). Something as simple as wearing a white coat can scare small children. Building trust between the HCP and the child is particularly important. Making sure the child and parent can ask questions is vital.

Providing the child with a small treat like candy or lollipop provides a distraction and a positive experience. Other items like "Superhero" stickers make the child an active participant in the vaccination program.

Distractors like cartoon Band-Aids, bubble wrap, "pop its" and buzzers all are helpful to take the focus of the vaccination of the "needle" which is the main obstacle to a smooth and fearless vaccination.

Parents can be the biggest obstacle to a successful vaccination as they can bring negative input including punishments if the child cries, disobeys or fails to get vaccinated. Taking away, "apps", vacations and many other assorted privileges does not make vaccination a positive experience especially when there is a second vaccination required. Try to have the parent be supportive and a positive attribute to the vaccination process. Negative feedback and threats are not necessary or effective.

It is best to have siblings wait outside the vaccination room especially if they are next. Watching usually increases anxiety.

Children get anxious waiting for injections so prepare all paperwork and syringes in advance.

Let the child choose which arm and then show them how you want them to move their arm and how often post-injection to prevent soreness.

Instruct child and parent about how much and what type of hydration they should do post-vaccination. Headache, fever, and fatigue are linked to failure to hydrate properly post-vaccination

Instruct child and parent about pain and the possibility of mild fever and what type and how much analgesia is appropriate. Parents tend to either give none or too much analgesia post-vaccination.

These tips should help HCPs especially pharmacists treat pediatric patients

Care continuity hospital pharmacy – Community pharmacy in patients with solid organ transplantation

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Introduction: Solid organ transplant (SOT) patients have very complex pharmacological treatments that have to be adherent and must adhere to strict healthy lifestyle habits to ensure the long-term success of the transplant.

During hospital admission, the patient receives pharmaceutical care from hospital pharmacists but when the patient is discharged the pharmaceutical care provided in the outpatient setting is unknown.

Methods: A training plan on pharmaceutical care for SOT patients was carried out at the Colegio of Pharmacists aimed at community pharmacists to increase their knowledge of the pharmacological treatment and healthy lifestyle habits that these patients should comply with.

The training plan consisted of 6 training sessions of 1.5 h each. The first dealt with the characteristics of the Spanish transplant system, the next four with the characteristics of 5 types of solid organ transplant: renal and pancreatic-renal, hepatic, cardiac and pulmonary, and the last session with medications and healthy lifestyle habits. The outline of the TOS sessions was:

- To know the differential characteristics of each solid organ transplant.
- To learn about the most common diseases that lead to transplantation.
- To learn about the characteristics of immunosuppressive drugs and other drugs used after transplantation.

- To know the most common complications that occur after transplantation over time.
- To know the treatment of organ rejection

To know the degree of knowledge and the activity carried out by community pharmacists in TOS patients before the training, a survey was made to all the participants before and after receiving the training. Participants had to rate each question from 0 to 10.

The questions were:

- Degree of knowledge of proper administration of immunosuppressive drugs, most common interactions of immunosuppressive drugs, most common adverse effects of immunosuppressive drugs, most common diseases leading to solid organ transplantation (SOT), proper vaccinations after SOT, proper dietary habits after SOT, healthy lifestyle habits after SOT.
- Do you perform any special Pharmaceutical Care function in SOT patients: measurement of blood pressure, glycemia, renal function, etc.?
- In case of doubt with pharmacological treatment, which health professional do you consult?
- Family doctor
- Family nurse
- Specialist doctor
- Specialist nurse
- Hospital pharmacist
- Do SOT patients usually ask you questions about their treatments?
- Which doubts do they consult you most frequently?

Results: After the training, there was an improvement:

- in all the questions on knowledge
- in the functions they perform with patients
- in communication with hospital specialists.

Conclusions: Training community pharmacists in TOS significantly improves knowledge about medications and healthy lifestyle habits that these patients should comply with, communication with hospital specialists and the degree of satisfaction with the information received.

Role of the pharmacist in the care of the lung transplant patient

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Introduction: After a lung transplant, patients must have knowledge about pharmacological treatment and healthy lifestyle habits.

Objectives: To evaluate the effectiveness of pharmaceutical care for lung transplant patients from 2017 to 2020 aimed at increasing their knowledge about pharmacological treatments and healthy lifestyles and its influence on unscheduled readmissions in the first 90 days after transplantation.

Methods: 129 lung transplant patients received, by the transplant pharmacist, informative sessions 2 or 3 weeks after transplantation, during the hospital stay, on medicines and healthy lifestyles and the delivery of an informative book prepared for the occasion by the multidisciplinary team. The knowledge acquired is evaluated with the completion of a questionnaire before and after informative sessions. The score of their satisfaction with the information received before and after the sessions is also collected.

Fifteen days after discharge, the patient is telephoned and the post-survey is carried out.

The reasons for unscheduled readmissions in the period were mainly worsening of the respiratory function test and fever.

Results: Out of the 129 lung transplanted patients in that period, 114 completed both questionnaires.

Exactly 70 were men and the average age was 55 years. The causes of transplantation were: Diffuse Interstitial Pulmonary Disease: 58, Chronic Obstructive Pulmonary Disease: 29 Bronchiectasis / Cystic Fibrosis: 17 and Others: 7 and Pulmonary Hypertension: 3.

Exactly 99 transplants were double-lung, 20 left single-lung and 10 right single-lung.

The percentage of correct answers varied from 70% in the pre-questionnaire to 85% in the post ($p = 0.000$).

The score of their satisfaction with the information received was 6.6 points on the pre-questionnaire and 9.3 on the post-questionnaire, ($p = 0.000$).

A total of 114 telephone calls were made to the patients' homes to answer the post-questionnaire.

In the first 90 days after transplantation, 27% of transplanted patients were readmitted unscheduled in 2020, compared to 38.2% in 2016 (control group) ($p = 0.225$).

Conclusions: Pharmaceutical care for lung transplant patients statistically significantly improves their knowledge about medicines and healthy lifestyles as well as their degree of satisfaction with the information received, and not statistically significantly improves the unscheduled readmissions in the first 90 days after transplantation.

Evaluating the feasibility and learning performance of objective structured clinical examination (OSCE) training scenarios effectively

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Introduction: The learning performance of OSCE has been involved in teaching hospital accreditation for physicians. Though the methods of evaluating learning performance for medical personnel haven't been stipulated by the accreditation criteria, Multi-institutional or single-institutional OSCE training is widely indicated as one of the methods for learning performance evaluation currently.

Clinical training scenario plays a crucial role when conducting OSCE evaluation. Therefore, whether the training scenarios are applicable or not becomes an important issue.

Objectives: Besides evaluating the learning performance of trainees, OSCE has a teaching purpose as well. In this study, we took the training scenario "Educating parents on the concepts regarding fever reduction and antipyretics instruction" as the topic for further analysis of feasibility and learning performance.

Methods: 1) We analysed the feasibility of the training scenarios by discrimination, difficulty, reliability and validity. Further explanations are as follows: (a) discrimination (d-value): the larger the d-value, the better the discrimination. The recommended d-value is between 0.20 and 0.40. (b) Difficulty (p-value): the larger the p-value, the easier the test. The recommended p-value is between 0.30 to 0.70. (c) Reliability (Cronbach's α -value): the larger the α -value, the better the reliability. The recommended α -value is between 0.50 to 0.70. (d) validity: expert validity was used, and at least five senior pharmacists conduct grading with consensus. 2) Learning performance was analysed according to the trainee's self-satisfaction with OSCE training by a 5-point Likert scale (one point is the lowest and five points is the highest).

Results: The evaluation of the training scenario "Educating parents on the concepts regarding fever reduction and antipyretics instruction" is divided into communication skills and medication instruction. Six questions have been asked by standard patients and evaluated via ten items. 1) Feasibility: this

scenario has not only high discrimination and middle difficulty but also has reliability and validity. The scores of discrimination, difficulty and reliability are 0.67, 0.67 and 0.71. 2) Learning performance: according to trainees' evaluation results, this scenario is highly helpful for clinical practice and the score is 4.86; the scenario difficulty is 3.52 which belongs to the middle difficulty analysed by a statistical tool. In addition, the overall satisfaction is 4.86.

Conclusions: The three main factors for OSCE evaluation are training scenarios, standard patients and examiner. Three of them should coordinate together to reach the best evaluation and learning performance for examinees. This training scenario has been evaluated by a statistical tool which shows consistency in trainee self-evaluation as well. Therefore, this model can be applied for feasibility evaluation in every training scenario in the future.

Medication reconciliation in stage-five chronic kidney disease patients

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Introduction: According to the United States Renal Data System (USRDS) 2021, the prevalence of end-stage renal disease (ESRD) in Taiwan is at the top globally in 2019. (3679 cases per million population); the incidence is in second place globally (529 cases per million population) and the population density of dialysis has become the world's first place. CKD stage 5 patients are one of the polypharmacy population due to multi-comorbidities induced high disease complexity. Previous studies have indicated that polypharmacy has negative impacts on disease control and is correlated to renal disease progression. Therefore, ESRD patients are a high-risk population for drug-related issues.

Objectives: The purpose of pharmaceutical care for ESRD is to increase patient adherence and delay the timing of dialysis intervention and the complication occurrence via patient management which includes medication reconciliation and providing medication guidance.

Methods: This study included ESRD patients without dialysis, age>20 years old, 2 comorbidities and total medication items >10 (determined by enrollment day) in a would-be medical centre. The medication record will be analysed and collected by National Health Insurance Pharma Cloud Data within a month.

Results: A total of 56 patients have been enrolled from 2019/1 till 2021/11 and 46.4% are male with a mean age of 64.1 ±15.28 years old. 64.3% of patients have eGFR<10 at enrollment; the

percentage of comorbidities diabetes, hypertension, and hyperlipidemia, are 50%,89% and 54%. In total, 25% of patients have three comorbidities above. The top three usages of hypoglycemic agents are DPP4 inhibitors, sulfonylureas and insulin which account for 64%, 29% and 21%; the top two usages of antihypertensive agents are CCB and ACEI/ARB which account for 52% and 44%; the top two usages of hypolipidemic agents are statins and fibric acid which accounts for 93.3% and 13.3%. Combination treatment has been mainly performed in controlling hypertension and hyperglycemia. However, a single agent is used to control hyperlipidemia. Inappropriate prescriptions have been discovered including eight contraindicated medications, five no-dose adjustments according to renal/hepatic function, one duplicate medication, one drug-drug interaction and one untreated case. All the above cases are near-miss prescriptions.

Conclusions: This study includes cross-department visiting patients and inappropriate prescriptions prescribed by cross-department physicians accounting for 79%. The percentage of inappropriate medication and the proportion of renal toxic agents have been decreased after prescription integration and optimisation by pharmacists. Further analysis will be conducted with more enrollment and dose adjustment guidelines for the renal impairment population will be developed as a reference for clinical practice in the future. In addition, we will focus more on eliminating inappropriate prescriptions and elevating patient medication safety via cross-disciplinary communication proactively.

An evaluation of adherence to insulin therapy in diabetic patients attending the diabetic clinic of Lagos state university teaching hospital, Lagos, Nigeria

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Introduction: Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin or the body does not use the insulin produced effectively. While good adherence to insulin therapy is established to be a major factor determining glycemic control and good treatment outcomes, it remains a challenge in many resources constrained countries like Nigeria.

Objectives: To determine the factors that affect adherence to Insulin therapy among Diabetes Mellitus patients attending Lagos State University Teaching Hospital, Nigeria.

Methods: A cross-sectional survey conducted over 3 months among Types 1 and 2 Diabetes Mellitus patients who have been on insulin for a minimum of six months was carried out. A

validated self-administered questionnaire was used to assess adherence to insulin and the factors determining it. Bivariate associations between adherence and patient characteristics (age, sex, race, education, and comorbidity) were tested using contingency tables, chi-square tests and Anova regression analysis test at a 5% level of significance.

Results: A total of 121 patients were studied, mostly in the 41-50 years age group (39%), and the majority were found with low adherence (83.1%). More females were non-adherent (65.3%), with 52% of the Patient using the Penfil device which is slightly above those using the vial. Age was the only factor found to be associated with adherence with the 51-60 years category being more adherent than others.

Conclusions: There was a very high level of non-adherence among diabetes mellitus patients on insulin studied and the factor of age is associated with adherence. There is a need to institute appropriate interventional measures to improve adherence.

Impact of a comprehensive intervention bundle implementing drug burden index (DBI) as a clinical risk assessment tool on deprescribing anticholinergic and sedative drugs in older adults admitted to an Australian acute hospital: A pilot study

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Introduction: The Drug Burden Index (DBI), a measure of total exposure to medications with anticholinergic and sedative effects, can identify patients at high risk of adverse drug events, who may benefit from deprescribing.

Objectives: To evaluate the impact of a comprehensive intervention bundle using the DBI on i) the proportion of patients with at least one anticholinergic and/or sedative medication dose reduced or ceased on discharge compared to admission to hospital and ii) DBI medication changes during hospitalisation.

Methods: This interventional study was conducted in a metropolitan tertiary referral hospital in Sydney, Australia. The inclusion criteria were patients admitted to the Aged Care service of the hospital for ≥ 48 hours from December 2020 to October 2021 who were aged ≥ 75 years and had a DBI > 0 on admission. The study consisted of three periods (111 days each): control, intervention and stewardship periods. During the control period,

an automated DBI calculator that was incorporated into the hospital's electronic medical record (eMR) ran in the background and usual care was provided. During the intervention period, the following multifaceted tool bundle was provided: 1) a clinician interface displaying the DBI score and report in the eMR, and 2) deprescribing guides for clinicians and information leaflets for consumers. In the stewardship period, a stewardship pharmacist provided individualised patient-level advice to facilitate the deprescribing of DBI medicines and supported clinician use of the intervention bundle. For the analysis of the reduction of DBI, logistic regression analysis was conducted to evaluate the impact of the intervention bundle only in the intervention period or the bundle plus stewardship program in the stewardship period using the control period as a reference. For the analysis of deprescribed medications, medications contributing to DBI were classified using the Anatomical Therapeutic Chemical (ATC) code 3rd level. χ^2 tests with Bonferroni correction were conducted to evaluate the changes in DBI medication between the 3 evaluation periods.

Results: A total of 1374 hospitalisations for 1188 patients were included in the analysis. The patient's baseline characteristics were comparable during the three evaluation periods. The most commonly used DBI-contributing medication class on admission was antidepressants (ATC code: N06A), followed by opioids (N02A) and antiepileptics (N03A). Patients in the stewardship period were more likely to have at least one DBI-contributing medication stopped or the dose reduced on discharge (43%, adjusted odds ratio (aOR) 1.74, 95% confidence intervals (CI) 1.05–2.89), compared with the intervention period (38%, aOR 1.39, 95% CI 0.86–2.25) and the control period (30%, reference). The proportion of opioids (N02A) used on admission in the stewardship period that was subsequently stopped or had their dosage reduced on discharge was statistically significantly increased (46%, $p < 0.05$) compared with that in the control period (18%).

Conclusions: Integrating the DBI in the eMR with an accompanying stewardship program can facilitate the deprescribing of sedative and anticholinergic medications. Based on these findings, a stepped wedge cluster randomised trial of the intervention involving six hospitals has commenced in New South Wales, Australia, to evaluate the impact on prescribing and clinical outcomes.

Pharmacist medication education in patient with acute myocardial infarction

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Introduction: According to the guidelines of the European Society of Cardiology (ESC), the pharmacist's medical education is a very important key in caring for patients with myocardial

infarction. Many patients suffer from myocardial infarction again due to poor medication compliance or have serious adverse reactions due to ignorance of drug side effects. In addition, the guidelines also suggest that tailor-made education has a better result in patients recognition.

Objectives: This study aimed to evaluate the efficacy of individualised medication education.

Methods: This study is a retrospective study, which includes patients admitted with acute myocardial infarction, from October 2021 to February 2022. The information collected includes age, sex, level of education, and the number of antiplatelet agents were included. The main results include the scores before and after education from a brief Medication questionnaire and a 14-day readmission rate. Statistical analysis results are expressed as mean \pm standard deviation, or as a percentage.

Results: A total of 83 cases were included in this study, with an average age of 60.0 ± 11.0 years old, of which 61 (73.4%) were mainly male. All of them had at least one antiplatelet agent. The pre-test score for individualized medication education was 2.60 ± 1.45 , and the post-test score was 4.95 ± 0.27 ($p < 0.001$). The score of the patient satisfaction survey on pharmaceutical services was 4.80 ± 0.41 , which was considered very satisfactory.

Conclusions: Tailor-made drug education for acute myocardial infarction of in-hospitalisation patients significantly improved their drug recognition.

Utilising rubric to improve the quality of formative feedback for pre-registration pharmacists journal club presentations

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Introduction: Pre-registration pharmacists must conduct a journal club presentation as part of the training program at KK Women's and Children's Hospital, Singapore. Traditionally, pre-registration pharmacists were given verbal feedback based on assessors' subjective assessment. The lack of a shared mental model on the expected standards resulted in pre-registration pharmacists being unclear on what was expected from them. This is not ideal as one of the core competencies identified in the Singapore Ministry of Health's development framework for pharmacists is the ability to critically evaluate literature.

A rubric is a scoring tool that uses a coherent set of pre-defined criteria for students' work to describe the level of performance quality based on the criteria. Hence, the authors seek to rectify

the above issue by using a rubric for assessment and feedback on pre-registration pharmacists' journal club presentations.

Objectives: This study aims to assess the effectiveness of using the rubric in improving the feedback quality for pre-registration pharmacists' journal critique skills during journal club presentations.

Methods: As the aim was to focus more on the quality of the tasks, the team consulted subject matter experts and modified Blommel *et al.*'s rubric. The authors also ensured that the modified rubric was representative of the required skill sets for a journal critique. Six pre-registration pharmacists were assessed using our rubric (intervention group), while the other six were assessed with traditional verbal unstructured feedback (control group). Pre-registration pharmacists in the intervention group received the scored rubric as part of the feedback process. The pre-registration pharmacists were given a survey using the Likert scale to determine their perception of their performance and the quality of feedback given to them.

Results: All pre-registration pharmacists in the control and intervention groups agreed that they were able to assess if they had met the expectations for their journal critique based on the feedback from the rubric. All six pharmacists from the intervention group could assess if they had exceeded expectations compared to only four (66%) in the control group. In addition, all from the intervention group could determine if they improved from their previous journal critique compared to four (67%) in the control group. Furthermore, compared to an average of two comments from each assessor who did not utilise the rubric, assessors with the rubric were now able to provide richer feedback based on all 17 pre-defined criteria and an average of five additional qualitative feedback per assessor.

Conclusions: Overall, using a rubric as a form of assessment tool improved the quality of formative feedback for the pre-registration pharmacists' journal club. The rubric provided clear descriptions of each task's expectations at each performance level. This provides pre-registration pharmacists with information on how to improve their literature appraisal skills and promote a drive towards excellence to exceed expectations. This assessment tool will be used for future journal club presentations for pharmacists. The authors will further extend the project of using the rubric as a tool for assessment for other performance assessments, such as case presentations, to encourage a better learning experience.

Pharmacist-led multidisciplinary approach in preventing strokes in people with atrial fibrillation

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Introduction: Targets set by Public Health England (PHE) state that 90% of patients with atrial fibrillation (AF) are expected to receive anticoagulation by 2029. In 2019/2020, across three London boroughs serving a population of 770,000, the percentage of AF patients at high risk of stroke (CHA₂DS₂VASc ≥2) anticoagulated was below the target set by PHE. In addition, the optimisation of risk factors can significantly reduce the risk of cardiovascular disease and associated mortality in these patients.

Objectives: To provide specialist input from a cardiovascular pharmacist to prevent AF-related strokes through the improvement of anticoagulation rates and optimisation of cardiovascular risk factors in patients with AF across three London boroughs over one year, as well as minimising bleed risk in patients on dual antithrombotic therapy.

Methods: A specialist cardiovascular pharmacist was commissioned to identify high-risk AF patients (CHA₂DS₂VASc ≥2) by working with primary care clinicians. Utilising 'proactive care frameworks' created by UCLPartners and Clinical Effectiveness Group Queen Mary University of London, patients were stratified and prioritised for review. Patients not on anticoagulation were deemed to be at the highest risk, requiring an urgent review to assess suitability for anticoagulation. A virtual multidisciplinary team (MDT) would review any complex patients and agree to an action plan. Patients on dual antithrombotic therapy were also assessed to determine if antiplatelet therapy was indicated to minimise the risk of major bleeding. All AF patients were reviewed for suitability of statin initiation to optimise cardiovascular risk prevention.

Results: At baseline, 86% (7581/8582) of AF patients with a CHA₂DS₂VASc ≥2 across the three boroughs were anticoagulated.

1001 patients were reviewed by a specialist pharmacist, with 84% (841/1001) of patients having a CHA₂DS₂VASc between 2-5, and 28% (280/1001) on antiplatelet monotherapy. Analysis at 12 months following intervention reported that 95% (7888/8280) of AF patients with a CHA₂DS₂VASc ≥2 were suitably anticoagulated, an improvement of 9%. Exactly 6% (61/1001) of patients were switched from antiplatelets and 25% (246/1001) were newly initiated on anticoagulation. A total of 13% (130/1001) of patients required specialist MDT input to determine appropriateness for anticoagulation initiation. There was also a reduction in dual anticoagulation and antiplatelet therapy from 429 to 252 patients (41% reduction). Lastly of those reviewed, 2609 patients received a recommendation to start a statin for either primary (n=1981) or secondary prevention (n=628).

Conclusions: The provision of a specialist cardiovascular pharmacist supported a multidisciplinary workforce to significantly improve and optimise cardiovascular risk, and reduce the risk of stroke in this high-risk population for people with AF across all three boroughs. By extrapolating these results nationally, 3600 strokes could be averted over 18 months.

A pharmacist-led intervention to reduce the number of antibiotics missed doses in the paediatric ward of a tertiary hospital in Nigeria

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Introduction: Missed antibiotic doses are a serious medication problem. It poses immediate and future risks to patients.

Objectives: To assess the extent of missed antibiotic doses and carry out stepwise interventions to control it.

Methods: The Plan-Do-Study-Act (PDSA) method of introducing change was used: first, pharmacists performed medication check rounds on pediatric inpatients to ensure that they had a 24-hour supply of all ordered medications. The first cycle of intervention involved reminding caregivers daily to ensure that there is always a complete supply of antibiotics, based on feedback from the first cycle, a second intervention involved making antibiotics available for patients who can afford them at the moment and tagging their folders to ensure that they pay up before discharge was added.

Results: Medication therapy of 37 pediatric patients were monitored. In total, 1,286 antimicrobial doses were ordered. Before intervention 6.40 % missed doses were recorded, after the first cycle of PDSA, 4.46 % of doses were missed signifying a 30.3 % improvement. By the end of the second cycle, a 91.7 % improvement was recorded. Days of PDSA Interventions caused a significant decrease in the gradient of the percentage of missed antibiotic doses ($p = 0.038$).

Conclusions: PDSA method was effective in reducing missed antibiotic doses in pediatric in-patients.

Developing a total parenteral nutrition app learning platform improves the work efficacy and efficiency of TPN

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Introduction: Total parenteral nutrition dispensing is a profession but complex training. Due to the difficulty, the training willingness is low and the trained pharmacists self-evaluated that they are unable to handle the whole TPN dispensing independently.

Methods: The major reasons which account for over 50% to cause low training willingness and lack of confidence in handling TPN independently include: 1). unfamiliar with the dispensing machine and administrative activity 2). unable to implement sterile operation 3). lack of interdisciplinary care interaction. The mobile app platform includes diverse knowledge management and innovative education and has been developed after finding the root cause and TPN team consensus. Besides, the e-learning platform has become an important component in the post-pandemic era. The project execution steps are as follows. Step one: Categorise and diversify the platform contents which include dispensing skills, administrative processes, and knowledge. Implement the content and learning objective into the mobile game teaching mode. Step two: Understand the needs of trainees and develop training videos and electronic materials. Step three: Develop a zero-time-lapse communication platform between trainees and trainers. The performance evaluates the differences between the traditional learning mode and this project which includes dispensing skill, knowledge and self-satisfaction.

Results: Six trainees have participated in this project and the evaluation of results in this project versus the traditional learning mode are displayed below. 1). dispensing skills: the correctness of sterile dispensing is 99% vs 98% respectively; the dispensing efficiency has improved by decreasing 36% dispensing duration and 50% administrative process 2). professional training: the importance of attending interdisciplinary care has been elevated from 1.2 points to 4.12 points; self-satisfaction is evaluated in the following three aspects by the Likert scale: 1). if the app can fit your needs 2). strengthen your dispensing confidence and 3). how innovative this teaching mode is. Overall, the trainees are highly satisfied, and the score is 4.83, 5.00 and 5.00 separately.

Conclusions: This project has combined the profession of the interdisciplinary team and the needs of trainees to develop an integrated learning platform with easily and conveniently used. This helps to keep zero errors in sterile dispensing and makes TPN learning more interesting and livelier. Besides, the message board makes the zero-time-lapse communication between trainees and trainers. In summary, this platform has improved trainees' capability to work independently and think flexibly which makes TPN team collaboration smooth.

Patient satisfaction with pharmaceutical care service on self-injecting glucagon-like peptide-1 receptor agonists

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Introduction: Patients use self-injecting medications such as insulin and glucagon-like peptide-1 (GLP-1) receptor agonists to control their blood sugar levels. Because of the common gastrointestinal symptoms associated with the use of GLP-1 receptor agonists, physicians usually increase dosage gradually. Therefore, patients need to learn the skills of self-injection from healthcare providers to ensure an accurate and effective dosage. In the hospital where this study conducted, doctors can refer patients to the pharmacy's consultation counter when they prescribe self-injecting medications or other complicated prescriptions.

Objectives: As a result, we conducted this study on patients with GLP-1 receptor agonist referrals to understand their satisfaction with such referrals and pharmacists' service attitude as well as patients' improvement after education.

Methods: In total, 133 patients who had no prior experience with GLP-1 receptor agonist usage, were enrolled in the study from May 2021 to April 2022. After these patients received self-injection education from pharmacists, they or their caregivers filled out a questionnaire on their levels of satisfaction with their physician's referral and the pharmacist's service attitude. Additionally, a patient self-awareness survey was conducted to assess an individual's understanding of the injection's use, administration and precautions before and after receiving education. We used a five-point Likert-type scale in the questionnaires, with one representing "strongly dissatisfied" or "strongly unclearest" and five representing "strongly satisfied" or "strongly clearest".

Results: In all of the 133 patients, 125 used semaglutide (94.0%), seven used dulaglutide (5.3%) and one took liraglutide (0.8%). The average point of the patients' satisfaction level with referrals and with their pharmacist's service attitude was 4.8 and 4.9 points on the five-point Likert-type scale, respectively. As for realising uses of GLP-1 receptor agonists, the average point rose from 2.7 before education to 4.8 points. Furthermore, the levels of understanding about the medication's administration and precautions both increased from 1.9 to 4.8 points.

Conclusions: Pharmacists can contribute to the safe and correct use of self-injecting GLP-1 receptor agonists through pharmaceutical care services.

The medicine information helpline - a patient safety initiative established by the hospital pharmacy in the capital region of Denmark

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Introduction: Many healthcare professionals (HCPs) experience limited time in their daily practice to search for and keep updated on new medicine information. The transition from hospitals to private homes is known to challenge patient safety. In particular, when patients are discharged to primary care with medicine restricted to hospitals it may lead to insecurities around medicine management for both patients and HCPs. Thus, there is an increasing need for medicine counselling aimed at HCP in primary care, and the Medicine Information Helpline (MIH) was established to provide hospital-based medicine information.

Objectives: The aim of this study is to evaluate the satisfaction of the HCPs in primary care with the MIH service, including its relevance and applicability in their daily practice and on patients' specific treatments. Furthermore, based on the HCPs evaluation, the clinical impact of the MIH on patient safety is assessed.

Methods: The MIH was established as a part of the Medicine Information Centre managed by hospital pharmacists in the Capital Region of Denmark. HCPs in primary care (e.g. rehabilitation centres, nursing homes) in the Capital Region of Denmark were offered access to the MIH where they could raise drug-related inquiries. A validated questionnaire was subsequently sent electronically using SurveyXact to the inquirers. Data were collected from April 2020 until April 2022 and were analysed using Excel 2008.

Results: A total of 489 inquiries were answered by the MIH and altogether 112 questionnaires were randomly distributed with a response rate of 66% (n=74). Generally, the respondents were all satisfied with the MIH and found the information provided relevant to a high- or a very high degree. In total, 93% (n=69) of the respondents could apply the answers from the MIH in their daily practice to a high- or a very high degree and 78% (n=58) were able to apply the answer provided by the MIH directly to a specific treatment. Further, 55% (n=41) expressed that the answer had a positive impact on a specific treatment, while 22% (n=16) thought it had no impact and 23% (n=17) were uncertain whether the answer had an impact. The impact on patient safety showed that 68% (n=50) believed that the answer positively influenced patient safety, whereas 17% (n=13) thought it did not and 15% (n=11) were uncertain whether the answer had an impact.

Conclusions: High satisfaction with the MIH service was observed amongst HCPs in primary care and the MIH was proven to provide relevant and highly applicable medical information. The MIH improves patient safety and plays a crucial part in supporting the patients' transition between hospital and primary care. Implementing the MIH at a national level can positively support patients' safe medication.

Assessment of patient satisfaction with pharmaceutical services in two tertiary health facilities in rivers state, Nigeria

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Introduction: Measures of patient satisfaction are used to compare healthcare programs, evaluate the quality of care to know which aspects of a service need improvement and assist organisations in identifying which consumers are likely to unroll.

Objectives: This study aims to assess the level of patient satisfaction with hospital pharmaceutical services in the two tertiary health facilities in Rivers State.

Methods: A descriptive cross-sectional study was conducted at the various pharmacy units at the health facilities between September and October 2020. Qualitative data was collected using structured self-administered questionnaires. A total of 200 patients from each of the two tertiary health facilities participated in the study.

Results: The study showed that the majority of the participants (34% and 64%) at the Rivers State University Teaching Hospital (RSUTH) were either very satisfied or satisfied with pharmaceutical services while 36.5% and 43.5% showed a varied level of satisfaction with care by pharmacists. At the University of Port, Harcourt Teaching Hospital (UPTH) those that reported satisfaction were 37% and 57.5% for the very satisfied and satisfied respectively for pharmaceutical services while it was 38% and 36% respectively for the very satisfied and satisfied with pharmaceutical care rendered by the pharmacists at the facility. However, there was no statistically significant difference in the satisfaction profile at the two facilities ($p < 0.05$).

Conclusions: This study concludes that the majority of patients assessing the two tertiary health facilities were either very satisfied or satisfied with the pharmaceutical services and care rendered by Pharmacists.

The study recommends that similar studies be conducted to assess patient satisfaction at secondary and primary healthcare facilities.

Development of a strategic plan for a hospital pharmacy department

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Introduction: Strategic planning is one of the most common types of planning conducted by healthcare organisations. Hospital pharmacy departments that perform strategic planning have been shown to have a higher number and quality of clinical pharmacy programs, with hospital administrators having greater satisfaction with the department.

Objectives: To describe the strategic planning process used by a pharmacy department at a 465-bed tertiary care, academic teaching hospital and the resultant strategic plan.

Methods: A consultant specialising in strategic planning for health system pharmacy departments was used to assist with the process. A survey was initially sent to all members of the department. Based on the results of the survey, the strategic plan was developed over three planning sessions, with representation from all major groups in the department.

Results: A three-year strategic plan was developed for the pharmacy department. In addition to new vision and mission statements, the plan contains five strategic priorities – developing a unified department culture; ensuring that the department's practice model continues to be relevant, efficient, innovative and sustainable; building the department's informatics and technology capabilities; advancing the department's leadership role in medication-related quality initiatives; and improving pharmacy technician recruitment, retention and professional development. Each of these strategic priorities has multiple strategic directions and objectives.

Conclusions: A contemporary strategic plan was developed for the pharmacy department which will provide direction in realising key priorities.

Initial implementation and evaluation of an intervention to improve the review of antibiotics in Scottish acute care hospitals

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Introduction: Reviewing antibiotic prescriptions to investigate their ongoing need is key to antimicrobial stewardship. Interventions focused on the review of antibiotics have been found to be effective in acute care hospitals. In Scottish acute care hospitals, a rise in the use of antibiotics, driven by intravenous (IV) antibiotic use, led to the introduction of the Hospital Antibiotic Review Programme (HARP) by the Scottish Antimicrobial Prescribing Group (SAPG). HARP is aimed at providing educational tools to support IV antibiotic review, documentation of antibiotic duration and quality improvement projects.

Objectives: The aim of this study was to evaluate the feasibility and acceptability of HARP, following early implementation in one case site.

Methods: A qualitative study was conducted through semi-structured online (video) interviews with four National Health Service (NHS) staff that implemented HARP in one NHS Scotland Board between the end of 2020 and early 2021, despite the

impact of the coronavirus (COVID-19) pandemic. An interview topic guide was used to explore, from the perspectives of interviewees (implementers), factors that impede or enhance the implementation of HARP. Interviews were audio-recorded and transcribed. The data was managed with NVivo software and analysed thematically through an inductive process, followed by post hoc interpretation with theoretical frameworks from implementation science.

Results: Following the initial implementation of HARP in one Board, the major themes identified from the data revealed key insights into the workability of HARP. HARP implementation is impacted by the capacity to 'conceptualise what review of antibiotics involves and its processes'; the provision of 'resources and structures for HARP implementation'; and 'the influence of culture and an understanding of the processes involved in creating a behaviour change'. Some specific barriers to implementing HARP in the case site include competing priorities with other initiatives, as well as a potential lack of confidence in the process of review. Conversely, facilitators to the implementation of HARP include the national influence of SAPG and autonomy to adapt aspects of HARP to different clinical contexts.

Conclusions: National implementation of HARP was stalled due to the COVID-19 pandemic. However, the findings gathered from the initial implementation of HARP in one case site should provide useful insights to guide the adaptation of HARP for future rollout nationally. The findings of this study highlight the complexity of the implementation process of intervention strategies to enhance the review of antibiotics in Scottish acute care hospitals. This study was conducted in one Scottish Health Board where HARP was implemented and does not provide national insights into the implementation of HARP. Useful insights into the impact of the COVID-19 pandemic on overall antimicrobial stewardship (AMS) in Scottish hospitals have been gathered alongside, in a separate study. The findings from both studies will be useful in aiding future pandemic preparedness and ensuring the resilience of AMS programmes in times of crisis.

Severity of medication administration errors in a teaching hospital in Brazil

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Introduction: The degree and nature of harm associated with medication errors differ among low-, middle-, and high-income

countries. However, epidemiological data on the occurrence of medication errors and, above all, on their severity, are scarce in Latin American countries.

Objectives: Assess the potential severity of administration errors identified by direct observation in a university hospital.

Methods: The study followed the methodology used by Barber and Dean (1999) and Taxis (2004) to assess the potential severity of errors. The survey used a 10-point scale, where 0 = no harm to the patient and 10 = death of the patient. This scale was validated for Brazil using generalisability theory, which allowed the authors to conclude that the potential severity attributed by at least four professionals is considered valid and reliable.

A prospective observational study⁴ using disguised direct observation of medication administration identified 203 medication administration errors. In the present study, these errors were organised according to similarity; similar errors were described only once in a list of cases, totalling 67 errors. This list was assessed in terms of severity by four professionals (a physician, a nurse, and two pharmacists) working in the hospital area and with more than three years of experience in the clinical area. An average score was calculated for each of the 67 medication administration errors considering the scores assigned by the four judges. This score was used as a severity index. Errors with severity index three were considered mild; those between three and seven, moderate; and above seven, severe. The same score was assigned to errors considered similar, and the severity of the 203 errors initially identified was analysed at the end.

Results: Professionals classified the potential clinical significance of errors as mild in 8.8% (18), moderate in 82.8% (168), and severe in 8.4% (17) of cases. The mean potential severity score was 5.2 (minimum score 2.6 and maximum score 7.7; SD 1.2).

Most of the errors considered potentially serious (41%, 7 errors) were technical errors. Meanwhile, 18% were errors of omission, dose, and extra dose (three errors of each type), and one error of unprescribed dose. According to Anatomical Therapeutic Chemical (ATC) category, potentially serious errors involved medications for the alimentary tract and metabolism (29%), systemic use (29%), blood and forming organs (24%), respiratory system, cardiovascular system, and nervous system (6% each). Insulin was the medication most involved in potentially serious errors (two doses, two omissions, and one technique error). As for the route of administration, nine potentially serious errors (53%) involved medications administered intravenously, five (29%) administered subcutaneously, and three (18%) administered orally. One of the cases assessed required the intervention of the observer, being classified as potentially serious (severity index >7)

Conclusions: Most errors were classified as potentially moderate in terms of severity. However, the frequency of errors considered potentially serious was higher than that found in previous studies using the same methodology, which highlights the need for a better understanding of the causes of these errors and strategies to reduce their occurrence.

Analysis of anticholinergic burden and influencing factors in elderly patients

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Introduction: In a study on caution drugs for the elderly, anticholinergic drugs are mentioned as typical drugs to be noted, is because this drug is widely used because of their various efficacy and indications, and even if the strength is low, the side effects may increase due to the cumulative effect.

Objectives: The purpose of this study was to investigate the anticholinergic burden in VHS patients and to analyze the factors influencing the anticholinergic burden.

Methods: The target patients were 20,332 outpatients from May 1, 2020, to July 31, 2020, who had a disease corresponding to the Charlson comorbidity index score. A retrospective analysis was performed based on electronic medical records. For technical statistical analysis, mean and standard deviation (SD) are calculated, and multivariate analysis is performed by Ordinal logistic analysis to investigate predictors of overexposure to anticholinergic drugs. For the evaluation of anticholinergic burden, the average daily Anticholinergic Risk Scale was calculated and compared using the ARS. The daily average ARS was obtained as the three-month average of the who-DDD value divided by the drug's dose multiplied by the ARS value of each drug. The Odds ratio and 95% confidence interval were calculated. When the p -value < 0.05 , the result was considered to be statistically significant.

Results: The average daily anticholinergic risk scale (ARS) of the patients studied was 0 points 11,456 (63.2%), more than 0 points less than 1 point 3,236 (17.8%), and one point or more and less than two points 1,552 patients (8.5%), 2 points or more were 1,878 (10.5%), and the average daily ARS was 0.47 points (SD ± 0.924). As a result of multivariate regression analysis on the risk of increasing anticholinergic burden, age, CCI, and multi-drug use (excluding drugs on the anticholinergic list) are factors that influence. The most frequently prescribed drug was amitriptyline with 2,358 cases. However, when considering the anticholinergic contribution by considering the number of anticholinergic drugs, WHO-DDD, prescription dose, and period, cetirizine received the highest score of 1889.2 points. As a result of classification by WHO ATC code, among anticholinergic drugs, the Nervous system (ATC code N) accounts for more than half the total.

Conclusions: The anticholinergic burden in veterans hospital patients was more than twice as high as in other similar studies. The anticholinergic burden was higher at the age of 85 years or older, the CCI score of three or higher, and the polypharmacy (six medicines or more).

Development of hospital pharmacy services at the transition of care points: A scoping review

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Introduction: Medication errors are defined as errors that can lead to an adverse drug event (ADE) or harm to the patient. One out of ten hospitalised patients experiences an ADE during his stay and it is estimated that the healthcare system incurs \$42 billion in costs annually due to medication errors. One way to prevent medication errors and increase medication safety is to provide pharmaceutical services. At each transition of care point, the patient's medication should be identified, reviewed, and, if necessary, changed to avoid medication errors and to provide the best possible treatment.

Objectives: This scoping review aims to summarise different hospital pharmacy services at the transition of care points to identify development trends and practice patterns in high-income countries over the past decade.

Methods: A literature search of four databases (PubMed, PubPharm, Cochrane Library (Ovid) and ScienceDirect) was conducted. An extensive search strategy was developed and refined with the help of a librarian. The search was limited to original studies, randomised controlled trials and systematic reviews published in the English language since 2011 in developed countries. To ensure quality and eliminate bias, title, abstract, and full-text selection was completed by two researchers independently using inclusion and exclusion criteria in accordance with the PICO framework as defined by the study protocol. Discrepancies were discussed and resolved with the help of a third independent researcher. The study was reported in accordance with the PRISMA-ScR items to ensure quality standard reporting.

Results: Out of 5734 studies screened, 69 were included in the final data analysis. Studies mainly originated from North America (n=30), Europe (n=30) and Australia (n=8). American studies primarily focused on medication review and medication reconciliation during discharge activities (n=10). The peak of which was in 2015. Nowadays research publications tend to report on the development, implementation and evaluation of interdisciplinary transition of care teams (TOC) (n=6). European studies have focused primarily on medication reconciliation on admission (n=14) with a peak in 2016. Research publications suggest a shift towards best possible medication history (BPMH) carried out by a variety of healthcare professionals (n=16). Australia shows a diverse publication pattern with a focus on medication reconciliation at multiple interfaces (n=4) and no observable single focus. By far the most common hospital pharmacy service reported in the literature overall focused on admission into hospital (n=49).

Conclusions: Research reporting of hospital pharmacy services across first-world countries seems to reflect a different professional development trend for each continent. Hospital pharmacy services are not yet able to uniformly input into the transition of care points, highlighting the significant scope for improvement towards eliminating avoidable harm in Health Care by 2030.

Compliance in clinical trials: The oncology patient experience

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Introduction: The degree of adherence and the effectiveness of treatments are directly related. In the case of clinical trials (CT), adherence plays a more important role since the objective is to evaluate the effectiveness of a new regimen or molecule.

Objectives: The aim is to evaluate the compliance of the patient attending the oral medication dispensing consultation included in a clinical trial.

Methods: Retrospective and observational study carried out between April-May 2022, in oncological and oncohematological patients attending the clinical trials unit of a tertiary level hospital. The variables collected were: type of clinical trial, pathology, date of dispensing and return, drug, dose, the amount returned, and reasons for non-adherence. To calculate adherence, the accounting module of the Fundanet application was used, and the date of dispensing and return with the quantity was recorded; on the other hand, the patient had to perform the Morisky-Green test. The programs used were: Excel for data collection, Fundanet for CT management and accounting, and SAP for clinical history. Major discrepancies were reported to the principal investigator (PI) of the clinical trial.

Results: Adherence was evaluated in 31 patients. Patients from five different clinical CDs (two oncohematologic and three oncologic) were collected. The pathologies collected were: multiple myeloma, myelofibrosis, ovarian cancer, breast cancer and glioblastoma. A total of 77.4% of the patients were adherent to the clinical trial drug. The main reasons for non-adherence were: 70.4% toxicity to the drug and 29.6% occasional forgetfulness. A total of 93.5% stated that they took their medication at the same time and that this favoured adherence.

Conclusions: Oncology and oncohematology patients have a high level of adherence to clinical trial treatment. It is necessary to continue promoting good medication adherence and therefore the role of the pharmacist in clinical trials is essential.

Use of a standardised patient-controlled analgesia (PCA) order form in opioid-naïve patients with oral mucositis

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Introduction: Oral mucositis following a hematopoietic stem cell transplant (HSCT) often requires acute pain management with patient-controlled analgesia (PCA). PCA, if not prescribed appropriately, can be associated with opioid-related adverse effects. The Institute for Safe Medication Practices recommends the use of standardized order forms to help ensure appropriate prescribing of PCA, although little data exists regarding the impact of standardized PCA order forms on improving patient safety.

Objectives: The aim of this study was to determine if a newly implemented PCA order form for opioid-naïve patients would be associated with a decrease in PCA-related adverse events without compromising pain management in patients with oral mucositis.

Methods: In this institutional review board-approved, single-centre, retrospective cohort study, patients were included if they were adults admitted for HSCT and opioid-naïve when ordered PCA for oral mucositis pain. Patients admitted between 6/2020-3/2021 were included in the pre-order form group (pre-group), while patients admitted between 4/2021-1/2022 were included in the post-order form group (post-group). The primary outcome was the incidence of adverse events (naloxone administration, oversedation, respiratory rate <12 breaths per minute or oxygen saturation [SpO₂] <90%) within the first 24 hours of PCA administration. The secondary outcome was the frequency of inadequate pain management, as indicated by PCA dose increases within the first 24 hours. Statistical analysis was done using Chi-squared or Fisher's exact tests.

Results: A total of 93 patients were included (pre-group: N=47; post-group: N=46). Baseline characteristics were similar between groups, except for female gender (pre-group: 63.8%, post-group: 43.5%, $p = 0.05$) and concurrent use of antidepressants (pre-group: 21.3%, post-group: 4.4%, $p = 0.03$). Hydromorphone was the PCA medication prescribed in 53.2% of patients in the pre-group vs. 39.1% of patients in the post-group ($p = 0.17$).

Appropriateness of initial PCA dosing increased from 14.9% in the pre-group to 41.3% in the post-group ($p = 0.005$). The major factor contributing to inappropriate PCA dosing in both groups was the inclusion of a basal rate (pre-group: 72.3%, post-group: 54.4%). No differences in adverse events were observed in the pre- and post-groups (oversedation: 6.4% vs. 4.4%, $p = 1$; SpO₂ <90%: 2.1% vs. 4.4%, $p = 0.62$). No patients developed respiratory depression or were administered naloxone. PCA dose increases were required in 42.6% of patients in the pre-group and 13% of patients in the post-group ($p = 0.002$).

Conclusions: For patients with oral mucositis following HSCT, a PCA order set for opioid-naïve patients was not associated with decreased incidence of adverse events. Pain management did not appear to be compromised, as fewer patients in the post-group compared to the pre-group required PCA dose increases. We observed a low incidence of opioid-related adverse events in this patient population and a larger study may be indicated to confirm the results.

Impact of a standardised patient-controlled analgesia (PCA) order form on adverse drug events in opioid-naïve post-operative patients

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Introduction: Patient-controlled analgesia (PCA) carries a risk of accidental opioid-related intoxication and overdose. Use of standardised order forms may help to improve the safety of PCA by reducing potentially inappropriate dosing, although little data exists to support this.

Objectives: We aimed to determine if the implementation of a standardized PCA order form in opioid-naïve, post-operative patients would be associated with a lower incidence of PCA-related adverse events.

Methods: We conducted an institutional review board-approved, single-centre, retrospective cohort study of opioid-naïve patients who were admitted for surgery and received PCA for post-operative pain either before implementation of the order form (June 2019–November 2019) or after the order form (June 2021–November 2021). Patient demographics and PCA prescriptions were recorded. The accepted PCA dosing range was defined based on the minimum frequency and maximum dose recommended on the PCA order form. The primary outcome was the incidence of adverse events (respiratory rate <12 breaths/minutes, oxygen saturation <90%, signs of over-sedation by standardised cognitive assessment, or naloxone administration) within the first 24 hours. The secondary outcome

was inadequate pain management defined by the need for PCA dose increases within the first 24 hours. Statistical analysis was done using Chi-squared or Fisher's exact tests.

Results: 129 randomly selected patients who met the inclusion criteria were included in the study (pre-form: $n=65$; post-form: $n=64$). Baseline characteristics of patients were similar, except for mean age (pre-form: 62.1 years; post-form: 67.4 years; $p = 0.02$). Hydromorphone was the most frequently prescribed PCA medication in both groups (pre-form: 87.7%; post-form: 93.8%; $p = 0.36$). PCA orders were within the accepted dosing range in 26.2% of patients in the pre-form group compared to 81.3% in the post-form group ($p < 0.0001$). Over-sedation was observed more frequently in the pre-form group than the post-form group (24.6% vs. 11%, $p = 0.042$). There was no difference between groups for other adverse events or the need for PCA dose increases.

Conclusions: In opioid-naïve, post-operative patients, implementation of a PCA order form was associated with increased compliance with dosing recommendations and a lower incidence of over-sedation with no difference in inadequate pain management. The use of a standardised PCA order form for opioid-naïve patients is recommended to help reduce the risk for opioid-related adverse events.

Exploration and practice of doctor-pharmacist cooperation in antimicrobial therapy for gynecologic oncology patients after surgery

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Objectives: To sort out the characteristics of antimicrobial therapy for gynecologic oncology patients after surgery by showing the practical experience and cases of the doctor-pharmacist corporation.

Methods: Take examples from aspects of drug selection, optimization of dose/frequency, therapeutic drug monitoring, and management of adverse drug reactions, and make an in-depth analysis.

Results: In an ovarian cancer patient with pelvic lymphocyst complicated with infection and diarrhoea after surgery, the doctor made the decision on diagnosis and comprehensive treatment, and the clinical pharmacist assisted the doctor in adjusting antibiotics, analysing the cause of diarrhoea and managing the symptoms; in a cervical cancer patient with pelvic infection after surgery, the doctor promptly performed surgical operations such as dilation of the vaginal stump and drainage, and the clinical pharmacist assisted the doctor in adjusting antibiotics, performed therapeutic drug monitoring, and optimizing the treatment plan, reflecting the roles of pharmacy services in antimicrobial treatment.

Conclusions: The model of doctor-pharmacist cooperation in antimicrobial therapy for gynecologic oncology patients after surgery allows doctors and pharmacists to better play their roles and optimise treatment outcomes.

Implementing pharmacists and medicines management technicians in a remote pre-assessment service at a large tertiary centre: A quality improvement project

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Introduction: 40% of medication errors are caused by incomplete or inaccurate medication reconciliation, particularly during transfers of care. It is well known that the pharmacy team reduce these errors by conducting detailed medication histories and reconciliation. In the authors' organisation, patients undergoing elective surgery have medication histories conducted as part of face-to-face pre-assessment appointments by nurses. During the coronavirus pandemic, the majority of pre-assessment appointments became remote telephone consultations. A recent audit showed that 75% of these medication histories only had drug names rather than doses, frequencies and formulations hence leading to inpatient prescribing errors and discrepancies in discharge 'to-take-away' prescriptions (TTAs). As such, we created a quality improvement project to improve the documentation of medication histories at the pre-assessment stage.

Objectives: This project aimed to improve documentation of medication histories at pre-assessment of patients undergoing elective urology surgery to reduce work duplication and inpatient and discharge prescription discrepancies.

Methods: Two plan-do-study-act (PDSA) cycles were designed with stakeholders based on the Capability-Opportunity-Motivation-Behaviour (COM-B) model and carried out to

improve the percentage of fully documented medication histories for urology patients on regular medication attending the pre-assessment clinic. The interventions included:

1. Medication histories conducted via telephone by the pharmacy team before the pre-assessment clinic.
2. Training the pharmacy team on how to correctly document medication histories on the electronic health record system (EHRS).

Data was collected retrospectively at baseline and after each PDSA cycle and analysed for the percentage of fully documented drug histories, the percentage of TTA discrepancies and the percentage of drug histories conducted by pharmacists or MMT. Run charts were used in order to analyse special-cause variation for process and outcome measures.

Results: At baseline, the pharmacy team conducted 13% of pre-assessment medication histories. This increased to 51% after PDSA cycle 1 and 39% after PDSA cycle 2. A total of 75% of drug histories conducted by the pharmacy team were fully documented after PDSA cycle 1, and 70% after PDSA cycle 2, showing a decrease compared to a baseline of 92%.

The first intervention showed an improvement as 49% of medication histories were fully documented, compared to 25% at baseline. The second PDSA cycle did not have a significant impact on process or outcome measures and 47% of drug histories were fully documented. The percentage discrepancy rate of TTAs went from 62% at baseline to 51% and 54% after PDSA cycles 1 and 2, respectively, showing a non-significant improvement. Feedback was obtained from pre-assessment nurses, which highlighted that nurses could not access pharmacy-conducted drug histories and so duplicated work, and drug histories were reverted to incomplete documentation. This has formed the basis of this study third PDSA cycle.

Conclusions: Whilst the objectives have not been met, preliminary results show improvement in the percentage of fully documented medication histories conducted remotely by pharmacy teams. Future PDSA cycles include 'triaging' medication histories and prioritising patients with complex needs, as well as optimising technology to allow pre-assessment nurses to access medication histories conducted by the pharmacy team.

Case study of an elderly patient whose quality of life (QoL) improved as an indirect result of the pharmacist's participation in the multidisciplinary care team to protect patient safety

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Introduction: The ageing of the population is an issue confronting countries around the world. It is a challenge to determine an appropriate treatment plan while trying to maintain or improve the quality of life (QoL) of chronic-phase patients, who often also have reduced activities of daily living (ADL). Japan has the fastest ageing population in the world. The authors' hospital specialises in chronic care, and the hospital strive to continuously improve chronic care management in reference to their abundant experience in the field. Multidisciplinary team meetings on the handling of long-term inpatients are still rare in Japan, although such an approach is commonly applied to perioperative care and discharge support. This abstract presents a case to demonstrate the beneficial effect of the participation of a pharmacist in multidisciplinary meetings on the treatment of a post-stroke patient with chronic kidney disease.

Methods: The patient was a man in his 80s. He was transferred to the hospital with aphasia, left hemiplegia, and a depressed level of consciousness (E3V2M5) after 3 months of treatment for acute intracerebral haemorrhage. Each member of the multidisciplinary care team submitted a treatment plan from the viewpoint of their discipline. At a joint meeting, the physician said that dialysis is indicated based on kidney function, which was considerably impaired. However, the social worker reported that the patient and his family had declined possible dialysis. To preserve the patient's renal function, the physician, pharmacist, and nutritionist cooperated to adjust the doses, frequency, and timing of administration of drugs and the content, timing, and rate of enteral nutrition. The pharmacist was assigned to monitor laboratory test values against the patient's clinical condition to ensure his safety.

Results: Dose and frequency adjustment was completed by 2 weeks after the joint conference, and the patient's condition soon stabilised to allow regular hospital treatment. Although the patient continued to need full assistance, his condition improved to the extent that he could be moved from the bed to a wheelchair and have pureed meals.

Conclusions: This case highlights the participation of a pharmacist in the multidisciplinary care team, which significantly contributed to improving the QoL of a chronic-phase patient. Pharmacists can ensure patient safety by monitoring laboratory test values against the patient's clinical condition to support the improvement of patients' QoL.

Guselkumab in moderate-severe psoriasis: An effectiveness assessment

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Introduction: Guselkumab is a human IgG1 λ monoclonal antibody that binds selectively to the IL-23, a regulatory cytokine, and affects the differentiation, expansion, and survival of T-cell subsets and innate immune cell subsets, which represent sources of effector cytokines.

Objectives: To evaluate the effectiveness of guselkumab at week 12 in a cohort of patients with moderate-severe psoriasis. As a secondary objective, to compare such effectiveness according to the treatment line received.

Methods: Observational, retrospective study (June 2019 - April 2021) conducted in a tertiary-level hospital. Patients were included with guselkumab for 12 weeks.

Variables collected: baseline population characteristics (age and sex), psoriatic arthritis comorbidity, previous biologic treatments (including apremilast), dosage, treatment discontinuation, reason and duration.

To measure effectiveness, the psoriasis area severity index (PASI) and dermatologic life quality index (DLQI) were collected at week 0 and week 12. The variables to measure response were PASI75 and PASI100 at week 12.

Patients were divided into two groups according to the treatment line received: 2nd/3rd line and successive lines.

Data were obtained from the electronic prescription program (PEA) and electronic medical records (Altamira). Statistical analysis was performed with the SPSS program. Fisher's test was used to compare the relationship between PASI75 and PASI100 response versus the treatment line. A $p < 0.05$ was taken as a statistically significant relationship.

Results: A total of 22 patients were included, with a median age of 57 years (23-84), predominantly male (68%). 27% (6) of the patients had psoriatic arthritis as a comorbidity and the median number of previous treatments was four (2-8). Exactly 91% (20) of the dosages were according to the summary of product characteristics and in the rest of the patients, the dosage was intensified.

In terms of effectiveness, PASI data were obtained in 13 patients, which decreased from 9.3 ± 6.3 at week 0 to 3.6 ± 5.4 at week 12, corresponding to a 61% decrease. For these patients, 58% (7) achieved PASI75 at week 12 and 38% (5) PASI100. Concerning DLQI, data were obtained in ten patients and decreased from 11.5 ± 6.3 to 1.7 ± 2.8 , representing a reduction of 85%.

At the end of the study, 36% (8) of patients had discontinued treatment [23% (5) due to lack of effectiveness and 13% (3) due to adverse effects (itching, diarrhoea and suspected inflammatory bowel disease)] after a median duration of 25 weeks (4-53).

In terms of treatment line, 13 patients with response data were analysed, 46% (6) were on guselkumab as the 2nd/3rd line and 54% (7) as successive lines (4th-8th line), with no statistically significant differences between groups in terms of PASI75 and PASI100 at week 12 ($p = 0.5921$ and $p = 0.5921$, respectively). According to eight patients who had discontinued treatment, 50% were taking the drug as the 2nd/3rd line and 50% as successive lines.

Conclusions: A third of patients treated with guselkumab discontinued treatment. Although it appears to be an effective alternative in clinical remission and improvement of quality of life, further studies are required to assess which factors may affect such effectiveness. It is also encouraging that guselkumab is an effective option in multi-treated patients.

Effectiveness and safety of mepolizumab in the treatment of severe eosinophilic asthma

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Introduction: Mepolizumab is a humanised monoclonal antibody (IgG1, kappa), that targets human interleukin-5 (IL-5) with high affinity and specificity. IL-5 is the major cytokine responsible for the growth and differentiation, recruitment, activation and survival of eosinophils.

Objectives: To analyse the effectiveness of mepolizumab in patients with severe eosinophilic asthma.

Methods: Retrospective, observational, single-centre study. Adult patients with severe eosinophilic asthma treated with mepolizumab were included (January 2017 - April 2021).

Descriptive variables collected: age, sex, body mass index (BMI) and comorbidities (obesity, smoking, nasal polyposis, and rhinitis). In addition, previous biological treatments and concomitant treatments were recorded.

Effectiveness variables: number of asthma exacerbations, forced expiratory volume in the first second (FEV1), forced vital capacity (FVC), blood eosinophils and concomitant treatment with oral glucocorticoids were recorded in the previous and subsequent years. Treatment discontinuation, the reason for discontinuation and duration were also recorded.

To analyse safety, adverse effects (AE) during treatment were collected.

Data were obtained from the electronic prescription program (PEA) and electronic medical records (Altamira).

Results: 17 patients were analysed, with a median age of 59 years (29-69) and 10 were women. The mean BMI was 28.1 ± 6.0 kg/m², with 23% (4) obese patients. Only 6% of the patients (1) were active smokers and 18% (3) were ex-smokers. Nasal polyposis was present in 29% (5) of the patients and 53% (9) had rhinitis. In addition, 41% (7) of the patients had received omalizumab as prior biologic therapy and all were receiving long-acting beta-2 agonists plus inhaled glucocorticoids chronically at baseline.

In terms of effectiveness, annual asthmatic exacerbations were reduced from 2 (0-5) to 1 (0-3). Regarding FEV1 and FVC values (data were obtained from 15 patients), both decreased from 68.0 ± 15.4 % to 65.5 ± 14.8 % and from 90.7 ± 17.5 % to 84.6 ± 17.2 %, respectively. Blood eosinophils value decreased from 0.4 ± 0.3 to $0.1 \pm 0.2 \times 10^9/L$. When analysing oral glucocorticoids, 3 of 6 patients receiving them at the start of mepolizumab treatment decreased the dose and 1 patient managed to withdraw them.

With regard to safety, 12% (2) of the patients showed AE: eczema and fever after administration, without leading to drug withdrawal in any of the cases.

At the end of the study, 29% (5) of the patients had discontinued treatment due to lack of effectiveness after a median of 13 months (11-36). The median duration for the remaining patients was 31 months (13-51).

Conclusions: Although treatment with mepolizumab in severe eosinophilic asthma leads to a reduction in exacerbations and a decrease in the use of oral glucocorticoids, no improvement in clinical parameters is observed in this study. Therefore, further studies are required to demonstrate its effectiveness. Concerning safety, the frequency of AE is low, without leading to drug discontinuation, and it is considered a safe drug.

Benralizumab effectiveness in patients with severe eosinophilic asthma

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Introduction: Benralizumab is an anti-eosinophil, humanised afucosylated, monoclonal antibody (IgG1, kappa). It binds to the alpha subunit of the human interleukin-5 receptor (IL-5R α) with high affinity and specificity.

The IL-5R α is specifically expressed on the surface of eosinophils and basophils. The absence of fucose in the Fc domain of benralizumab results in a high affinity for Fc γ RIII receptors on

immune effector cells such as natural killer (NK) cells. This leads to apoptosis of eosinophils and basophils which reduces eosinophilic inflammation.

Objectives: Analyse safety, and adverse effects (AE) during treatment with Benralizumab in patients with severe eosinophilic asthma in a tertiary hospital.

Methods: Retrospective, observational, single-centre study. Adult patients with severe eosinophilic asthma treated with benralizumab were included (December 2018 - April 2021).

Descriptive variables collected: age, sex, body mass index (BMI) and comorbidities (obesity, smoking, nasal polyposis and rhinitis). In addition, previous biologic treatments and concomitant treatments were collected.

Effectiveness: asthma exacerbations, hospital admissions, forced expiratory volume in the first second (FEV₁), forced vital capacity (FVC), blood eosinophils and concomitant treatment with oral glucocorticoids were recorded in the previous and subsequent years, as well as treatment interruption, reason and duration.

To analyse safety, adverse effects (AE) during treatment were collected.

Results: Ten patients, median age of 60 years (40-80) and seven women were analysed. The mean BMI was 28.2±6.5 kg/m², in three obese patients. One patient was an ex-smoker, three patients had nasal polyposis and four had rhinitis. Three patients had received two previous biologic treatments (omalizumab and mepolizumab/reslizumab) and all were receiving long-acting beta2-agonists plus inhaled glucocorticoids. Three patients were receiving oral glucocorticoids.

Effectiveness, annual asthma exacerbations were reduced from 2.5 (0-5) to 1 (0-4). Three patients required hospital admission in the year before benralizumab and two patients required hospital admission during treatment with benralizumab. FEV₁ and FVC values (data from eight patients) increased from 80±24% to 94.6 ±21.3% and from 94.5 ±25.4% to 107.4 ±18.2%, respectively. Blood eosinophils decreased from 0.6 ±0.4 to 0 ±0.1 × 10⁹/L. Two patients of three decreased oral glucocorticoid dose and another one discontinued them during benralizumab treatment. One patient had to start oral glucocorticoids at a low dosage during treatment.

Safety, four patients presented AE: facial dermatitis and folliculitis, skin rash, oesophageal discomfort and arthralgias, none AE led to drug withdrawal.

At the end of the study, two patients discontinued treatment with benralizumab due to lack of effectiveness after 6 and 11 months of treatment. The median duration in the remaining patients was 22 months (13-28).

Conclusions: Treatment with benralizumab in severe eosinophilic asthma is an effective and safe alternative which improved pulmonary function, reduced asthma exacerbations and reduced the use of oral glucocorticoids. Larger studies are needed to have more conclusive data on the effectiveness of benralizumab and to evaluate its efficiency versus other alternatives.

The trend of carbapenem utilisation in community-onset urinary tract infections in hospitalisation and the risk factor analysis for mortality: A study using the Taiwan national health insurance research database from 1997 to 2012

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Introduction: In recent years, there has been an increasing trend of antibiotic resistance in community-onset urinary tract infections. In hospitalised patients with extended-spectrum β-lactamase strain infection, carbapenem is the drug of choice as definitive therapy.

Objectives: To ascertain whether there is an increase in the temporal trend of carbapenem utilisation in community-onset urinary tract infection in Taiwan which would suggest the emergence of multidrug-resistant pathogens and explore possible mortality risk factors.

Methods: This study used the National Health Insurance Research Database in Taiwan from 1997 to 2012 to identify carbapenem use in hospitalised patients with community-onset urinary tract infections. Non-carbapenem users were selected in a 1:10 ratio to a matched control group. This study performed a case-control study to compare the comorbidity and mortality of these groups.

Results: This study found the carbapenem user in community-onset urinary tract infections with hospitalization increased rapidly after 2003. Furthermore, diabetes mellitus, cerebrovascular disease or peripheral vascular disease of underlying comorbidities and beta-lactam or fluoroquinolone use were associated with carbapenem use during hospitalisation. Carbapenem use was independently associated with day 90 mortality after adjusting for other confounding factors (adjusted hazard ratio [HR], 2.09; 95% confidence interval [CI] 1.18-3.73). Other risk factors included cancer (adjusted HR, 2.03; 95%CI 1.23-3.33).

Conclusions: This nationwide study confirmed the increased temporal trend of carbapenem utilization and that the use of more carbapenem cannot be avoided. The higher mortality of the carbapenem-treated cohort after discharge is a challenge to health professionals.

Comparing adverse drug reactions on TB regimens: A case study in KZN, South Africa

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Introduction: Treatment outcomes for multidrug-resistant tuberculosis (MDR-TB) regimens have been unsatisfactory due to adverse effects and the long duration of treatment. This called for a regimen maximising the killing of *Mycobacterium tuberculosis* in a shorter time with fewer adverse drug reactions (ADRs). In efforts to improve treatment outcomes, new and repurposed drugs, including bedaquiline and linezolid, were introduced for the treatment of MDR-TB. In an amended regimen in South Africa in 2018. This replaced the previous 18-24 months regimen.

Objectives: The aim of this study was to review ADRs associated with the new MDR-TB regimen amongst a patient population in the KwaZulu-Natal province, South Africa, with a high incidence of MDR-TB.

Methods: This was a retrospective study carried out in the Northern KwaZulu-Natal (KZN) region of South Africa at four public sector hospitals. These hospitals were used as initiation sites for the changed MDR-TB regimen in 2018. Patient medical files, dated between January 2018 and December 2020, were reviewed. One-hundred and forty-seven medical files were reviewed.

Results: A total of 306 ADRs were reported and graded as mild (63.7%) or severe (36.3%). At the time of reporting, 92.2% of ADRs had resolved while 3.1% had not resolved, 1.4% of ADRs were found to have caused a disability and 3.1% of the ADRs were suspected to have caused death.

The most commonly experienced ADRs recorded were anaemia (17.3%), joint pain (12.8%), peripheral neuropathy (9.9%), QT prolongation (7.7%), nausea and vomiting (6.7%), itchy body rash (5.1%) and skin discolouration (5.4%). The drugs most associated with ADRs were pyrazinamide (30.4%), linezolid (23.0%), bedaquiline (13.5%) and isoniazid (10.8%).

Conclusions: The new MDR-TB regimen has definite advantages including a shorter treatment duration, ease of administration of the medication, and effective killing of *Mycobacterium tuberculosis*. Despite the benefits of shorter treatment duration and ease of administration, the new MDR-TB regimen is not without challenges. Strict vigilance for known and unknown ADRs, monitoring of laboratory and clinical parameters, and taking appropriate preventative measures can reduce the incidence and severity of ADRs. As ADRs can lead to treatment interruption, treatment cessation, or dose reduction before treatment completion, physicians, pharmacists, and nurses should all participate in monitoring for suspected ADRs to ensure

the least harm to the patient and prevention of treatment failure and increased mortality.

Cost analysis of new antibiotics against serious gram - infections used in intensive care units: Cefiderocol vs Meropenem/Varbobaactam

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Introduction: Infections caused by Gram-resistant bacteria are one of the main causes of mortality in patients in intensive care units. The eradication of these germs has a serious economic impact on the public health budget. Cefiderocol and the combination Meropenem/Vaborbactam are state-of-the-art antibiotics used to treat such infections in intensive care patients with limited treatment options. Cefiderocol is a siderophore cephalosporin conjugated with a catechol group, used intravenously, which has high stability against β -lactamases and impressive bactericidal activity. Meropenem/Vaborbactam is a combination of a carbapenem with a broad spectrum of action and an irreversible, non- β -lactam and β -lactamase inhibitor.

Objectives: The aim of the study is, the evaluation of the economic impact of Cefiderocol and Meropenem/Vaborbactam in patients who have recovered completely from serious infections caused by Gram-resistant bacteria in the intensive care unit of this hospital.

Methods: Retrospective observational study was conducted in the hospital from January 2021 to March 2022 in the intensive care unit on patients with serious infections with Gram - bacteria who had no other therapeutic option and who recovered after treatment with Cefiderocol or the combination of Meropenem/Vaborbactam. The treatment protocol involved administering two grams every eight hours of the antibiotic Cefiderocol or the combination of Meropenem/Varbobaactam with the same dosage by slow intravenous injection for seven days of therapy. Data processing was carried out through the use of patient medical records, infectious diseases consultations, the company informatic system and the control of prescriptive appropriateness by nominal prescriptions.

Results: The overall analysis conducted covered a total number of 40 patients. 75% (n=30) of the patients recovered after treatment with one of the two drugs. Of these, 53.33% were treated with Cefiderocol and 46.67% with Meropenem/Vaborbactam. The cost analysis, considering the dosing schedule of 6g/day for seven days, shows that the average cost per patient treated with Cefiderocol is € 3,499.86 while with

the Meropenem/Vaborbactam combination is € 2,527.14. Of the patients treated with cefiderocol, 53.33% had a pharmaceutical cost of € 55,997.76. In contrast, 46.67% of the patients treated with Meropenem/Vaborbactam generated a pharmaceutical expense of €35,379.96.

Conclusions: The results showed that the mean cost per patient for Meropenem/Vaborbactam treatment is 16% lower than with Cefiderocol. Considering that the rate of patients cured with the two drugs is comparable and that the average cost per patient with the Meropenem/Vaborbactam combination is lower than with Cefiderocol, the use of the first antimicrobial should be preferred from an economic point of view, all clinical conditions being equal. In the interests of better control of pharmaceutical costs, constant monitoring of the use of the two antibiotics is therefore necessary for patients in the intensive care unit who have life-threatening infections with Gram-resistant bacteria and have limited treatment options.

Addressing mixed infections with customised 3D-scaffolds

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Introduction: Osteomyelitis is a demanding bone infection caused by bacteria (e.g. *Staphylococcus aureus*) and/or fungi (e.g. *Candida albicans*), involving the bone and its structures through a complex inflammatory process. At present, these infections are notoriously difficult to eradicate, as they are often caused by multiresistant strains as well as single or mixed microbial biofilms. Conventional therapies (oral and intravenous), involving the administration of high-antibiotic doses, may lead to systemic toxicity associated with significant costs for the patients and healthcare systems. In this context, there is an emerging need for more successful and personalized therapeutic approaches.

Objectives: Production and characterization of minocycline-and-voriconazole-loaded poly (DL-lactic acid) (PDLLA) scaffold for the potential treatment of bone infections associated with polymicrobial biofilms.

Methods: The morphological and chemical properties of PDLLA scaffolds, as well as drug release kinetics were examined. Cytocompatibility studies using MG-63 osteoblasts were also conducted. The anti-biofilm effect and efficacy of the co-delivery system were evaluated in vitro against single- and dual-species biofilms (*S. aureus* and/or *C. albicans*).

Results: The PDLLA scaffolds presented a sponge-like appearance, suitable to support cell proliferation and drug release, with structural elements unaffected by drug loading. Minocycline and voriconazole-loaded PDLLA scaffolds showed activity against *S. aureus* and *C. albicans* single- and dual-biofilms. Ultimately, the scaffolds showed *in-vitro* cytocompatibility and functional activity.

Conclusions: Overall, PDLLA scaffolds loaded with minocycline and voriconazole presented suitable properties for the in vitro targeting of mixed biofilms.

A vital approach in the fight to slow antimicrobial resistance: Partnership between the pharmaceutical forum of the Americas and the society of infectious diseases pharmacists to support antimicrobial stewardship education for pharmacists in Latin America

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Introduction: The Pharmaceutical Forum of the Americas (PFA) is a regional organisation created in 2000, with the support of the International Pharmaceutical Federation (FIP) and the Pan American Health Organisation (PAHO). The aim was to contribute to the improvement of the health of the population through pharmaceutical practice and education development. In September 2020, a roadmap for antimicrobial resistance (AMR) action in the Americas was established by FIP and the Global Respiratory Infection Partnership (GRIP). The third strategic objective of the Global Action Plan on AMR of this alliance (FIP-GRIP) was to optimise the use of antimicrobial medicines; a suggested initiative was to support the PROA approach in hospital pharmacies. Having this framework in mind, an agreement between the Society of Infectious Diseases Pharmacists (SIDP) and the PFA was made in November 2021 to support specialised training and mentoring in antimicrobial stewardship (AMS) for hospital pharmacists working in Latin America.

Methods: Nine member associations belonging to the PFA were invited to apply for the SIDP AMS Certificate Program (SIDP-CP) which came with additional mentoring by SIDP members. The SIDP-CP consists of approximately 27 hours of self-study learning, eight hours of live webinars, and a skills component completed at the practice site at the participant's institution. Participant selection was based on their ability to apply knowledge and skills gained from the SIDP-CP to their institution.

Results: Sixteen applications were received and twelve pharmacists whose profile and role in the hospitals best fit the proposal were selected to participate. In the first six months of the program, a close ongoing collaboration between SIDP and PFA representatives has been established. The partnership steering committee meets quarterly to assess participant progress and identify the needs of participants. SIDP has recruited Spanish-speaking infectious diseases pharmacist members of their organization to provide support for SIDP-CP participants during their monthly meetings. Participants work in hospitals of different levels of complexity and services and span across three countries: Costa Rica (San José de Costa Rica, La Managua de Quepos, and Puerto Limón), Colombia (Barranquilla, Bucaramanga, and Cartagena de Indias), and Argentina (Córdoba).

Conclusions: This partnership was created to support education as a key action area, which includes the knowledge, skills, abilities, and proficiencies acquired via incorporating antimicrobial stewardship in all healthcare institutions worldwide. This approach is vital in the fight to slow antimicrobial resistance. The observations and lessons learned from this partnership between PFA and SIDP will help inform plans for future AMS training programs.

Evaluation of inpatients medication prescribing practice at Ibrahim Malik teaching hospital: A descriptive cross-sectional study

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Introduction: Prescribing errors account for almost 50% of medication errors and represent the eighth leading cause of death in the US.

Objectives: The current study aimed to evaluate inpatient prescribing practice by assessing adherence to prescription-writing guidelines and identifying the frequency and severity of drug-drug interactions (DDIs) and drug-disease interactions (DDIS).

Methods: An observational-descriptive cross-sectional study was conducted among inpatient wards in Ibrahim Malik teaching hospital, Khartoum, Sudan. Total coverage sampling was performed and the sample size consisted of 132 prescriptions containing a total of 700 prescribed drugs. The data were collected from patients' files, and the completeness of prescriptions was assessed according to national and international guidelines. Drug interactions were checked by the interaction checker of www.drug.com.

Results: The overall prescription completeness was 0%, and the completeness of both prescriber data and medication data was 1.5%, (0.4% for IV and 0.6% for non-IV drugs) respectively. The most missing elements of the prescription were duration and qualification. Moreover, only 25% of the prescribed drugs were written in the Prescription and Medication Administration Record or drug chart, but the rest were written elsewhere within the patient's file. The prescriptions containing DDIs and DDSIs were 49.2% and 46.2%, respectively, ranging from major (9.1%), moderate, (40.9%), and minor (28%) for DDIs, major (30.3%), moderate (33.3%), and minor (0.8%) for DDSIs. The highest percentage of drug interactions was found in the internal medicine ward. Diabetes was significantly associated with both DDIs ($p = 0.003$) and DDSIs ($p = 0.031$).

Conclusions: The findings of this study reflect a real problem in prescribing practice, as no prescription was considered to be complete, and nearly half of the patients were exposed to DDIs and/or DDSIs.

Evaluation of hospital-based medicine information aimed at primary healthcare professionals

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Introduction: The Capital Region of Denmark runs a well-established hospital-based medicine information helpline (MIH) where pharmacists provide evidence-based medicine information. The MIH has until 2020 been reserved for healthcare professionals (HPC) at the hospitals. From April 2020 the MIH was opened for HCP in the primary sector in The Capital Region of Denmark. The service for primary healthcare was developed in a context where the complexity of treatment is increasing and where more and more patients are discharged to continued treatment outside the hospital settings. The aim of the MIH expansion was to support safe and optimised medication across the healthcare sectors.

Objectives: The aim of this study was to investigate the type of inquiries posed by HCPs from the primary healthcare sector to support further development of hospital-based MIH services.

Furthermore, the aim was to evaluate how the HCPs assessed the MIH service in terms of whether the information requested was provided and the professional level of the answers.

Methods: HCPs were included from primary health care units including rehabilitation centres and respite care centres located in The Capital Region of Denmark. All inquiries from HCPs were categorised into twelve predefined categories. HCPs contacting the MIH were sent an electronic questionnaire (SurveyExact) to evaluate the MIH service. Data was collected from April 2020 until April 2022 and were analysed using Windows Excel and descriptive statistics.

Results: During the study period, a total of 489 inquiries were answered by the MIH. The results show that the majority of inquiries were posed within the categories: “dose and administration” 33% (n=162); “handling of medicines” 23% (n=113), “storage and stability” 15% (n=74) and “product information” 9% (n=45). Less asked categories were “interactions”, “compatibility”, “adverse effect”, “unintended event” and others.

A total of 112 electronic questionnaires were distributed with a response rate of 66%. Results from the questionnaire showed that the HCPs assessed the information given appropriately to a high or very high degree (74% very high, 22% high degree, 4% some degree)

Furthermore, the HCPs assessed the professional level of the MIH service and reported general satisfaction (91% appropriate level, 8% to a high level and 1% don't know).

Conclusions: The results from the current study demonstrate that specific categories within medicine information were more requested than others, indicating that these topics could be highly relevant to focus on in the future development of the MIH service.

HCPs reported a high degree of satisfaction with the MIH service and assessed that MIH provided the information needed at an appropriate professional level. The present study supports the role of a MIH for primary healthcare professionals in supporting safe medication across healthcare sectors.

Study of in-hospital protein drug supply chain

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Introduction: Protein drug products (such as monoclonal antibodies, enzymes, and coagulation factors) have dramatically improved the lives of people with immune-system diseases, and rare diseases for example rheumatology or extended the survival rate of people in treatment for cancer. However, stresses such as vigorous shaking and vibration must be avoided by end-users in hospitals when handling these products to preserve their pharmaceutical quality and guarantee their safety and efficacy.

Objectives: The purpose of this study is to describe the supply chain for in-hospital use of protein drugs and demonstrate handling process steps that may be subject to protein drugs' stress.

Methods: Sales statistics for the Uppsala university hospital (Sweden) were used to observe the distribution of protein drugs from the Concise database hosted by the Swedish eHealth Agency. Documentation of the supply chain from distributor to patient administration was completed by pharmacists.

Results: Infliximab, Rituximab and Bevacizumab are the most frequently used protein drugs in the hospital. The most common wards for administration are the polyclinical units for oncology, haematology and gastroenterology where approximately 50% of protein drugs are prepared in the cleanroom while the others are reconstituted in the ward medication rooms before being administered. Rheumatology drugs, e.g. etanercept and adalimumab are predominantly prescribed and handled in the out-patient supply chain.

Conclusions: The protein drug supply chain is described and points of potentially harmful stress for the proteins are highlighted. The supply chain flow chart will be used to develop the processes for more robust protein drug handling and ensure increased patient safety.

Design of a structured objective clinical assessment test for students in practices in the pharmacy service

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Introduction: Structured assessment for final-year students is a teaching tool that has been implemented in Spain for many years. However, carrying out this evaluation system for students doing internships in the hospital's Pharmacy Service is very innovative.

Objectives: To describe the process of designing a structured evaluation for students who carry out internships in the hospital Pharmacy Service. The purpose of the structured objective clinical evaluation is to verify that the students can demonstrate what they have learned during their internships. To do this, different clinical skills and technical skills will be evaluated, simulating real situations related to the work of the Pharmacy Service.

Methods: In order to assess student learning during their internships at the hospital, six tests have been established: pharmaceutical care for outpatients, validation of medical prescriptions, stock management, reconciliation of medication on admission, preparation of a master formula and oncology pharmacy. All tests are related to daily assistance activities of the Hospital Pharmacy.

In each test, the student has a limited time to perform the task that is indicated. In some, it will be necessary to use actors who pretend to be patient. The qualification method is objective, through a previously defined checklist. A schedule has been scheduled for everything to be ready in September 2022.

Results: The objective clinical evaluation has been structured in three tests, in which a total of 24 students may be examined. The presence of three evaluators and three actors will be necessary. The cost of each test will be minimal because most of the materials are donations from pharmaceutical laboratories and other companies. The qualification is immediate, and the duration of the test will be about three hours.

The checklist of each test will be reviewed by two evaluators and must include items on clinical, technical and interprofessional communication skills.

Conclusions: The clinical evaluation system for internship students in the pharmacy service is expected to be very useful for pharmacists in the Pharmacy Service. Thanks to this exam they will have objective information about their teaching role with these students, thus detecting points for improvement. In addition, the student learns about clinical reasoning, decision-making, problem-solving, and interpersonal relationship skills.

Utilising a quality control cycle to improve the satisfaction of patients receiving pharmaceutical service in the outpatient pharmacy: Taking one regional teaching hospital as an example

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Introduction: Recently, hospitals aim to provide patient-oriented healthcare. Patients pay more attention to the medical service quality and pharmaceutical service is an important part of medical service. Because the outpatient pharmacy provides pharmaceutical service to patients directly, it's the most suitable department to assess the satisfaction of patients and find out shortcomings.

Objectives: Improving the satisfaction of patients receiving pharmaceutical service (the space planning, the process of receiving medicine, the service attitude of the pharmacist, and drug instructions) and the process of drug administration through the project. Furthermore, reducing the complaints from patients and enhancing the quality of pharmaceutical care.

Methods: In addition to using a self-designed questionnaire to assess four aspects of satisfaction, including the space planning, the process of receiving medicine, the service attitude of the pharmacist, and drug instructions, also collecting problems of the administration process and summarising by an affinity diagram. Each aspect and problem was further subdivided into five subgroups of people, process, material, equipment and environment.

We utilised the eight steps of a task-oriented QC story. First, we selected improvement focuses and expected values. Then, calculated the deviation between expectation and reality to plan policies. At last, we confirmed the feasibility and then selected appropriate policies to execute them.

Results: The questionnaire adopts a 5-point Likert type scale, a type of psychometric response scale in which responders specify their level of agreement to a question typically in five points: 1) strongly disagree; 2) disagree; 3) neither agree nor disagree; 4) agree; 5) strongly agree. If patients never experienced the question content, the question point was not included in the scoring.

The outcome showed that the satisfaction of patients was enhanced from 3.94 to 4.55 and the improvement rate is 15.48%. The number of patient complaints was reduced from five to one. Furthermore, the waiting time to receive medicine, the thing patients care about the most, was shortened from 5.96 minutes to 5.07 minutes.

Conclusions: Through this project, we were able to understand the satisfaction of patients receiving pharmaceutical service in the outpatient pharmacy and then improve the pharmaceutical service quality. Most importantly, we found that utilising a quality control cycle can explore more unknown problems and efficiently improve the satisfaction rate.

Comparison of patient-associated risk factors between acquisition of *Klebsiella pneumoniae* and *Escherichia coli*

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Introduction: *Klebsiella pneumoniae* (KP) and *Escherichia coli* (E. coli) are the most important pathogens causing infections in healthcare and the rates of resistance are increasing.

Objectives: This study aims to investigate the risk factors among patients with infection caused by *K. pneumoniae* or *E. coli*.

Methods: A total of 416 KP and 751 *E. coli* isolates were collected from a 700-bed regional hospital. We compared the data of demographic characteristics, antibiotic use and underlying diseases of these patients with *K. pneumoniae* and *E. coli* infection.

Results: The rate of male patients in KP isolates was significantly higher than those of *E. coli* isolates (56.2% vs 20.0%; $p = 0.000$). Comparing *E. coli* and Kp groups, the rate of patients with pulmonary disease (OR, 1.78; 95% CI, 1.39 to 2.28; $p = 0.000$), hepatic disease (OR, 2.41; 95% CI, 1.62 to 3.58; $p = 0.000$), previous surgery within one month (OR, 1.77; 95% CI, 1.31 to 2.40; $p = 0.000$) and patients who stay in an intensive care unit (ICU) or respiratory care ward (RCW) (OR, 2.51; 95% CI, 1.90 to 3.32; $p = 0.000$) was significantly higher in Kp group. Patients with a positive culture of KP were more in rate to have been exposed to beta-lactams/beta-lactamase inhibitors (OR, 2.88; 95% CI, 1.83 to 4.53; $p = 0.000$), 3rd-generation cephalosporins (OR, 1.94; 95% CI, 1.17 to 3.60; $p = 0.000$) and carbapenems (OR, 7.88; 95% CI, 3.90 to 15.94; $p = 0.000$) within three months.

Conclusions: Compared with *E. coli*, this study indicate that previous exposure to certain classes of antibiotic, especially carbapenems (OR, 7.88), over seven days within three months

during hospitalisation can predispose patients to be infected with *K. pneumoniae* in this hospital.

The analysis of the medication that children may spit most

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Introduction: The most bothersome thing for parents is to spit the medicine when the children take it.

Objectives: To find out the medicine that the children may spit off most.

Methods: The data were collected from January 2019 to June 2021. We collected the data of the number we dispensed again when the ones were spit by the children, the medication name, and the prescribed times. Clinical outcomes were assessed by SPSS.

Results: In the first part of this study, we analysed the medication that was spit the most. The top five medicines were dextromethorphan, N-acetylcysteine, gascon, acetaminophen, and ambroxol.

In the second part of this study, we divided the prescribed number of the medicine. We found that the spit portions of dextromethorphan and acetaminophen were over 2%.

Conclusions: Dextromethorphan and acetaminophen might be the medications children dislike most.

Risk factor for the patient acquisition of carbapenem-resistant *Pseudomonas aeruginosa*

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Introduction: Treatment of infection caused by *Pseudomonas aeruginosa* (PA) is becoming more challenging with each passing year. And the rates of PA resistance to carbapenems are increasing.

Objectives: The objective of this study was to determine the difference in risk factors between infection due to carbapenem-susceptible *Pseudomonas aeruginosa* (CSPA) and carbapenem-resistant *Pseudomonas aeruginosa* (CRPA).

Methods: During the study period, 1434 *Pseudomonas aeruginosa* isolates were separated into two groups: 1279 isolates were sensitive to carbapenems (CSPA), and 155 isolates were resistant to carbapenems (CRPA). Comparisons were made between the two groups. Risk factors analysed included demographic variables, the antibiotics used and comorbid conditions.

Results: The number of patients who stay in an intensive care unit (ICU) were significantly more in the CRPA group (32.3% vs. 21.1%; $p = 0.003$). The rate of underlying pulmonary disease was significantly higher in patients with CRPA infection (20.0% vs. 12.0%; $p = 0.006$). Patients exposed to beta-lactams/beta-lactamase inhibitors, carbapenems or quinolones before the positive culture were significantly more in CRPA group (40.6% vs. 33.4%; $p = 0.07$, 36.1% vs. 12.0%; $p = 0.000$ and 33.5% vs. 22.7%; $p = 0.003$, respectively).

Conclusions: In this study, the patients whom exposure to carbapenems would have more chance to acquire CRPA infections than CSPA (OR, 4.16; 95% CI, 2.88 to 6.02). Other risk factors for the patient acquisition of CRPA included admission to the ICU, underlying pulmonary disease and previous exposure to beta-lactams/beta-lactamase inhibitors or quinolones.

Experience with trifluridine/tipiracil and regorafenib in metastatic colorectal cancer

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Introduction: Trifluridine/tipiracil and regorafenib have been approved for the treatment of adult patients with metastatic colorectal cancer (mCRC) who are refractory to or are not considered candidates for current standard chemotherapy.

Objectives: To describe the effectiveness and safety of trifluridine/tipiracil and regorafenib after trifluridine/tipiracil in patients with mCRC in real clinical practice.

Methods: A retrospective descriptive study including all patients with mCRC who started treatment with trifluridine/ tipiracil and regorafenib was carried out from January 2018 to September 2021. Demographic, diagnostic and therapeutic variables were collected by reviewing medical records and chemotherapy prescription and validation programme (Farmis_Oncofarm). Adverse effects and dose reductions/temporary interruptions of treatment were recorded to measure safety. Descriptive statistical analysis and survival analysis with the Kaplan-Meier method were applied using SPSS 20.0 software.

Results: Thirty-one patients were included, but one was discarded because he had not still started the treatment ($n=30$). (Median; range): 66 years (51-86); 53.33% male; 76.67% ECOG 0-1; median previous lines: 3 (1-5). Median progression-free survival (PFS) with trifluridine/tipiracil was 3.63 months (95%CI 2.45-4.81) and median overall survival (OS) was 6.47 months (95%CI 0.00-16.30). The median number of cycles was 3 (1-16). Seven patients started treatment with regorafenib after trifluridine/tipiracil and the median PFS was 6.07 months (95%CI 2.71-9.41). Median OS was not at the data cut-off date. The median number of cycles was three (1-8). The most frequent adverse effects related to trifluridine/tipiracil were asthenia ($n=15$, 50%), neutropenia ($n=10$, 33.33%), anorexia ($n=5$, 16.67%) and hepatic toxicity ($n=3$, 10%), and dose reductions/temporary interruptions of treatment were required in 60% of the patients. With regorafenib, asthenia, diarrhoea, hand-foot syndrome and rash being the most frequent adverse reactions, dose reductions/temporary interruptions of treatment were required in 71.43% and one patient had to stop treatment permanently due to toxicity.

Conclusions: According to the authors' experience, trifluridine/tipiracil and regorafenib are used in advanced stages of the disease after some previous lines, with modest effectiveness. Both drugs induce high toxicity, with high drug-related problems, dose reductions and temporary interruptions of treatment. Patients who could benefit from these therapies

must be carefully selected according to age, ECOG and comorbidities, among other clinical features.

Gmonotherapy for advanced mycosis fungoides

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Introduction: Mycosis fungoides are one of the most common variants of Cutaneous T-cell lymphoma, a rare form of non-Hodgkin lymphoma. They last in the skin for long periods with polymorph lesions. In advanced periods, they can affect lymphatic ganglions and internal organs. Currently investigated treatments for transformed mycosis fungoides are few and include phototherapy, chemotherapy, biologic response modification, targeted molecular therapy and combinations thereof. Gemcitabine, a pyrimidine nucleoside analogue, is gaining recognition as a potential therapeutic agent for advanced-stage and refractory diseases.

Objectives: To review the safety and efficacy of the chemotherapeutic agent gemcitabine in monotherapy for the treatment of mycosis fungoides in advanced-stage and refractory disease in a patient without response to specific treatments.

Methods: An observational retrospective study has been conducted on an 87-year-old patient. Prior treatment with oral (corticosteroids, retinoids) and systemic therapies (bexarotene 300 mg/m²) or radiotherapy had not improved her skin lesions. Gemcitabine was given as monotherapy every 15 days (1000 mg / m²) for six cycles. Prophylactic antiemetic treatment with ondansetron, support medication with allopurinol (300 mg/d orally) to prevent tumour lysis syndrome and antibiotic prophylaxis with moxifloxacin were given. All adverse events were recorded. Valuable data were collected from the review of medical histories and dispensation registers. Clinical features were assessed using scales, which measured the number of lesions and the state of the disease.

Results: After a total of six months of gemcitabine treatment, the patient achieved partial response (60%). Treatment was well tolerated; hematologic toxicity was mild (grade 1-2, including leukopenia and thrombocytopenia), which resolved without dose reduction.

Conclusions: Gemcitabine as monotherapy every 15 days (1000 mg/m²) for six cycles was well tolerated and should be considered an effective treatment in patients with tumour-stage mycosis fungoides. However, further studies are warranted to assess the efficacy and optimal dosage of gemcitabine in monotherapy for the treatment of mycosis fungoides in advanced-stage and refractory diseases.

Intralesional methotrexate for keratoacanthoma of the face

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Introduction: Keratoacanthomas (KA) are self-regressing, destructively expanding keratinocyte skin neoplasms typically characterised by sudden onset of explosive growth followed by complete involution. Although many treatment modalities have been described, surgical excision is currently the treatment of choice for the majority of keratoacanthomas. Occasionally, however, the size and location of these lesions (often face) preclude complete excision without extensive reconstruction and/or scarring. Several case reports and retrospective studies have demonstrated that intra-lesional methotrexate (MTX) could be a very effective and safe alternative treatment of keratoacanthoma (KA).

Objectives: To evaluate the clinical efficacy and safety of the intra-lesional MTX to reduce the tumour size of KA before surgical excision, with superior aesthetic results in two patients affected by KA of the face.

Methods: An observational retrospective study of two patients with KAs (size larger than 1.5 cm) treated with intralesional MTX before the surgery was performed. The data were obtained from the clinical history and the electronic prescription programme. The variables recorded were: sex, age, dose of intralesional MTX, tumour shrinkage rate, and adverse effects. Patients provided signed informed consent.

Results: During the study period, two patients (a 67- and a 77-year-old females) affected by KA of the face were treated with neoadjuvant intralesional methotrexate. The therapeutic approach was based on only one injection with intralesional MTX (1 ml of 12.5 mg/ml) injected in 4 quadrants and at the base of the tumour, one month before the surgical excision. The injections were followed by 10 mg of folic acid to be taken 24 h later. The two patients showed a tumour shrinkage rate at the time of surgical excision of 75% (77-year-old) and 80% (67-year-old). None of the patients had complications related to the inoculation of MTX or the surgical intervention.

Conclusions: The results from the present retrospective study show that intralesional MTX injection is an effective and well-tolerated treatment option for KAs. Even though complete surgical excision is the treatment of choice, intralesional MTX has proven its benefits in the two cases of KA of the face, significantly reducing the tumour size before surgical excision, with superior aesthetic results.

Management measures of supply shortages of immunoglobulins among hospitals in Catalonia

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Introduction: Immunoglobulins (IG) are an essential drug for patients with primary immune deficiencies, protecting them from infections but also as an immunomodulatory agent. An increase in demand, a manufacturing process highly dependent on plasma donation, and the current Covid-19 pandemic situation have had an impact on the supply of IG increasing shortages worldwide.

Due to the regulations in blood and plasma donation, two different sources of IG are available in Catalonia (Spain), Plangamma is an IG manufactured by local donors and other brands from international donors are also marketed. Benchmarking of actions taken by hospital pharmacies may provide new insights to optimise the drug management of IG.

Objectives: To identify the best management measures to handle supply shortages of IG. To assess the extent to which IG supply can be sourced from the local donors of plasma.

Methods: A survey addressed to hospital pharmacies was performed requesting information about the hospital,

percentage of coverage by local plasma donors manufactured IG (Plangamma), availability of emergency stocks and other management measures applied according due to the supply shortages situation. The survey was distributed in April 2022 to hospital pharmacy directors at the regional level. Data was collected and analysed through Microsoft Excel 365.

Results: A total of 13 hospitals completed the survey. The mean coverage of IG requirement with Plangamma was 51% (range 30%-80%). The average of days covered with Plangamma was 22 days within a minimum of seven days and a maximum of 120 days. Only in eight hospitals (61.5%) an emergency stock of IG was available. The most frequently implemented management measures were adjusting to lower doses or lengthening intervals of administration, in 69% of the centres (n=9), followed by the use of a prioritisation protocol (n=8) and individual assessment of off-label cases (n=8). Additional remarks were collected regarding initiatives such as the acquisition of alternative brands of IG, centralised procurement, promoting therapeutic alternatives and establishment of a weekly committee to monitor IG use.

Conclusions: Assessing the levels of supply coverage of IG enables to implement management measures at the hospital and regional levels. Benchmarking of management of IG supply shortages may be useful to provide new insights for the rational use and prescription of IG, which could be extended to other drugs with supply shortages.

Using PDCA management methods to effectively improve the overall quality of drug dispensing and shorten the waiting time of patients

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Introduction: In response to the increased outpatient and inpatient performance of the hospital, the pharmacy's dispensing business has increased. Since October 2020, the pharmacy department will use the PDCA management method to review the main reasons for the prolonged waiting time for outpatient and inpatient dispensing operations and propose effective measures. Improve countermeasures and use online satisfaction questionnaires to confirm the effectiveness of process improvement.

Objectives: Improve counter-measures and use online satisfaction questionnaires to confirm the effectiveness of process improvement.

Methods: During the period from 2020/10 to 2021/11, this study examines the factors that may affect the waiting time of outpatient and inpatient dispensing operations, uses PDCA to carry out quality improvement intervention measures, and collects and analyses the changes in the waiting time before and after the intervention. Use statistical analysis method two-sample t-test to compare before and after differences to confirm improvement.

In addition, by using the online Google form tool, and designing a satisfaction survey form with a Likert scale, we can further understand the actual feelings of pharmacists regarding the improvement measures.

Results: Four major problems were found after reviewing the dispensing process, and the strategy and effectiveness verification are as follows:

A. Strategy 1- Shorten the waiting time for inpatients: Set up an inpatient drug dispensing area to shorten the distance of drug delivery, and strengthen the mobility of personnel for the drug delivery system. The waiting time before and after intervention decreased by 25.1%, 15'45" and 11'48" respectively ($p < 0.001$)

B. Strategy 2- Waiting time for taking medicines after discharge: Design a program that can be connected to an automatic medicine chartering machine for medicines taken after discharge, to reduce the time spent on manual dispensing. The waiting time before and after intervention decreased by 13.3%, 11'56" and 10'21" respectively ($p < 0.001$)

C. Strategy 3- Inpatient pharmacies to add automatic medicine chartering machines: splitting single-dose dispensing and outpatient prescription dispensing operations.

D. Strategy 4- Classifying and diverting prescriptions: Chronic disease prescriptions and discharge prescriptions are adjusted to independent dispensing operations. The waiting time before and after intervention decreased by 13.8%, 4'42" and 4'03" respectively ($p < 0.001$)

The satisfaction survey on the improvement of the overall dispensing operation process for pharmacists is based on the results of ≥ 4 points. Among them, the satisfaction rate of "opening inpatient drug dispensing area" and "discharged medicine can be connected to an automatic drug charter machine" is as high as 96%, and "single-dose dispensing operation diversion" satisfaction is 92%.

Conclusions: The overall patient waiting time was improved, and all statistical analyses showed significant differences ($p < 0.001$). In addition, the satisfaction questionnaire was highly affirmed by the staff, which also proved that the improvement measures were effective.

A tool for hospital pharmacist interventions optimisation

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Introduction: The validation of medical prescriptions by the Hospital Pharmacist is a key factor in the provision of healthcare. This validation process leads to pharmacist interventions (PIs) that are entered into the electronic prescribing system.

A useful and general tool for recording PIs allows a better clinical follow-up of the patient, optimises the daily work and increases the pharmacist's inclusion and intervention in the multidisciplinary team. Therefore, we developed an Excel file with predefined fields that would allow this registration by all the pharmacists.

Objectives: The purpose of this study was to develop and implement a tool used for PIs record, categorisation and monitoring and report acceptance rates by physicians in an Internal Medicine Department.

Methods: A retrospective study was conducted in this hospital between January and September 2021. Three pharmacists have recorded their PIs, concerning Internal Medicine Services, on the Excel file. The interventions registered during that period were characterized and analysed according to medical team acceptance. This tool allows the record of patients' data, type of intervention (antibiotic therapy, therapeutic reconciliation, dose adjustment, among others), drug, pharmacist recommendation, acceptance date or rejection and motives.

Results: In this period, a total of 742 PIs were carried out in 504 different patients whose average age was 74 years old. The most common types of PIs were: dosage adjustment to renal function (23.36%), antibiotherapy (13.43%) and route of administration (10.66%). Exactly 16% of the PIs concerned enoxaparin, 6% vancomycin and 5% amoxicillin/clavulanic acid. The general acceptance rate was 77% and among the non-accepted PIs, only 47% were by physician rejection.

Conclusions: The record of PIs with this tool facilitates and encourages the follow-up and resolution of prescribed drug-related problems through more effective communication with other professionals. The implementation of this tool contributed to increasing the acceptance rate in this hospital. The aim was to improve the tool and include the economic evaluation outcomes of accepted PIs.

The creation of a national PIs register system, available for all hospital pharmacists, would enhance the role as clinical

pharmacists in this hospital and standardise practices to develop research work.

Preventing medication errors for better care by using bedside technology

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Introduction: Medication errors (ME) are a common cause of potentially avoidable harm to patients. According to statistics, at least one death each day results from ME and approximately 1.3 million people are harmed annually in the United States. In England, more than 237 million ME are made every year with a cost upwards of £98 million according to national estimates. Errors can occur at every point in the process, around 54% are made at the point of administration and 21% are made during prescribing. 72% of the ME are minor and 2% of all errors can result in serious harm. WHO launched in 2017, a global initiative to reduce severe, avoidable medication-associated harm in all countries by 50% over the next five years.

The closed-loop system in this study, PharmaTrac, is an essential approach to preventing ME related to administration.

Objectives: Improve medication administration safety and the traceability of the global medication process by implementing a closed-loop system, PharmaTrac.

Methods: All patients admitted to the Hospital receive a wristband with an exclusive barcode that enables following by the closed-loop system. In the pharmacy, we prepare single doses of medication by repacking or labelling with a barcode to ensure a closed loop. All nursing activities are done on a single mobile device which directly checks the prescription.

Results: Since 2010, the authors have been using the PharmaTrac project at this hospital. This system allows medication traceability from the pharmacy until patient administration. After repacking and labelling, all the single doses prepared have a QRCode with all the information about the medicine (name, pharmaceutical form, dose, batch, expiration date and manufacturer's name).

All medication orders are made electronically according to the physician's prescriptions or restocking. Medical prescriptions are validated by a pharmacist before the drug administration. During medication administration, nurses identify patients by scanning their wristbands and then scanning each medication. If the

patient, medication and prescription match, the nurse confirms the administration on the handheld device. With this system, we ensure the "five accurate": patient, medication, time, route and dose. The traceability is guaranteed during the administration process. It is also possible to analyze drugs not administered (detailed by the hour, drug, professional or type of justification), errors caught by the system and alerts (such as drug-drug interactions, allergy, medicine dilutions and others). We have an average percentage of closed-loop medication administration (CLMA) of 94.3% between 2018 and 2021. Even during the COVID peak, we maintained a CLMA of 91%. During the first trimester of 2022, our CLMA was 96%.

Conclusions: The development and implementation of this process were essential for patient safety and to revalidate our HIMSS stage 7. In addition to reducing the probability of ME, this system allows nurses to have more time to provide care to the patient since patient records are automatically made. Also, the reverting process becomes automated. This system allows more mobility, productivity, safety and information integration.

Small bowel and spleen infarction in the patient with tense bullous pemphigoid over right face and neck

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Introduction: Bullous pemphigoid is an acquired inflammatory autoimmune disease. The pathogenesis of bullous pemphigoid has not yet been fully elucidated. Bullous pemphigoid risk is strongly involved with age, genes, drug and disease. Due to the activation of pathways including the immune system, inflammation, and coagulation, the coagulation activation in bullous pemphigoid is associated with an increased thrombotic risk.

Case summary: An 85-year-old woman is dementia without a history of diabetes and atrial fibrillation. She initially received madopar 250mg TID on December 14, 2021, because she developed Parkinson's disease (PD) features including rigidity and bilateral tremor. Parkinson's disease dementia (PDD) was diagnosed on January 7, 2022, after her TRODAT SPECT imaging showed radioactive uptake in the left and right basal ganglia regions. After taking madopar for three weeks, she had bullae on her heels and fingers. The immunologist suspected bullous pemphigoid and prescribed prednisolone 10mg QD for her on January 7, 2022, then changed the immunosuppressive regimen to prednisolone 7.5mg QD and madopar 80mg BID on January 21, 2021. The neurologist adjusted madopar interval from 250mg TID to 250mg BID and did madopar induced skin eruption

notification on February 18, 2022. Bullous pemphigoid worsened with bullae on the sacrum and legs on April 25, 2022 and new bullae over the right neck on May 16, 2022 even after the immunosuppressive regimen was adjusted to prednisolone 10mg QD and mycophenolate mofetil 500mg BID. Therefore, she received prednisolone 10mg BID and mycophenolate 500mg BID since May 16, 2022. Unfortunately, she was admitted to the hospital on May 22, 2022, due to bloody stool and altered consciousness. Real-Time RT-PCR of SARS-CoV-2 RNA was negative. Laboratory data showed pancytopenia and abdominal CT showed thickening of the wall of the terminal ileum with poor enhancement and intramural gas, in favour of ischemic bowel disease and splenic infarction on May 24, 2022. Laparoscopic terminal ileal and cecal segmentectomy and ileocolostomy were performed on May 31, 2022. Pathology report of small bowel segmental resection revealed ischemic bowel disease with transmural infarction and acute necrotizing inflammation.

Conclusions: Likely, multiple factors including continuous madopar for PD treatment, associated PDD and infection trigger BP worsening. The use of systemic corticosteroid and immunosuppressant are often accompanied by significant adverse effects, making disease control more difficult. The prothrombotic state during exacerbation of bullous pemphigoid raises the thrombotic risk. But an indication of anticoagulant therapy during activation of bullous pemphigoid will be further studied necessarily.

A study on the assessment of clinical outcomes and factors related to the severity of diabetic foot ulcer

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Objectives: To assess the clinical outcomes and factors related to the severity of diabetic foot ulcer.

Methods: This study was conducted prospectively at Kify Hospital, Rajahmundry, East Godavari district, Andhra Pradesh, India. Patients of both genders who were diagnosed with diabetes mellitus having a diabetic foot ulcer were included. Patients who were clinically suspected of having Charcot's foot were excluded from the study.

Results: Among the 144 patients, 68.75% (99 patients) were found to be male and 31.25% (45 patients) were found to be females. About 11.80% (17 patients) had an ulcer size of ≤ 1 cm, 63.20% (91 patients) had an ulcer size of 2-5 cm and 25% (36 patients) were having an ulcer size of ≥ 6 cm. The mean ulcer size of the study population was 3.73 ± 2.03 cm. Among the 144 cases, 54.16% (78 patients) were having neuropathic ulcers, 27.78% (40 patients) were having neuro-ischemic ulcers, 16.67% (24

patients) were having ischemic ulcers and 1.39% (2 patients) were having unclassified ulcers. About 25.69% (37 patients) had a leg amputation of those which 62.16% (23 patients) had a minor amputation i.e. toes followed by 27.02% (10 patients) undergoing feet amputation, 8.10% (3 patients) ended up with amputation below the ankle, 2.70% (1 patient) ended up with amputation above the ankle.

Conclusions: The prevalence of diabetic foot ulcers was observed to be 5.6% in this study. About 25.69% of the ulcers resulted in amputation (major and minor) and only 19.44% of all ulcers healed at some stage without amputation within 6 months. In the case of the relation between HbA1c level and diabetic foot ulcer outcome, those with HbA1c level $< 7\%$ had a higher healing rate, compared to those with HbA1c 7-10%. About 53.47% of ulcers were persistent and unhealed at the end of the observation period and 1.4% of the patients died. Clinical pharmacists should take responsibility for creating awareness in case of diabetic foot ulcers among the diabetic patients which can improve the quality of life of the patients.

Cancer outpatient treatment analytics and data visualisation through business intelligence

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Introduction: In recent years a high volume of complex, real-time both clinical and economic data on cancer patients has been generated. Powerful data processing tools become necessary to analyse cancer treatments, as well as the impact of the COVID pandemic or biosimilar products on specific indicators.

Objectives: To design an agile, customisable and dynamic scorecard for the visualisation and analysis of key performance indicators (KPI) of cancer outpatient treatments dispensed in the hospital through Business Intelligence.

Methods: A multidisciplinary working group (biomedical engineers from the Innovation Unit, bioinformatic scientists, managers, oncologists, and hospital pharmacists) was created in a tertiary hospital.

Design thinking methodology was applied. Face-to-face and online meetings were performed. KPI was defined by the team. Ethics committee approval was obtained.

Data from different sources were collected from 2016 to 2020: outpatient prescription software, hospital administrative database, oncology electronic medical record data, pathology

records and tumour registry. Raw databases were extracted and processed through data mining.

Variables:

- Demographics (sex, age, country of origin, reference hospital, place and postal code of residence)
- Updated status of the patient (deceased, discharged)
- Main diagnosis according to International Classification of Diseases 10th Revision (ICD-10) and diagnosis date
- Treatment: oral and intravenous antineoplastics and support medication dispensed in the hospital, costs.
- Pathology records (if available): tumour, nodes, metastases (TNM) classification.

A software tool was developed between March and April 2022 in Microsoft PowerBI, by integrating the cited databases. The prototype was implemented in May 2022 and validated by different types of users (administrative staff, managers, and clinicians).

Results: A visual scorecard of the cancer outpatient treatment was designed. Data from 10,161 patients were processed (average age 67.3 ±14.5, 46.8% female), who received 66,308 outpatient dispensations or 106,628 infusions.

Eleven panels using charts and graphs were designed: five descriptive panels of general variables (patients, demography, incidence and prevalence according to the ICD-10 diagnosis, TNM classification, patient status) and six panels regarding the pharmacological profile (number of dispensations and type of oral antineoplastics or support medication dispensed, ambulatory care unit drugs infused, biosimilar products, costs). One or more filters such as age, sex, time frame, diagnosis, treatment, etc. can be applied. Filters allow the customisation of interactive reports in real-time.

The structure was designed for the automatic updating of the panels from the successive updates of the source databases. The quality of the raw databases can be a limitation. It has been necessary to define how to handle missing and duplicate data. Pre-processing, normalisation, and transformation data processes have been applied too.

Regarding patient data protection, security breaches are prevented and data granularity is modulated to avoid the identification of individual patients.

Conclusions: Processing the huge dataset from various sources was possible by Business Intelligence tools that synthesise data, apply analysis based on Artificial Intelligence and provides dynamic and engaging visualisation.

New technologies help us improve strategic decisions in cancer treatment: detection of behaviours and trends, reduction of uncertainty (real-world data, biosimilars) and influence of the COVID pandemic through monitoring over time.

Farmatec innovation training project

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Introduction: Hospital Pharmacy Technicians play an increasingly relevant role within the organisation of Pharmacy Departments. Their close contact with other healthcare professionals and patients requires specific initial training as well as regular updates.

The theoretical and practical training plan for Pharmacy Technicians could improve efficiency and safety in the use of medications by contributing to efficient and patient-focused therapeutic management.

Objectives: To develop an innovative training plan to improve the continuous professional development of Hospital Pharmacy Technicians.

Methods: The training programme was carried out face-to-face at the Pharmacy Service of a tertiary hospital in February 2022. Innovative teaching methodologies such as gamification, surveys and practical examples were used.

The course consists of twelve hours spread over six days. The content was agreed upon by 20 hospital pharmacists and the nursing supervisor and taught in two calls according to the pharmacy technicians' work shifts.

The training program was accredited as continuous training by the Commission for continuing education of health professionals with 1.2 credits.

At the end of the program, a satisfaction survey was conducted among the attendees.

Results: The training programme was attended by 26 Pharmacy Technicians. Topics were as follows:

DAY 1:

- Introduction of the Pharmacy Service.
- Quality management system. Medication errors and economic/clinical impact. Security and recommendations of the Spanish delegation of the Institute for Safe Medication Practices.

DAY 2:

- Stock management and dispensing procedures.
- Narcotics.
- Repackaging.

DAY 3:

- Parenteral Nutrition/Ambulatory Care Unit.

- Cytostatic and Intravenous Mixtures. Standard operating procedures in laminar flow cabinets. Removal of cytotoxic waste.

DAY 4:

- Compounding and pharmaceutical technology.
- Dispensation in hospitalised patients. Antimicrobial Stewardship Program.

DAY 5:

- Outpatient pharmaceutical care. Dosing, uses, storage and preservation.
- Outpatient software. Troubleshooting and patient follow-up.

DAY 6:

- Oncologic outpatient pharmaceutical care.
- Humanisation.
- Medication self-administration devices. Batch traceability. Management of medication returns.
- Dispensing rules according to the medication program and exceptions.

The survey showed that theoretical contents, adequacy and methodology scored 7.5 out of 10 points, above the practical contents (6.9). The utility of the course was the item with the highest overall score: learning objectives achieved (7.5), interest in topics (7.5), applicability in daily work (7.2) and adaptation to previous expectations (7.2). Facilities (7.3), materials (7.2) and usefulness of the documentation (7.0) were also well-valued. Pharmacy technicians were satisfied with the previous information about the course, but they valued the adaptation to working hours with a 4.6 due to work shifts. Regarding the duration of the course, 17% thought that it was insufficient, 52% appropriate and 31% excessive.

Conclusions: Training plans are one of the ways to improve the knowledge and motivation of Hospital Pharmacy Technicians. In this hospital, Pharmacy Technicians who completed the training rated the programme as satisfactory, especially in terms of its usefulness for their regular work, interest in the topics and theoretical contents. This methodology can be reproduced as a starting point by other hospitals' Pharmacy Departments adapted to their own needs.

Deep learning application to automatic classification of pharmaceutical interventions: Towards better monitoring of pharmaceutical analysis

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Introduction: Pharmaceutical analysis (PA) of medication prescription is a critical step in the prevention of adverse drug events. PA enables to identify drug-related problems (DRP) and triggers pharmaceutical interventions (PI) for optimal prescribing or administration practices.

Objectives: Create a deep learning algorithm to classify the clinical pharmacists' comments according to the DRP classification (ACT-IP) of the French Society of Clinical Pharmacy (SFPC).

Methods: Dataset: The study was conducted at the University Hospital of Strasbourg. The prescription data were collected over a full year period (2017) directly from the hospital information system. The extracted data were limited to prescriptions with date, time, validation status and clinical pharmacists' comments. Data related to prescriptions with comments over the first six-month of 2017 were reviewed by two pharmacists independently, who assigned each comment a DRP code number (class) according to the SFPC ACT-IP classification.

Deep learning classifier: A deep learning classifier was built to learn to predict the expected class from the labelled processed DRP comments. Accuracy, Specificity and Sensitivity metrics were used for performance evaluation.

Results: A total of 27,699 comments associated with prescriptions were extracted for the first six-month of 2017. The class prediction accuracy calculated on the validation dataset was about 78.0%. Class-specific sensitivities and specificities ranged from 0.31 to 0.96 and from 0.94 to 1.00, respectively. To demonstrate the classification capacity of the algorithm, we predicted the DRP code for all the comments collected between July and December 2017. All predictions with a probability larger or equal to 0.95 were selected and manually checked by a pharmacist. Amongst the 4,460 predictions checked, only 1.5% needed to be corrected.

Conclusions: Taken together, these data demonstrate that automatic classification of PI based on deep learning can be achieved with exciting performance and we imagine that this application could find a critical place in routine practice to facilitate PA.

Strengthening antimicrobial stewardship capacity of healthcare workers using a hub and spoke model: A pilot at two public tertiary hospitals in Zambia

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Introduction: Globally, Antimicrobial Resistance (AMR) poses a major public health threat resulting in high morbidity and mortality, including increased healthcare costs. The negative economic burden of AMR is even greater in low-middle-income countries. Antimicrobial Stewardship (AMS) as an integrated approach to health systems strengthening is one of the key pillars to arresting AMR. The other two pillars are Infection Prevention and Control (IPC) and medicine and patient safety.

To strengthen AMS capacity among key health workforce in Zambia's tertiary hospitals, the Brighton-Lusaka Health Link (BLHL) with support from the Tropical Health Education Trust (THET) developed a Hub and Spoke model (HSM), where the University Teaching Hospital (UTH) in Zambia with established AMS capacity was designated as the "Hub" was supported to capacity-build two other tertiary level hospitals in AMS practice. The capacity building was through targeted training in AMS and surveillance. The HSM model has been used across other sectors to augment peripheral services/practices by centralising key resources. This was the first such initiative to use an HSM model for AMS capacity-building in Zambia.

Objectives: This project assessed the use of an HSM to enhance AMS practice improvement across public hospitals in Zambia.

Methods: With collaboration from a multi-disciplinary team in Brighton UK and the local AMS committee of the University Teaching Hospitals (UTH), and technical experts from the University of Zambia, a contextually relevant AMS training package was developed and validated for use. Building on existing AMS practice concepts recommended by the World Health Organisation (WHO), including objectives of the Zambia National Action Plan for AMR, the team AMS Training package targeted medical doctors, pharmacists, nurses, IPC officers, and other health workers across the healthcare value chain, including hospital administrators. These were taken through a two to three-day onsite AMS training facilitated by staff from UTH. Therefore, UTH was a Hub hospital capacity building other spoken hospitals in the country. Pre- and post-training knowledge assessments were conducted to determine healthcare workers' knowledge of AMS. The AMS teams at the pilot-spoke hospitals were constituted and trained on how to

conduct antibiotic use surveillance using the Global Point Prevalence Survey (GPPS) standard methodology.

Results: About 42 multidisciplinary healthcare workers were trained at the Kitwe Central Teaching Hospital and the Kabwe Central Teaching Hospital, respectively. Among those trained in AMS were 16 medical doctors, seven pharmacists, four nurses, five biomedical scientists, five Environmental health officers, and four hospital administrators. The majority of participants were males (62%) as compared to females. The average score for the pre-test was 74% while the average post-test score was 84%.

Conclusions: Our pilot project demonstrated that HSM can be used to deliver AMS training and therefore improve the knowledge, practice and awareness of AMS using local capacity with limited resources. The HSM can be implemented to capacity-build other public and private sector hospitals in the peri-urban regions of Zambia and other settings with similar AMS needs.

Clinical pharmacy interventions and antimicrobial therapy in a rural hospital in Austria

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Introduction: Clinical pharmacy interventions ensure the safer use of medicines. According to the federal association of German Pharmacists associations (ABDA - Bundesverband deutscher Apothekerverbände) 5% of all hospitalisations are caused by adverse drug reactions, with 2/3 of them being preventable. However, in Austria clinical pharmacy services are still underrepresented in clinical practice – only 15.8% of all hospitals in Austria have a pharmacy department, with only a few regularly providing clinical pharmacy services. Antimicrobial resistance (AMR) poses a major threat to all humans and it is estimated, that by 2050 more people will die from untreatable infections than from cancer. In concordance with the national action plan on antimicrobial resistance (NAP-AMR plan) in Austria and the EU One health plan on antimicrobial resistance this abstract focuses on clinical pharmacy interventions made concerning antimicrobial products with the ATC code "J". It discusses which clinical pharmacy interventions are needed for anti-infectives and their severity.

Objectives: This clinical pharmacy interventions study demonstrates the need for multidisciplinary ward round teams, especially the need for clinical pharmacists. Clinical pharmacists are core team members of Antimicrobial Stewardship Groups in

secondary care institutions and should not only restrict certain antibiotics, procure anti-infective goods and write AMR formularies but also support physician clinical decision-making with their expertise in the choice of antibiotic, route of administration, and dosing, side effects, interactions and therapeutic drug monitoring.

Methods: Data on 727 clinical pharmacy interventions made by one clinical pharmacist at the Tauernklinikum Zell am See in Austria were collected via convenience sampling over two years and rated on a six-point clinical significance scale. The data were filtered by ATC codes, “J” representing anti-infectives for systemic application and assigned to 16 different types of interventions.

Results: Out of 727 interventions 95 were concerned with systemic antimicrobial therapeutics. Most identified problems were “drug-drug interactions” (30/95), followed by a need for “therapeutic drug monitoring” (also including laboratory parameters and electrocardiograms) and “specific information and therapy discussion”. The significance rating was “highly important” (4) for 6 out of 95 interventions and “very important” (3) for 23 out of 95. Prescriptions rated inappropriate and “highly important” to address by the clinical pharmacist included interactions potentially causing fatal arrhythmias, prescription not according to the antibiogram and not covering bacterial specimen in severe infection, inappropriate choice of antibiotic in the elderly, wrong antibiotic dilution solution prescribed and the prescribed antibiotic causing serotonin syndrome as being concomitantly prescribed with other medication.

Conclusions: It can be seen from the results obtained that clinical pharmacists have a key role to play in the safe effective use of antimicrobial agents as a component of overarching clinical pharmacy provision. This service provision needs to be routinely available in all hospitals.

Severe neutropenia in African-descent patients treated with clozapine: Results of a six-month, multinational open-label clinical trial

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Introduction: Although clozapine is the most effective antipsychotic for treatment-resistant schizophrenia, it is markedly under-utilised, particularly in the African American (AA) population. Low absolute neutrophil count (ANC), either at

baseline or during treatment (ANC < 1500 cells/mm³), has been a significant barrier to clozapine use in AA patients. This low ANC cut-off was developed in White populations. It was recently shown that the “ACKR1-null” C/C genotype (SNP rs2814778) on the ACKR1 gene (previously called Duffy Antigen Receptor for Chemokines (DARC)), more commonly found in AA than in White populations, is associated with a lower normative ANC range as compared with that seen in White populations. Low ANC associated with this genotype, and without pathophysiological consequences, has been termed benign ethnic neutropenia (BEN). In 2015 (after the beginning of this study), the Food and Drug Administration issued new guidelines (including lower ANC thresholds) for clozapine monitoring in patients with BEN. However, the range of ANC variability and safety of clozapine has not been established in BEN patients or examined prospectively in patients of African descent.

Objectives: To assess the effect of clozapine use on the Absolute Neutrophil Count in adult patients of African descent.

Methods: We recently completed a 6-month, open-label clinical trial of clozapine use in African-descent adult patients with schizophrenia spectrum disorders with or without the “ACKR1-null” genotype, conducted at two sites in the United States (Baltimore, MD; Washington, DC) and one in Lagos, Nigeria. We examined clozapine safety and weekly ANC during clozapine treatment and evaluated ANC variability and ranges by genotype, sex, location, dosing, and other characteristics. Genotype was assayed using TaqMan™ technology (Thermo Fisher Scientific, Waltham, MA USA).

Results: We enrolled 274 participants (150 US, 124 Lagos, Nigeria), of whom 227 (82.8%) completed six months of clozapine treatment. 47 discontinued clozapine treatment: 14 adverse events, 15 participant choice, 6 non-adherence, 2 lack of therapeutic response, and 10 lost to follow-up/error/prescriber choice. There was one case of severe neutropenia (<500 cells/mm³) (0.36%), which occurred at week 6. Of the participants with known genotypes, 199/249 (79.9%, including participants with severe neutropenia) had the “ACKR1-null” genotype. This genotype was more common in the Nigerian sample (n=107, 100%) compared to the US sample (92/142 (64.8%)) (2=47.14, df=1, p<0.0001).

Conclusions: To the authors knowledge, this is the largest prospective clozapine trial in African-descent patients. Severe neutropenia was very rare (0.36%), despite the expected occurrence of lower ANC and the high prevalence (80%) of the “ACKR1-null” genotype in this study.

Creating policies for the compassionate use of medical cannabis in healthcare facilities

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Introduction: At the United States (US) federal level, Cannabis is classified as a Schedule I substance and considered to have a high potential for dependency and no accepted medical use. In 1996, California became the first state to allow for the medical use of Cannabis with the passage of Proposition 215. Because healthcare facilities are accredited through the Federal Center for Medicare & Medical Services (CMS), they are at risk of losing funding and facing penalties if patients possess and use Cannabis in their facilities. As a result, legislation was passed in 2022 (California SB 311, also known as Ryan's law) to require facilities to allow patient access to medical cannabis. However, how to implement the law with consideration of other relevant statutes, regulations and enforcing agencies was not specified.

Objectives: The objective of this work is to create policies and procedures for facilities that are compliant with this new law and minimises the risk to the institution. The secondary objective was to distribute these policies and procedures to provide a consistent patient experience regardless of facility.

Methods: The authors, all members of the Pharmacists' Cannabis Coalition of California reviewed Ryan's law and found that the law clearly indicated that institutions needed to allow compassionate access to terminally ill patients in their facilities or be at risk of legal action from patients. The authors reviewed both state and federal laws to determine the legal status of different Cannabis compounds (e.g. tetrahydrocannabinol – THC, cannabidiol – CBD). Further analysis was done to determine the expectations of enforcing agencies such as the US Drug Enforcement Agency (DEA); US CMS and the California Department of Public Health.

Results: Based on the laws and regulations reviewed, the authors created healthcare facility policies and procedures for 1) authorisation of the patient; 2) authorisation of the use of medical Cannabis; 3) verification of the Cannabis product; 4) institutional policies to maintain compliance with other laws and regulations; 5) references for Cannabis facts and drug interactions, and 6) templates for documenting use and product description. These materials were shared in webinars with the

California Hospital Association, California Society for Health-System Pharmacists, and California Pharmacist's Association and via continuing education webinars to pharmacists and the general public.

Conclusions: While there remain conflicts between federal and state laws, we have created policies and procedures that mitigate risks from legal action, citation or accreditation. We continue to distribute drafts of these policies and templates to enhance understanding of the legal issues and minimize variability in implementation.

Analysis of medication error reporting at St. Bartholomew hospital in London, England

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Introduction: Over 237 million medication errors occur each year in England alone, costing the healthcare system millions and harming over 1700 lives. As part of an ongoing effort to improve the safety of their institution, St. Bartholomew's Hospital in London, England is addressing medication error reporting.

Objectives: The purpose of this project was to evaluate a medication error reporting system database to identify frequent reports and focus areas for medication safety improvement.

Methods: A comprehensive evaluation was performed on the medication errors listed in a reporting system database at St. Bartholomew's Hospital. Each monthly report was evaluated and the medications with the two highest rates of error reporting were further evaluated. From that list, the type of medication error was assessed. Medication errors were categorized into groups: allergy to medication, administration, controlled drugs, dispensing, homecare, medication reconciliation, prescribing, storage, and supply. Each group was further divided into subgroups describing what type of event occurred. Results will be used to develop an intervention to prevent the most frequent errors.

Results: A total of 470 medication errors were reported between March and August 2021. In the error reporting database, the most frequent controlled substance medications included morphine (n = 32) and oxycodone (n = 10). Of the non-controlled substance medications, enoxaparin (n = 11) had the highest number of errors reported. Of the errors reported with those medications, the administration of controlled drugs had the highest frequency of occurrence (n = 12). Medication errors involving documentation of controlled drugs followed (n = 8).

Conclusions: Data analysis of the system identified that the administration phase of controlled substances had the highest reoccurrence of errors. Hospital-specific medication safety education is being developed to address the commonly reported errors.

Impact on the optimisation of treatment and the clinic of inflammatory bowel disease through pharmaceutical monitoring

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Introduction: Optimisation of infliximab treatment in inflammatory bowel disease (IBD) through pharmacokinetics.

Objectives: To assess the impact of monitoring infliximab plasma levels in patients with IBD.

Methods: Retrospective descriptive research, which included patients with IBD who were asked for infliximab plasma levels between September 2019 and March 2021. A therapeutic interval between 3-7 mcg/ml was considered. Anti-infliximab antibody values >10U/ml were defined as positive. Active disease was Harvey Bradshaw Index >6 in Crohn's Disease and Mayo Clinic activity index >9 in Ulcerative Colitis. The impact of monitoring was assessed by the adjustment of therapy and the response to it. The variables collected were: age, sex, pathology, plasma and antibody levels, disease activity, concomitant immunomodulators, intensification of treatment and change of target and/or drug.

Results: Twenty-three patients were included, with a mean age of 42 years, 65% men, all with immunomodulatory treatment, except one who presented positive antibodies. None had active disease at the time of the research.

A total of five had levels within the range, two even having positive antibodies.

Infratherapeutic levels were shown in eight patients. Five did not have associated antibodies, of which three intensified treatment, obtaining positive results in two, and intolerance and change to adalimumab in another. The antibodies were not determined in two, of which one intensified obtaining a good response. A patient with positive antibodies intensified treatment with clinical improvement.

Levels above the range occurred in ten patients. The antibodies were negative in five, three with intensified treatment, one switched to normal doses obtaining a good response and one changed the target due to ineffectiveness; and two with no

intensified regimen, one switched to adalimumab due to intolerance. Antibodies were not determined in five, four with normal doses, of which two had the dose increased improving clinically, and one with intensified infliximab, which presented a good response. In 39% of patients, monitoring marked the medical decision.

Conclusions: Pharmaceutical monitoring, and evaluation of infliximab antibodies and clinical features, modifies the medical prescription, which allows for optimising the drug regimen and changing the anti-tumour necrosis factor or target. It shows that it is a tool that allows optimisation based on the characteristics of the patient.

Review of home medication of hospitalised polymedicated patients: Deprescription

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Introduction: Currently, there is an increase in chronic pathologies and comorbidities and, therefore, in polypharmacy due to the progressive increase in life expectancy. The main direct consequences of polypharmacy are an increased risk of adverse drug reactions and drug interactions, leading to increased emergency room visits and hospital admissions.

It is necessary to develop new healthcare pharmaceutical activities during the patient's hospital stay to identify possible causes of admission related to home medication and treatment optimisation to prevent future adverse events.

To cover the need to improve the safety and quality of life of the patient, it is necessary to establish a multidisciplinary care strategy.

Objectives: The objective is to describe the results obtained in the pharmacotherapeutic review of the home medication of polymedicated patients admitted to a university hospital.

Methods: Retrospective descriptive study, in a university hospital, including hospitalised polypharmacy patients (with ten or more active prescriptions for home medication for 180 days or more), from June 2021 to May 2022. Data were obtained from the Digital Medical Record (Diraya) and an Access database designed by the Pharmacy Service (which included: service where the patient was hospitalised, responsible doctor, responsible pharmacist for the review, date of admission and date of discharge, drugs proposed to be deprescribed and drug proposals to be deprescribed accepted). The variables collected were: sex, age, number of active prescriptions, number of drugs proposed to be deprescribed, number of drugs deprescribed, and drug deprescribed grouped by ATC code.

Results: A total of 104 patients (56% women) were included, with a mean age of 76 years (+/- 10). It was proposed to deprescribe 365 medications, of which 204 (55.90%) were deprescribed. The mean number of discontinued drugs per patient was 1.96 (+/- 1.74). Out of the discontinued drugs, 29.95% belonged to the group of drugs that evolved into the nervous system (of which 10.60% were analgesics, 7.83% antidepressants and 4.60% benzodiazepines); 25.80% belonged to medications related to the alimentary tract and metabolism (of which 8.29% were oral antidiabetics, 5.07% cholecalciferol, and 4.15% proton pump inhibitors); 14.75% belonged to drugs related to the cardiovascular system (of which 4.15% were related to lipid metabolism); 10.60% belonged to the respiratory system group (5.99% were inhalers); 10.14% belonged to the blood system group (of which 7.84% were iron and folic acid); and the remaining 8.76% belonged to other drug groups.

Conclusions: The review of the home medication of hospitalised polypharmaceutical patients by the hospital pharmacist is an activity that allows reducing the number of drugs prescribed per patient (an average of 1.96 +/- 1.74) being accepted by the responsible doctor a 55, 90% of the recommendations.

The main discontinued medications are analgesics, oral antidiabetics and antidepressants.

Discuss the changing of incidence in dispensing errors after setting up automatic dispensing equipment

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Introduction: Understand the impact of smart dispensing equipment on dispensing errors and its importance to the work of pharmacists, hoping to build a more complete smart pharmacy.

Objectives: Discuss the changing of incidence in dispensing errors after setting up automatic dispensing equipment.

Methods: This is a retrospective research analysing the collected data. The automatic dispensing equipment was built in January 2022. The data was collected from January 1st, 2021 to March 31st, 2021 and from January 1st, 2022 to March 31st, 2022. This research is going to compare the incidence rate of near-miss-dispensing-error after setting up the automatic dispensing equipment during the same period of the year.

Results: The average dispensing error rate is 0.015% from January 2021 to March 2021 and 0.006% from January 2022 to March 2022. The average number decreased by 46.2% ($p = 0.11$) in the first season of 2022. We further analyze the error types of dispensing. It contains 43% of counts of a medication error, 88.9% of appearance mixing errors, 66.7% of mixing medication names, 63% of dosage mistakes, and 42% of mixing storing sites.

Conclusions: The incidence and the number of dispensing errors decreased in the later period. From the types of errors and the reduction scale, it can be seen that the misjudgment caused by humans (fatigue, negligence, lack of understanding of drugs) and the environment (complex or changing of storage location) decreased. Automatic dispensing equipment can reduce dispensing errors with the majority proportion of counts of medication errors. The reason is the limitation of scanning equipment. Some other reasons may be the lack of barcodes on the medication packaging and the misusing of automatic dispensing equipment. Taking advantage of precise and real-time smart devices can prevent dispensing errors from occurring. Although there is no statistical significance, follow-up data accumulation, personnel training and construction of a more completed smart pharmacy may be required. We hope to bring the dispensing error to zero.

The evaluation of the therapeutic effects of low dose Edoxaban in atrial fibrillation patients: A single centre, case series study

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Introduction: Atrial fibrillation (AF) is an independent and crucial risk factor to stroke and systemic embolism. The use of Edoxaban, a non-vitamin K antagonist oral anticoagulant (NOAC), with 60 mg or 30 mg daily is non-inferior to the well-managed use of Warfarin when it comes to the therapeutic effects on AF patients.

Objectives: To evaluate the therapeutic effects of low-dose Edoxaban in atrial fibrillation patients.

Methods: The authors used a retrospective statistic collected from outpatient prescriptions administration of Edoxaban from July 2021 to September 2021, and followed the patients using a low dose of Edoxaban from March 2017 to May 2022. Dosage adjustment, changes in prescription, and bleeding events during treatment will be analysed. Statistical analysis was performed using the SPSS software package.

Results: A total of 355 patients were involved in this research. 124 (34.93%) were prescribed low doses of Edoxaban, including 67 (54.03%) females and 57 (45.96%) males. The age of patients ranged from 56 to 96 years old with an average of 76.17 years old. The number of patients that had creatinine clearance CrCl < 50 mL/min was 42 at the very beginning and 47 in the latest data report. Exactly 65 (52.42%) of them weighed lower than 60 kg. The number of patients that switched from other anticoagulants to low-dose Edoxaban due to drug-related bleeding side effects was 38 (30.65%). During the monitoring period, March 2017 to May 2022, the average time of using low-dose Edoxaban is 31.60 months. A total of 17 of them had a record of combining the use of Gastric Acid Secretion Inhibitors, however, one of them lost follow-up. When assessing drug-related side effects, we discovered that 18 (14.5%) of the patients were admitted to the hospital due to Edoxaban-related side effects, including nine (50%) events of bleeding with an average of 78.33 years old. The period of Endoxan use ranges from three months to 50 months with an average of 22.28 months. Four patients died during research, including three women and one man. From the latest statistics, 109 patients still keep using Endoxan.

Conclusions: As the prevalence of AF is strongly related to age worldwide, the elderly are at an especially increased risk of stroke and systemic embolic events. According to estimates by the National Development Council, Taiwan will become a super-aged society in 2025. In the light of the ELDERCARE-AF study, Edoxaban for the management of elderly Japanese patients with atrial fibrillation ineligible for standard oral anticoagulant therapies which 15 mg once daily may be considered. Edoxaban should be prescribed from the lowest dose and slowly titrate up, especially in the high-risk group, including the elderly, kidney impairment, low body weight, or concomitant use of specific P-glycoprotein inhibitors.

Improving the efficiency of stocktaking via smartphone in Southern Taiwan regional hospital pharmacy

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Introduction: The total items of medicine used in hospitals has increased rapidly these few years from brand drugs to generic drugs due to the pharmaceutical company lacking raw materials, delay of shipment, etc. While the total items of medicine used is increasing, this means that stocktaking is very important to track the number of medicine in the pharmacy to solve the issue before running out of medicine.

Objectives: To improve the efficiency of the stocktaking process while reducing the working time.

Methods: To achieve this goal, we divided the area of pharmacy into 22 parts. Each part is given a part number using the vertical and horizontal array. After this, we cooperate with the information department to build a stocktaking website that can choose the parts to start with and it can connect via smartphone. Pharmacists and assistants can count and enter the number of medicine at the same time.

Results: The work time of stocktaking dropped from five hours to four hours, involving 35 persons and 1500 items.

Conclusions: By increasing the efficiency of stocktaking does not only benefit the pharmacy department but also saves the time of the pharmacist who is doing the job. Although the device we are using is not provided by the hospital, the pharmacists and assistants have agreed to try the more efficient process by using their smartphone to make the new stocktaking method works.

Predictors of mortality in patients with Lassa fever in federal medical centre Owo - A tertiary health institution in Nigeria

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Introduction: Lassa fever is an acute, highly communicable hemorrhagic disease which causes considerable morbidity and mortality in West Africa. People become infected through direct exposure to the excreta of infected rats or by transmission from person to person via body fluids. Some studies indicated that 300,000 to 500,000 cases of Lassa fever and 5000 deaths occur yearly across the West African sub region. There is, therefore, a need to critically evaluate factors associated with outcomes.

Objectives: This study was aimed at evaluating the possible predictors of mortality in patients with Lassa fever in Southwest Nigeria.

Methods: A retrospective, observational cohort study of consecutive Lassa fever patients in Southwest Nigeria who tested positive for Lassa virus with RT-PCR reagents was conducted. These patients were treated at the Infection Control and Research Centre (ICRC) at Federal Medical Centre, Owo, Ondo State, Nigeria between January 2018 and December 2019. Univariate analysis of the socio-demographic and clinical variables and multivariate analysis to identify the factors associated with patient mortality was carried out.

Results: The data set comprised three hundred and seventy-nine (379) patients treated at the Infection Control and Research

Centre (ICRC), Federal Medical Centre, Owo, Ondo state, Nigeria. Of the three hundred and seventy-nine (379) cohort, two hundred (200) were males (52.8%) while one hundred and seventy-nine (179) were females (47.2%). The average age of the patients was 36.2 years (SD \pm 18.9). The age group most affected by Lassa fever was 30-39 years (23.2%). The total Case Fatality Rate (CFR) was 15.6%. CFR was higher for male patients (17%) than for female patients (13.9%). CFR was lowest in children less than ten years old (3.8%) and highest in adults greater or equal to 80 years of age (50%). Adults aged 60 to 80 years or greater had statistically higher CFR compared with children less or equal to ten years of age.

Conclusions: From the analysis, factors associated with mortality in patients with Lassa fever were Passage of loose stool ($p = 0.0003$); Sore throat ($p = 0.01$), Reduction in urine ($p = 0.005$), Acute Kidney Injury ($p = 0.0001$), Hiccup ($p = 0.002$), Encephalopathy ($p = 0.0001$) and Coma/seizure (0.0001). Independent predictors of mortality in patients with Lassa fever were AKI (Odd Ratio 24.13; 95% CI 8.54-68.19) and Passage of loose stool (Odd Ratio 3.22; 95% CI 1.18-8.70).

Pharmacotherapeutic interventions in hemato-oncology patients and palliative care. Hospital Dr. Rafael Hernández, Caja de Seguro Social. January to April 2022

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Introduction: Patients with hemato-oncological diagnoses and in palliative care face an emotional overload that makes pharmacotherapy management more difficult. The Pharmacist within the interdisciplinary team is the ideal professional to lighten the load that the pharmacological treatment of these groups of patients represents since he is the medical expert.

Objectives: Quantify the number and type of pharmacotherapeutic interventions in hemato-oncology patients and palliative care at the Hospital Dr Rafael Hernández, Caja de Seguro Social. January to April 2022.

Methods: The pharmacotherapeutic interventions carried out in the period from January to April 2022 were quantified, both in outpatients and hospitalised patients who received medical care from the Hematology-Oncology or Palliative Care services. Interventions could be performed by order of the treating physician or when dealing with patients undergoing scheduled outpatient chemotherapy treatment.

Interventions were classified into:

1. Pharmaceutical advice

2. Liaison with the medical team on medication management issues.

3. Advice to the medical and nursing team on medication use issues.

4. Medication management and advice to the family or primary caregiver.

Results: 48 hospitalised hemato-oncology patients received 70 pharmaceutical consultations during their hospital stay, 36 links were made with the medical team for medication management; 18 consultations with the medical or nursing team on the use of medications and 22 management of medications with advice to the family or primary caregiver.

153 outpatient hemato-oncology patients received 144 pharmaceutical consultations, 40 links were made with the medical team for medication management; 30 consultations with the medical or nursing team on the use of medications and 22 management of medications with advice to the family or primary caregiver.

88 patients hospitalised in palliative care received 70 pharmaceutical consultations during their hospital stay, 46 links were made with the medical team for medication management; 18 advice to the medical or nursing team on the use of medications and 19 medication management with advice to the family or primary caregiver.

36 outpatients in palliative care received 34 pharmaceutical consultations, 14 links were made with the medical team for medication management; 11 consultations with the medical or nursing team on the use of medications and 7 management of medications with advice to the family or primary caregiver.

Conclusions: There is a significant demand for pharmacotherapeutic interventions during the care of both groups of patients. The role of the pharmacist is essential to promptly attend to the needs of the patient and the family to optimise the pharmacological treatment.

Pharmaceutical experience - SARS-CoV-2 Pandemic- Dr. Rafael Hernández Hospital pharmacy, Caja de Seguro Social, 2021 Panamá

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Introduction: The health emergency situation declared in March 2020 in the Republic of Panama and in the world has marked a before and after for pharmacists who carry out their work in the hospital setting. The pandemic declared by the new coronavirus has required Hospital Pharmacy Services to radically rethink and significantly increase their activities.

Objectives: 1. Describe the work carried out during the pandemic by Hospital Pharmacists in Panama.

2. Disseminate the needs detected in the exercise of the profession for future health emergencies.

Methods: An observational fieldwork was carried out, in the rooms assigned for the care of patients with SARS-CoV-2 and in the Dr Rafael Hernández L. Hospital Pharmacy in Panama; made by the authors.

Results: At the beginning of the pandemic, hospital pharmacists turned to carrying out campaigns with general measures to prevent the disease, advice to patients to avoid self-medication; participation with the multidisciplinary team involved in patient care.

Multiple weaknesses emerged during the health emergency, such as a lack of training in specific areas such as telemedicine management, computer-assisted prescription, and job security.

Conclusions: The pandemic changed all Pharmacists in the world in the workplace, we have had to innovate in new forms of care; The authors recommended improvement of skills to be able to provide a better service in future health emergencies.

Using a modified CPOE system to reduce intravenous medication errors in Taiwan academic medical centre

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Introduction: Intravenously administered drugs are associated with the highest medication error frequencies and more serious consequences to the patient than any other administration route. According to the literature, it has been estimated that the probability of making at least one medication administration error (MAE) in intravenous doses is 73% and that intravenous doses are five times more likely to be associated with a MAE than non-intravenous doses (Keers RN, *et al.*, 2015). Medication error was found about 36% and the prescribing error of medication error is about 58% in the Annual Report 2020 of the Taiwan Patient-safety Reporting System. The medication administration error in intravenous doses is about 54% in Taiwan.

Objectives: Intravenous medication errors in hospitals are common, expensive, and sometimes harmful to patients. Computerized provider order entry (CPOE) systems with clinical decision support system (CDSS) functionality have been shown to reduce the occurrence of prescribing errors. The objective of this

study was to evaluate whether the implementation of modified pop-out alerts CPOE with CDSS system reduced medication prescribing of intravenous medication errors in Taiwan academic medical centre.

Methods: The study was conducted in a 2,111-bed care academic medical centre located in central Taiwan. We assessed the error rates of intravenous medications in prescribing before and after the implementation of the modified CPOE with the CDSS system, including all patient prescriptions from January 2017 to December 2021.

Results: In the pre-implementation period (2017 to 2019) of modified CPOE with the CDSS system, the error rate of medication errors in prescribing of intravenous medications was increasing from 12% (312/2,526, 2017) to 33% (1,474/4,511, 2019) causing to deficiencies in CPOE software, the lack of software customization, poor implementation plans, inadequate interface design, or an overreliance on CDSS in this hospital. In the post-implementation period (2020 to 2021) of modified CPOE with the CDSS system, the error rate of medication errors in prescribing of intravenous medications was increasing from 33% (1,474/4,511, 2019) to 30% (801/2,695, 2020) to 19% (238/1,255, 2021). The overall medication error was reduced by about 50% from 2,526 to 1,255 from January 1, 2017, through to December 31, 2021.

Conclusions: The modified CPOE with the CDSS system can reduce the overall medication errors and the intravenous medications errors in the prescription process, as well as specific types of errors, such as wrong rate, wrong dose, and duplication. But, the implementation of CPOE can also lead to new errors, such as poor implementation plans, inadequate interface design, and overreliance. The modified CPOE system has both benefits and disadvantages. It has been shown to reduce the number of medication errors in hospitalised patients and is associated with increased time for completion of some physician workflow.

Reducing near-miss of infusion rate errors with information technologies of CPOE and CDSS in the inpatient department in Taiwan

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Introduction: The percentage of medication errors was found about 36.43% (24,846/68,203) in hospitals according to the Annual Report 2020 of the Taiwan Patient-safety Reporting System. In this hospital, the rate of medication error is about 0.0146% and the infusion rate error of intravenous medications

is 0.0013% in 2020. Many intravenously administered drugs are high-alert medications, bearing a high risk of causing significant patient harm if used in error.

Objectives: Prescription errors of intravenous medications can cause serious adverse drug events. The use of information technologies, such as computerized provider order entry (CPOE) and clinical decision support systems (CDSSs) is an effective means of reducing prescription errors. The objective of this study was to evaluate whether implementation of CPOE embedded in a CDSS system reduced medication prescribing of infusion rate error in the inpatient department

Methods: We conducted a before-and-after in a 2,111-bed care academic medical centre that was implementing the CPOE/CDSS system to improve patient medication safety. We assessed rates of infusion rate error in prescribing intravenous medications before and after implementation of the modified CPOE/CDSS system, including all inpatient prescriptions from 1 January 2020 to 31 March 2022.

Results: The infusion rate error in prescribing intravenous medications was decreasing from 0.0028% (Q1 2020) to 0.0001% (Q1 2022) in hospitals. The infusion rate error in the inpatient department was significantly reduced from 0.0082% (Q1 2020) to 0.0002% (Q1 2022). The modified CPOE/CDSS system was introduced into modified pop-out alerts of CPOE/CDSS, drug dose issued within the set range CDSS technology, drug dose automatically calculated according to body weight and renal function, and linked calculation of drug diluent solution from 1 January 2020 throughout to 31 March 2022.

Conclusions: The modified CPOE/CDSS system technology significantly reduced the infusion rate error in prescribing intravenous medications in this hospital. Overall, the results suggest that the modified CPOE/CDSS system can deserve strong consideration as a tool to improve patient safety.

Explore the patterns of resistance mutations to anti-retroviral drugs in treated patients infected with HIV in Northern Oman

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Introduction: The effectiveness of antiretroviral therapies (ART) made it possible for people with HIV to live long and healthy lives. However, a significant threat to the progress obtained thus far in ART is posed by rapid mutation patterns of HIV, which confer its resistance to ART.

Objectives: This study aims to explore the patterns of resistance mutations to antiretroviral drugs, in Northern Oman, in different population groups including wives and husbands (couples), singles and homosexuals.

Methods: A retrospective cross-sectional design was selected to carry out this investigation. Data from 193 HIV-positive patients from Northern Oman health institutions, Suhar Hospital (tertiary hospital) and Suhar Polyclinic (Secondary care) were used in this study. A total of 82 participants had a genomic assay (genotype) analysis done and were included for mutation and resistance assessment, which included the number of ART that had resistance or susceptibility, the type of mutations and their frequencies. Ethical approval had been obtained from the Robert Gordon University committee and the Central Ethical approval committee in Oman. Data of CD4 and VL was analysed via descriptive statistics and Wilcoxon matched-pairs test.

Results: The majority of the HIV-positive patients were married (n=144 out of 193, approx. 74.6%), in the age group of 31-45. The highest rates of transmitted HIV infection were found to be associated with sexual behaviour (n= 106 out of 193, approx. 54.9%), this figure included different population groups (single and married, males and females, of different ages). Mutation and resistance patterns were found to be increased in patients undergoing NRTI and NNRTI ARTs. Population description and genomic assays mimic those seen in other HIV-positive populations. Different strategies had been recommended by the WHO such as combination therapies of new ART and patient adherence follow-up.

Conclusions: Resistance mutations to ART developed fast post 6 months of initial treatments in the study population. This concluded, there was a huge gap between the initial treatment and the most recent progression results and this gap should be indicated.

Integrated multidisciplinary care pathway for optimising secondary prevention lipid modification therapy in people with established cardiovascular disease – Six-month interim analysis

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Introduction: Cardiovascular disease (CVD) is a leading cause of mortality worldwide and accounts for approximately 27% of all deaths in the United Kingdom (UK). It is also estimated that 7.7 million people in the UK are living with CVD and it is costing the economy £19 billion every year.

The relationship of hypercholesterolaemia to CVD is well established and understood in terms of the response to the retention model of atherogenesis. The INTERHEART study demonstrated that of the nine modifiable CVD risk factors, hypercholesterolaemia is shown to carry the highest attributable risk by percentage, even more than smoking, hypertension and diabetes such that anyone who has established CVD should receive lipid modification therapy.

Reduction in the concentration of atherogenic lipoproteins, in particular low-density lipoprotein (LDL), with lipid modification treatments has been shown to reduce the risk of CVD events and mortality.

Objectives: To design, test and develop an integrated care pathway that utilises specialist cardiovascular pharmacists working with primary care teams in optimising secondary prevention with lipid modification therapy in people with established CVD across 42 General Practitioner (GP) practices over a one-year pilot programme.

Methods: A specialist cardiovascular pharmacist was commissioned to work with primary care clinicians to identify, review and optimise secondary prevention in high-risk patients who have known CVD not receiving lipid management treatment. This high-risk group of patients were identified using the 'Lipid management proactive care frameworks' created by UCLPartners and Clinical Effectiveness Group Queen Mary University of London. Clinical notes of eligible patients from 42 GP practice patient lists were clinically reviewed to confirm CVD diagnosis, history of treatment, blood results and CVD risk factors. National Health Service (NHS) Accelerated Access

Collaborative CVD prevention and statin intolerance guidelines were used to provide each patient with a tailored lipid modification therapy treatment plan. Complex patients were reviewed by a virtual lipid specialist multidisciplinary team (MDT) to agree on a treatment plan. Patients were contacted for a virtual consultation to discuss and initiate lipid modification therapy within primary care.

Results: A preliminary review of GP practice lists showed that 20% (2200/11233) of patients had a CVD diagnosis and were not receiving lipid modification therapy. A six-month interim analysis of 1100 out of the 2200 clinical reviews identified 60% (660/1100) of patients were eligible for statin therapy. 4% (44/1100) had true statin intolerance of which half (22/1100) were initiated on ezetimibe and the remaining 22 patients were started on other lipid modification therapy.

The remaining 36% (396/1100) were not for lipid modification therapy. Of these patients, 6% (66/1100) declined treatment, and 26% (286/1100) did not have atherosclerotic CVD following clinical review by a clinician. The remaining 4% (44/1100) were no longer part of the practice list.

Conclusions: An integrated care pathway using specialist cardiovascular pharmacists supporting a multidisciplinary workforce within primary care has shown a significant improvement in lipid modification therapy prescribing to reduce the risk of myocardial infarction (MI) and stroke in this high-risk population. Extrapolating these results nationally would avert 50,588 MIs and 15,846 strokes over five years.

The remuneration of professional services delivered by clinical pharmacists in intensive care units in Taiwan

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Introduction: The National Health Insurance (NHI) in Taiwan began to reimburse pharmaceutical care delivered by pharmacists in intensive care units (ICUs) in 2018. A total annual budget of 35 million New Taiwan Dollars (NTD) was allocated for all ICUs in medical centres and regional hospitals. Pharmacists qualified for reimbursement must have experience in ICU care for at least six months previously. There're four categories of interventions: correcting drug-related problems (DRPs), optimising medication treatment, therapeutic/adverse events monitoring, and medication reconciliation. All interventions must be documented in SOAP notes.

Objectives: This study aims to evaluate the pharmacist's interventions in a medical centre in central Taiwan.

Methods: This retrospective study included ten ICUs with a total of 179 beds, and each ICU is equipped with one clinical pharmacist. The claims data for pharmacists' interventions were collected from the hospital information system dating from September 2019 to August 2021. SPSS ver.25 was used for analysis.

Results: During the study period, ten pharmacists filed 1,487 intervention claims for 1,083 ICU patients. A total of 620,400 declaration points were reimbursed and each point equalled 0.89 NTD. The majority of pharmacy interventions belonged to the category of optimizing medication treatment (n=624, 42%). Correcting inappropriate drug frequency or dosing (n=565, 38%) was the most popular intervention for all types of ICUs. Indicated drug not prescribed (n=82, 16.9%) ranked second in internal medicine ICUs while suggesting therapeutic drug monitoring (n=134, 18.9%) ranked second in surgical ICUs. In the pediatric ICUs, the second and third most popular interventions were therapeutic drug monitoring (n=32, 10.8%) and drug duration adjustment or drug discontinuation (n=18, 6.1%) respectively.

Conclusions: Through the establishment of remuneration for pharmaceutical care services, pharmacists' role in the ICU has received more recognition in Taiwan. The ICU pharmacists' active interventions did optimise patient medication and could help avoid potential adverse drug events.

Analysis of the effect of importing the concept of Entrustable Professional Activities (EPAs) into the education and training of pharmacists in a medical centre in Taiwan

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Introduction: In recent years, medical education has developed rapidly. In 2005, the medical education scholar, Olle ten Cate, proposed Entrustable Professional Activities (EPAs) which provide an educational program to establish the curriculum planning and assessment model. It is hoped that EPAs can be introduced into the education and training of pharmacists.

Objectives: The objectives of this study are to carry out competency-oriented education training and evaluation, to cultivate the professional ability of pharmacy and to improve the quality of pharmaceutical care.

Methods: Exactly 50 pharmacists participated in the educational training of EPAs in a medical centre from March 2020 to June 2021. We utilised Google Forms to conduct the pre-class

awareness, post-test and satisfaction survey for understanding the learning efficiency. Descriptive statistics and inferential statistics were calculated by using SPSS 25.0.

Results: All participants completed the survey (n=50), of whom, 37 (74%) were female. The overall average age was 35 years old. There were 48% of clinical teachers had more than six years of practice experience.

In terms of the pre-class cognitive questionnaire, 64% had heard any speech or seminar related to EPAs once or twice before. Regarding the self-rating level, the overall average score is 7.92 points (out of ten).

There are seven questions in the course test. The overall average score was 71.4, and the standard deviation was 22.22, indicating that everyone has established the concept of EPA.

In terms of the after-class satisfaction questionnaire, 66% of pharmacists were very satisfied with participating in EPA training courses, and 98% of pharmacists agreed with EPAs as a method of teaching and training.

Conclusions: The results of the study show that the use of EPAs in pharmacist education and training is affirmed. Importing the concept of EPAs is conducive to learning effectiveness, cultivating the professional quality of pharmacists, improving the professional ability of pharmacists, and then becoming a well all-round pharmacist.

Optimising medication administration safety by improving compliance with Barcode Medication Administration at Johns Hopkins Aramco Healthcare

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Introduction: Information technology (IT) is an essential quality improvement tool that aides healthcare systems by improving patient quality of care, enhancing patient safety, and organisational efficiency practices.

One way to reduce medication errors is by utilising IT through the application and use of Barcode Medication Administration (BCMA). Johns Hopkins Aramco Healthcare (JHAH) implemented barcode scanning at the patient's bedside in an attempt to improve medication administration safety and reduce medication administration errors.

Objectives: The objective of this study is to improve the BCMA compliance, reach and maintain the organisational and Johns Hopkins International contractual key performance indicator with benchmark goal of 95%.

Methods: An inpatient team of pharmacists along with a nurse representative was constituted to investigate the issues surrounding BCMA compliance and identify barriers and challenges faced by nurses in complying with the barcode medication administration. The units included all inpatient wards, pediatric treatment room, psychiatry, and post-anesthesia care units. Following the identification of barriers a multidisciplinary plan was developed to overcome contributing obstacles as well as measure the unit's BCMA compliance on a weekly basis to monitor adherence to compliance. A report titled 'Closed loop medication administration' was created by the pharmacy informatics team to measure weekly compliance. In addition, a report with daily data was created to monitor each department's individual compliance, with a breakdown by user (nurse scanning the medication), hour of the day (24 hours), date, medications, and reasons for medication that failed to scan. The multidisciplinary team developed a comprehensive strategy to increase BCMA compliance which included:

- Educating healthcare professionals in the entire hospital about organisational policies related to safe medication administration.
- Bimonthly meetings were held in collaboration with nursing to discuss compliance rates of each individual area and medications and inform the pharmacy informatics team regarding barcode scanning failures. Feedback from the data reports was shared with both frontline and nursing leadership.
- Key stakeholders were identified and recruited to implement improvement changes such as supply chain management. The supply chain correspondents came up with a workflow to generate and label all IV fluids before being distributed to the hospital.
- The pharmacy audited reports and medication labels to help identify specific medications that had faulty programming associated with the barcode.
- All medication barcodes upon packaging by the user unit area had an initial and final check performed by the pharmacist to ensure that the medications packaged for unit doses had a functional barcode.

Results: With successful collaboration with the nursing departments and pharmacy informatics, the pharmacy department achieved and kept monthly compliance above 95% for the year 2021.

Conclusions:

- Positive statistical significance was noted post-implementation of the comprehensive action plan.
- The BCMA compliance benchmark of 95% was missed for a few months in 2020, as the organisation faced major challenges due to the COVID-19 pandemic. As a result, more organised efforts were made to ensure that not only the benchmark was achieved by also the results would be sustained.