Pharmacy Education (2023) 23(6) 192 - 294
https://doi.org/10.46542/pe.2023.236.192294

CONFERENCE ABSTRACTS

FIP Brisbane 2023

81st FIP World Congress of Pharmacy and Pharmaceutical Sciences in Brisbane, Australia, 24 to 28 September 2023

Hospital pharmacy

A strength, weakness and threat analysis with a digital revolution for hospitals in the pharma trade

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One development we have witnessed in the early 21st century is the beginning of digitization. Massive amounts of data and the digital world are becoming more and more crucial to modern civilization. The COVID-19 outbreak is an example of how this is changing how we make goods and deliver them to customers. It has completely revolutionized the e-business sector. Customer demand and value creation have both been revolutionized by this. Digitization in the healthcare industry is a long but necessary process. The COVID-19 pandemic has caused a rapid digitalization of healthcare delivery in order to fulfil new provider needs and evolving patient expectations. The fastest-growing sector in India is the pharmaceutical business. The pharmaceutical industry complies with all standards for a challenging and rigorously regulated industry, including multi-stakeholder involvement. The goal is to research hospital digital revolution solutions that will increase the convenience and safety of pharmaceutical services while delivering healthcare services. In this study, a SWOT analysis is conducted using a digital transformation case study for hospitals in the pharmaceutical trade, to identify strengths, weaknesses, opportunities, and threats. Information source for the following SWOT analyses: Hospitals are undergoing a digital transformation as part of the global pharmaceutical trade. New technologies are being introduced with increased dependability, security, and safety. Laws and rules; culture in relation to human resources and customer experience. The results of the SWOT analysis emphasize the strengths, weaknesses, opportunities, and threats. Hospitals in the pharmaceutical supply chain should utilize the SWOT matrix and appropriate strategies to enhance their strengths and opportunities while reducing risks or managing their weaknesses and challenges with the digital transformation. The hospital's involvement in establishing a trustworthy pharmaceutical trade should be addressed using the lessons learnt from SWOT analysis and planning, decision-makers and stakeholders are urged to do. In order to change and modernize a pharmaceutical trade operation, the study's results include integrating powerful new technology, rewriting techniques, and rethinking organizational structure. Digital health is one strategy to broaden accessibility while reducing costs and enhancing healthcare outcomes. To do this, the government must expand market access, encourage international trade, and support team-based clinical research.

Preventing medication errors with barcode scanning: A systematic review

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Background: Medication administration errors are common and their risk may be increased by the absence of barcode medication verification, resulting in patient harm. Barcode scanning is a life-saving method to prevent medication related errors. The lack of definitive evidence that barcode scanning interventions prevent medication administration errors was identified as a barrier to its implementation. This systematic review aims to address this barrier and summarize published evidence on the efficacy of barcode scanning in hospitals, specifically bar-code-enabled medication administration (BCMA).

Methods: AJHP, PubMed and Mayo Clinic searches were conducted to collect articles for this systematic review. Articles were included if they assessed the efficacy of barcode scanning, pre- and post-implementation of barcode scanning was studied, BCMA was implemented, and if statistics were included. Articles were excluded if full access

was restricted, barcode scanning was not the primary outcome, and pre- and post-implementation of BCMA was not analyzed. Quality was assessed with Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist.

Results: Three articles from 2009-2018 were found to meet the inclusion and exclusion criteria and were included in this systematic review. An AJHP study conducted at an Adult Medical ICU in Grand Rapids, MI found a 56% reduction in medication errors after implementation of barcode medication administration. Deaconess Medical Center in Boston, MA found a reduction in medication administration errors by 20% after barcode administration implementation. The Mayo Clinic found a 43.5% reduction in medication administration errors and a 55.4% reduction in patient harm events when barcode medication administration was implemented.

Discussion: The establishment of BCMA has been proven to reduce medication administration errors throughout all articles in this systematic review. Future research should assess the occurrences of non-BCMA related human errors that result in medication administration errors, and how BCMA can help to minimize these events.

Targeting colon cancer stem cells as new therapeutic approach in the treatment of colorectal cancer

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Introduction: There has been an arousing interest in cancer stem cells (CSCs) ever since it was discovered few decades ago. CSCs are well-known by not only their ability to undergo self-renewal and differentiate into more mature cancer cells but also by their tumour-initiating ability from relatively very small number of cells. Only little investigation into the exact role of isolated populations of (CSCs) has been undertaken and the prevalence of CSCs in malignancies is still a matter of some debate and controversy. Here, we aim to identify specific CSC markers and isolate CSC sub-populations from colon cancer in order to force them from dormancy into active division, which will potentially make them more susceptible to chemotherapy.

Methods: Expression levels of several colorectal CSCs markers including CD271, SSEA1, EPCAM, Cript-1, or ABCG2 were validated under both hypoxic and normoxic conditions in SW480 and CSC480, colorectal cancer cell lines, using Flow cytometry and immunofluorescence. The relationship between hypoxia and cellular expression of Brn2, which is a transcription factor that could be a CSC marker, was explored via flow cytometry an immunofluorescence. Furthermore, correlation between CSC markers expression in primary and metastasis tissues in human colorectal cancer was examined by immunofluorescence.

Results: ABCG2 and Cripto-1 were expressed in low levels on cell-subpopulations compared to CD271, EPCAM or SSEA1. Interestingly, all the markers expression levels were increased in a subpopulation by 72 hours under hypoxia compared to normoxia conditions. However, comparison over the time course of hypoxia; EPCAM, Cripto-1, or ABCG2 expression were decreased at 48 hours and then increased again at 72 hours. The SW480 Brn2-EGFP cell line showed a significant decreased in Brn2 positive cells between the normoxia and hypoxia samples at 24, 48, or 72 hours. We found that all markers were highly expressed in metastasis compared to primary sections in human tissues.

Conclusion: ABCG2 and Cripto-1 are potentially suitable markers for studying colon CSCs. Notably, colon CSCs could possibly exert a strong proportional relationship with hypoxia and metastasis. Additionally, all of the CSC markers were found to be more highly expressed in the metastatic colorectal cancer samples compared primary sections.

Co-creating a theory-informed intervention package to optimise vancomycin therapy in hospital settings

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Background: Optimising the management of vancomycin by obtaining target therapeutic concentrations early during therapy has been associated with reduced mortality and morbidity. Despite the availability of guidelines and training, the management of vancomycin remains suboptimal.

Purpose: The primary outcome was the development of interventions and associated implementation strategies to optimise the management of vancomycin therapy. The study describes the development of a theory (TDF) informed intervention package and the Statewide implementation across a wide range of in-patient hospital settings.

Method: This was a multiple methods study which was informed by a series of qualitative interviews triangulated with baseline audit and mapped to intervention functions using the Theoretical Domains Framework (TDF). The study consisted of four phases in order to describe the "intervention development" strategies: identify context factors via pre-assessment, map these factors to specific intervention functions and develop a theory informed education package (intervention) using stakeholder-consensus.
The study was initially conducted across the four teaching hospitals in a large Hospital and Health Service amongst multidisciplinary healthcare practitioners namely nurses, doctors, pharmacists
The Statewide implementation strategy consisted of evidence-based resources including development of a multidisciplinary online interactive eLearning course. Development and implementation of the intervention

package was supported by a Statewide expert working group. The Statewide uptake of the package was evaluated.

Results: Findings from the TDF co-design identified key strategies; namely translating guideline into practice supported by a multifaceted package of interventions. The intervention package consisted of a fact sheet; lanyards and guidelines. This was supported by upskilling clinicians with e-Learning module support consisting of a podcast, webinars, and articles, allowing learning to be tailored to an individual's discipline and knowledge requirements. Implementation of the package was supported by local multidisciplinary champions. The online course enrolment started in October 2022 and as of May 2023 the multifaceted package has been implemented across 15 of 16 Hospitals and Health Services (HHSs) across the State. Two hundred and twenty-seven clinicians have enrolled in the online course and 34% (77/227) have successfully completed the modules. Initial user feedback has indicated that the program is interactive, simple to navigate and use.

Conclusion: The use of theory-informed process and participatory approach assisted with the intervention development process as well as aligning the intervention content with the priorities of stakeholders. The TDF provided a structured process for developing intervention content which will allow further exploration of stakeholder perspectives of the interventions so that the implementation plan is both scalable and sustainable.

Medication adherence in adult sickle cell patients attending a tertiary hospital

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Background: Pharmacotherapy and self-management are the main stay in the treatment of sickle cell disease (SCDx). Adherence to pharmacotherapy among patients may however, be suboptimal. In resource-limited settings adherence to sickle cell pharmacotherapy may be stifled by factors such as access and patient knowledge of the disease. Evidence on medication adherence has the potential to inform strategies for improving treatment outcomes in sickle cell disease.

Objective: The aim of this study was to assess the level of medication adherence amongst sickle cell patients and the prevalence of factors that potentially influence adherence.

Method: It was a prospective cross-sectional study using a standardised questionnaire. Data was collected on demographics, knowledge on the disease, factors that potentially influence adherence to sickle cell disease medications and medication adherence. Adherence was measured using a validated self-reported 8-item adherence scale. One hundred and twenty patients were recruited using convenience sampling method from January to March 2020. Patients 18 years and above were included. Severely ill and pregnant sickle cell disease patients were excluded. Data was analysed using SPSS.

Results: There were 76 (63.3%) males and 44 (36.7%) females. Forty-four respondents (41.4%) had medication adherence below 50.0 %. Eighty-seven respondents (72.5%) had adequate knowledge on the causes of SCDx. Twelve respondents (10%) had inadequate knowledge and 21 respondents (17.5%) had no knowledge on what causes SCDx. Twenty-three respondents (21.5%) spent long times at the pharmacy to buy sickle cell disease related drugs. About ninety- four percent (n=100) experienced long consultation waiting times. Forty-two respondents (35%) indicated they use non-medical forms of treatment. Four or more medications were used by 72.9% (n=78). Common side effects of medication occurred in 32 respondents (31.8%).

Conclusion: There was significant non-adherence among the patients surveyed. Lack of knowledge about SCDx among the patients, prevalent complexity of treatment, common medication side effects and challenges associated with waiting time found in this study may have accounted for the significant non adherence among the patients. This study suggests the need to implement facility contextualized and practitioner level strategies to improve adherence to sickle cell drug therapy. Replicating this study in other hospitals may corroborate these findings in Ghana.

Erythromycin as a cause of hiccups

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Introduction: Antibiotics are one of the drugs most commonly causing adverse drug reactions. According to the patient's age, liver or kidney function or course of treatment, adverse drug reactions may vary from person to person. This study investigates medication-related hiccups and the side effect of erythromycin. The patient has been treated and developed hiccups with erythromycin due to allergic rhinitis.
Case presentation
We report a 42-year-old male who uses erythromycin for an allergic reaction. Erythromycin is the common antibiotic for allergic rhinitis. However, he develops adverse reactions, and hiccups, that bother him a lot. According to Micromedex, the common side effects of erythromycin include QTc prolongation, abdominal pain, diarrhea, nausea, weakness and hearing loss. Apart from the above-

mentioned adverse effects, the hiccup is in some papers or case reports.

Discussion: We use the adverse drug reaction probability scale (Naranjo) to evaluate whether hiccups are a side effect of erythromycin. The score on the Naranjo probability scale is 5, which is a probable adverse drug reaction. In addition to the Naranjo ADR probability scale, we utilized WHO-UMC causality criteria to assess the probability of erythromycin-related hiccups. The answer is probable/likely. Besides, we search the works of literature in PubMed with "hiccups" and "erythromycin", and the results are similar.

Conclusion: According to Micromedex, Uptodate and studies in PubMed, we conclude that macrolide antibiotics for azithromycin and erythromycin may trigger medication-related hiccups. Since antibiotics are not suitable for self-discontinuation, we recommend that the patient return to the hospital in advance and inform the doctor of the side effects of hiccups. Let the doctor evaluate whether to stop the drug or switch to other types of antibiotics.

The influence of beta-blockers on the efficacy of epidermal growth factor receptor inhibitors in advanced non-small cell lung cancer

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Background: Recent studies have suggested that beta-blockers may also have an impact on the effectiveness of EGFR inhibitors in treating advanced NSCLC. Some studies have shown that patients who take beta-blockers along with EGFR inhibitors may have better outcomes, such as longer progression-free survival and overall survival, compared to those who do not take beta-blockers. The mechanism by which beta-blockers may enhance the efficacy of EGFR inhibitors is not yet fully understood. If further studies confirm these results, it could lead to the development of new treatment strategies that combine beta-blockers and EGFR inhibitors to improve outcomes for patients with advanced NSCLC.

Purpose: The study aimed to determine whether BB use is associated with progression-free survival (PFS) and overall survival (OS) in patients receiving EGFR-TKIs treatment for advanced NSCLC.

Methods: This retrospective cohort study enrolled patients with advanced NSCLC under first-line EGFR-TKIs (erlotinib or gefitinib) between January 2014 to October 2021. and divided into two groups based on whether they received a BB or not in the therapeutic regimen: BB(-)/ EGFR-TKIs(+) and BB(+)/ EGFR-TKIs (+). The effects of β-blockers use, defined as ≥60 defined daily doses within 180 days before initiation of EGFR-TKI therapy. All variables associated with clinical outcomes were analyzed using the Cox proportional hazards model.

Results: Ultimately, 223 patients (87 men and 136 women) who met the study's eligibility criteria were enrolled. The participants' mean age was 65.5 ± 12.3 years. There were 154 (69.1%) patients in the BB(-)/EGFR-TKIs(+) group and 69 (30.9%) patients in the BB(+)/EGFR-TKIs(+) group. The estimated median PFS in the BB(-)/EGFR-TKIs(+) and BB(+)/EGFR-TKIs(+) groups was 8.80 and 9.30 months, respectively. The Kaplan–Meier cumulative rate for PFS did not differ significantly (log rank test: p = 0.148) among the two groups. The estimated median OS of patients from the BB(-)/EGFR-TKIs(+) and BB(+)/EGFR-TKIs(+) groups was 13.20 and 15.80 months, respectively. The Kaplan–Meier cumulative rate for OS did not differ significantly (log rank test: p = 0.096) among the two groups.

Conclusion: It has been suggested that beta-blockers may inhibit the growth of blood vessels that supply the tumor with nutrients, which can enhance the effects of EGFR inhibitors. Additionally, beta-blockers may also have immunomodulatory effects, which could help to boost the body's immune response to cancer. In our study, in the patients with advanced lung adenocarcinoma under first-line EGFR-TKIs, prior use of β-blocker was associated with a better outcome. The findings encourage further prospective clinical study to validate the possibility of β-blockers as adjuvant anticancer therapy.

Clinical efficacy and population pharmacokinetics of biapenem in patients with sepsis

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Background: According to the current clinical practice, the clinical efficacy of biapenem in patients with sepsis is not satisfactory. In that case, this study aims to investigate factors that influence the clinical efficacy of biapenem.

Purpose: The aim of this study was to evaluate the factors influencing the 7-day clinical efficacy of biapenem and to explore the pharmacokinetics of biapenem in patients with sepsis by population pharmacokinetic (PPK) modeling.

Method: A retrospective analysis was performed on patients with sepsis treated by biapenem for more than 72 hours and received therapeutic drug monitoring (TDM). Patients were divided into 7-day clinical effective and ineffective group. A logistic regression analysis was performed. PPK analysis was conducted using a non-linear mixed-effects modelling approach by the NONMEM software. All patients were randomly divided into a modeling group and an external validation group in a ratio of 3:1.

Results: A total of 317 adult patients with sepsis were included. Among them, 62% of the patients were considered clinical treatment success and 38% were not. Logistic

analysis results showed that the factors influencing the 7-day clinical efficacy were: the trough concentration of biapenem ≥ 1.95μg/mL (OR=8.78, 95%CI: 3.29-23.42, P＜0.001); ALB ≥ 31.05 g/L (OR = 3.77, 95%CI: 1.29-10.93, P=0.015); and initial CRP ≤ 57.6mg/L (OR=4.31, 95%CI: 1.53-12.15, P = 0.006). A total of 466 biapenem concentrations with a range of 0.28–6.20 mg/L were included for PK modeling.Among them, 351 blood concentration samples collected from 245 patient were defined as the modeling cohort, while the other 115 biapenem concentration samples collected from 72 patients were defined as the external validation cohort. A two-compartment model fitted the data. The creatinine clearance (CLCr) and blood urea nitrogen (BUN) were the most significant covariates. The final model was CL (L/h) = 0.0293×CLCr(ml/min)+4.87, Vc (L) =11.4, Q (L/h) = 0.271×BUN(mmol/L)+0.646, Vp (L) = 52.5, where CL is the clearance, Vc is the volume of distribution of the central compartment, Q is the intercompartmental clearance and Vp is the volume of distribution of the peripheral compartment.

Conclusion: The target trough concentration attainment, serum albumin and C-reactive protein levels has a significant impact on the clinical response of biapenem. These results better define the pharmacokinetics of biapenem and help in the choice of the appropriate dosage regimens for patients with sepsis.

The development, production and use of medicine for children in Sichuan province: A across-sectional study

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Objective: To investigate the development, production and use of children's drugs in Sichuan Province, analyze the problems existing in these links, and provide suggestions for ensuring that children's needs for drugs are met.

Methods: The self-filling electronic questionnaire was used to investigate the production, procurement and use of children's drugs in 14 pharmaceutical companies producing children's drugs and 20 general hospitals with pediatric departments or children's hospitals in Sichuan Province.

Results: The 14 surveyed pharmaceutical companies reported that 116 children's drugs were being developed or produced (75 first-class children's drugs with exact medication information for children, 41 second-class children's drugs only noted as children's discretionary reduction or use according to clinician's instructions), out of which 109 (93.97%) drugs had been approved for marketing, 21 (18.10%) were national essential medicines and 76 (65.52%) were covered by national basic medical insurance. The dosage forms of first-class children's drugs were mainly tablets (28, 37.34%) and granules (19, 25.34%), while oral solution (3, 4.00%), syrup (5, 6.67%) and other dosage forms suitable for children were less. According to the surveyed results on the use of children's drugs in hospitals, there were 57 children's drugs whose minimum use units needed to be manually divided into smaller ones on average in each hospital, and it was the most common operation pattern that pharmacists informed nurses, patients or patients' family members of the dose splitting methods and then splitting drugs' minimum use units by themselves.

Conclusions: There is a great demand for splitting minimum use units of drugs whose strength is too big for children in medical institutions, and some children's drugs need to be developed and further modified to meet the clinical children's drug needs. We should further increase investments and policy supports for the children's drugs, promote children's clinical trials, and encourage the research and development of children's drugs.

Reducing the error rate of prescribing orders

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Background: According to the term definition of the Taiwan Patient Safety Information Network of the Ministry of Health and Welfare: Medication error refers to any preventable occurrence of factors related to professional medical behavior, health care products, procedures and systems during the course of drug treatment. Incidents of drug inappropriate use or patient harm. It may occur during the writing of prescriptions, the transcription of medical orders, the labeling, packaging and naming of drugs, the dispensing, distribution, administration, patient education, supervision and use of drugs.According to Article 38 of the Good Drug Dispensing Practice (GDP): Pharmacists should evaluate the appropriateness of prescribed drugs before dispensing. The evaluation of the appropriateness of medication in the preceding paragraph includes the following items: (1) Whether the patient is allergic to the prescribed drug. (2) Purpose of medication. (3) Dosage and frequency. (4) Dosage form and route of administration. (5) Course of treatment. (6) Whether there is repeated administration of all current medications. (7) Whether there is any interaction with all current medications. (8) Others. Article 39 of the GDP: After assessing the appropriateness of medication in accordance with the preceding article, the pharmacy staff should take the initiative to contact the prescribing physician and ask him to confirm or re-issue the prescription when he believes that there is a problem with the patient's medication. The process in the preceding paragraph should be recorded on the special record form for prescription or refilling of drug treatment issues, and the time for discussion with the physician should be indicated.

Objective: To use the control or warning of the prescription system to reduce the error rate of prescription.

Method: The prescribing error rate of the whole SKH hospital from 2018 to 2021 was counted and compared with the TPR (Taiwan Patient safety Reporting system, TPR) system.

Results: Most of the prescribing errors in our hospital and other hospitals in Taiwan were similar to those in the TPR national notification. The error in the path was also well controlled in our hospital from 2018 to 2020. However, in 2021, an abnormality occurred when the new system was just launched, which led to an increase in the number of errors. The system has been corrected, and no similar situation has occurred. With a number of management and control measures, our hospital has reduced the error rate of prescription prescriptions year by year. In 2021, the error rate of prescription prescriptions will be reduced by 50.5% compared with 2018. This means that our hospital attaches great importance to the improvement of prescription errors, and all improvement measures have achieved good results.

Conclusion: Using the management and control of the prescription prescribing system can effectively reduce the error rate of prescription prescribing, and the control or warning of the prescription prescribing system can be used to reduce common prescribing errors or avoid serious medical errors.

Development of the assessment tool for level up of pharmacist communication skills

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Background and Purpose: Communication skills have been regarded as a core competency of pharmacists. The Department of Pharmacy at Seoul National University Hospital has been making steady efforts to enhance patient-pharmacist communication. We developed a communication assessment tool for improving communication skills of pharmacists.

Methods: Members of the patient counceling committee, the customer satisfaction committee of the department of pharmacy shared patient counseling cases as hospital pharmacists and discussed on patient-centered communication. We searched literatures and developed of a communication assessment tool that can be used in all areas where pharmacists meet patients. Developed tool was self - tested two times by pharmacists with some interval.

Results: A total of 146 self-assessments were completed in the field test. In the 2nd self test, the score was reported higher compared to the score in the 1st test(77.8% vs 90%). Cases from the Patient Counseling Committee were loaded onto the hospital's online education program to be shared with all staff, and the Patient Counseling Committee activities and counseling cases are shared with other hospitals through symposiums.

Conclusions: Through various activities for effective communication between patients and pharmacists, we tried to Increase pharmacists' understanding of patients and strengthen patient-centered communication. The communication assessment tool can offer an opportunity for reflection on communication skill of pharmacists with the goal of more attention for improvement.

A Real-world effectiveness of immune checkpoint inhibitors in upper urinary tract urothelial carcinoma: Evidence from a medical center in Taiwan

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Background: Upper tract urothelial carcinoma (UTUC) is a rare and aggressive malignancy from the renal pelvis or ureter. In high-risk UTUC, platinum-based chemotherapy and immune checkpoint inhibitors (ICIs) for unfit or patients who decline chemotherapy are recommended as first-line treatment. Previous trials have proven that ICIs are first-line treatment for metastatic disease in cisplatin-ineligible patients. However, previous trials included less UTUC patients. Our study was aimed to analyze effectiveness of immune checkpoint inhibitors (ICIs) for UTUC patients in real-world clinical practice.

Methods: We conducted a retrospective cohort study by using single medical center (containing 3,500 beds) electronic medical records in Taiwan. We retrospectively analyzed patients with UTUC who received first-line ICIs or second-line ICIs with or without cisplatin chemotherapy from January 2016 to December 2021. All eligible patients followed up to loss of follow-up, death and December 2022. The primary outcome was overall survival and we evaluated the association between the tumor burden (e.g., metastatic site, PD-L1 expression), baseline demographics (e.g., ECOG, sex, age), and overall survival (OS). The univariable was applied for statistical analyses.

Results: In total, 119 patients were enrolled, including 54 men and 65 women with a median age of 70.4 years (range 63.6 to 78.4) . The median follow-up was 12.0 months. The overall median OS was 43.3 months. In univariable analyses, liver metastasis and ECOG performance were associated with worsen OS.

Conclusion: Our real-world evidence demonstrated long-term survival in UTUC patients with ICIs treatment. Future large scale study is suggested to confirm our findings.

A retrospective review of icatibant for use in off-label non-hereditary angioedema treatment

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Background Information:
Off-label use of the braydkinin B2 receptor antagonist icatibant to treat non-hereditary angioedema is increasingly being prescribed when patients fail to respond to conventional treatments. Due to its infrequent use the indications for treatment and the resulting efficacy remain poorly described in the literature.

Aim:
Characterise the patient demographic receiving icatibant, identify the indications for administration and document the efficacy of icatibant administration in a tertiary referral hospital.

Method:
Retrospective audit of patients presenting with non-hereditary angioedema who were administered icatibant between July 2017 – June 2022. Background data including patient characteristics, indication, administration of concurrent medications, time to symptom improvement and intubation status were collected and examined.

Results:
A total of 12 patients (5 female; 7 male) with a median age of 69 (range 46-84) received off-label icatibant for non-hereditary angioedema. All patients experienced angioedema of the tongue or lips and 41% experienced swelling of the oropharynx or larynx. Three indications were identified; 10 experienced ACE-I induced angioedema, one experienced angioedema following alteplase administration and one experienced angioedema from an acquired C1 esterase inhibitor deficiency. Only 50% had documented efficacy outcomes with the time to symptom improvement ranging from 15 minutes to 22 hours. Three patients required intubation. Conventional therapy of adrenaline (IM or nebulised) and steroids (IV or oral) were administered to 91% of patients prior to icatibant without improvement.

Conclusion:
Acute administration of icatibant predominately occurred in the emergency setting following lack of response to conventional therapies. This highlights the present difficulty of differentiating between histaminergic or Bradykinin induced angioedema. The use of icatibant in this setting may be attributed to the lack of alternative treatment options. The development of a bedside assay that differentiates non-hereditary angioedema presentations and a validated treatment algorithm would support clinicians in prescribing icatibant judiciously. The highly variable response to icatibant described in this audit supports the need for further clinical and pharmacoeconomic review. This would support the evidenced based and cost-effective use of icatibant for non-hereditary indications.

Reducing hospital readmissions with a post-discharge clinical pharmacist medication review: The PREVENT study

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Background
There are many factors that increase the risk of patients being readmitted to hospital after discharge, and approximately one in five readmissions have been attributed to medications and adverse drug events (ADEs). Therefore, it is crucial that we improve the medication management of high-risk patients and reduce the risk of patient harm in the post-discharge period.
A comprehensive inpatient medication review has been shown to identify medication related problems (MRPs), improve potentially inappropriate prescribing, medication adherence and reduce hospitalisation. However, there are few studies evaluating whether a post discharge clinical pharmacist medication review in a hospital-based clinic improves patient outcomes or hospital readmission. Hence, the Pharmacist Review and Evaluation of Existing and New Therapies (PREVENT) clinic was implemented in a metropolitan hospital in Queensland with an aim to provide post-discharge follow-up for patients at high-risk of medication misadventure or readmission to hospital.

Purpose
To evaluate the impact of the PREVENT clinic on 30-day hospital readmissions and/or ED representations.

Method
A single-site, retrospective, case-matched control study was undertaken comparing those that attended the PREVENT clinic within 30 days of discharge, to a selection of case-matched control patients who did not attend the PREVENT clinic. Data were obtained from the Health Information Management Service identifying patients who attended the PREVENT clinic between 01/01/2018 and 31/12/2019. Control patients were matched on a 1:1 basis with PREVENT group patients based on gender, age, discharge date, unit of admission +/- length of stay or discharge disease related group. Patient medical records were reviewed to collect relevant data including patient demographics and hospital readmission or ED representation information. Data was collected using Research Electronic Data Capture (REDCap) and analysed using R Commander.

Results
A total of 179 patients attended the PREVENT clinic within 30-days of their index admission, of which 80 (44.7%) were female. The was no difference in mean age or length of stay between the groups.
The PREVENT clinic significantly reduced 30-day hospital readmissions (n = 21, 11.7% vs n = 42, 23.5%; $\chi^2 = 8.495$, p =

0.0036) and 30-day ED representations (n = 28, 15.6% vs n = 43, 24.0%; $\chi^2 = 3.953$, p = 0.0468).

Conclusion
A post-discharge clinical pharmacist medication review in a hospital-based clinic, in addition to comprehensive inpatient clinical pharmacy services significantly reduced both 30-day hospital readmissions and ED representations. Future research to identify patients most at risk of readmission or those who are most likely to benefit from post-discharge medication review would help target the allocation of future health-care funding.

Development of the pharmacist research, education and medicines use evaluation (REM) program to drive capability and outputs at an Australian tertiary hospital

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background
Quality Use of Medicines (QUM) programs underpin effective clinical practice and learning in a hospital pharmacy department. Our pharmacy department, in a leading Australian academic and research health centre, has 123 clinical pharmacists and 23 clinical assistants working across 12 speciality teams and a high-output dispensary. This large and diverse team, with varying levels of experience and qualifications, provides contemporary pharmaceutical care across a 1,033-bed tertiary hospital.
There are 2.3 Full-Time Equivalent (FTE) clinical pharmacists dedicated to research (0.3FTE), education (1FTE), and Medicines Use Evaluation (MUE) (1FTE) portfolios. In December 2022, these largely siloed experts were integrated into one specialist team [the Research, Education and MUE (REM) team]. This provided an opportunity to develop a co-ordinated, team-based strategy to improve staff engagement, skill development and retention. The broader goal being to drive sustainable quality improvement and research outputs for the department.

Purpose
To develop a cohesive team-based, structured approach to drive capability in, and monitor outputs of, the hospital pharmacy's QUM program.

Method
The REM team undertook stakeholder engagement via in person meetings with the department's clinical specialty teams from January 2023 to March 2023. A structured template for the meetings was developed to facilitate meaningful discussion and goal setting around individual team needs, and to capture performance indicators, across the three REM domains. Discussion and outcomes from stakeholder meetings were documented and themed. Themes were iteratively reviewed by the REM team to ensure consensus, then used to develop metrics for the REM domains. A snapshot of the department's performance against each metric was generated as a baseline reference for future tracking.

Results
Eleven out of twelve clinical speciality teams, representing 95% of clinical staff in the department, participated in the in-person stakeholder meetings. Five key themes were identified:
1) Publication of audits, research, and narrative reviews
2) Completion of the full quality cycle in MUE undertakings
3) Engagement in postgraduate learning
4) Participation in optional on-the-job training
5) Commitment to teaching
Six metrics (two for each REM domain) to evaluate workforce capability and program output were developed. Baseline participation rates in residency training programs and research higher degrees was encouraging. Improvement targets revolved around skills development (foundational quality improvement and academic writing) and increased participation in QUM initiatives from some clinical teams (technician workforce and generalist clinical teams).

Conclusion
A collaborative, structured approach to drive and evaluate the hospital QUM program was developed. Stakeholders were highly engaged, allowing identification of specific targets for staff support and development. Future research will include additional staff surveys (follow-up in person stakeholder meetings and online questionnaires), milestone performance measurement, and translation of this QUM model to other pharmacy departments.

Medication-related questions asked to pharmaconomists in the hospital setting: A descriptive study

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Background:
In Danish hospitals, pharmaconomists teach other healthcare professionals general tasks related to medication management and perform several medication-related tasks in the clinic. Tasks include dosing medicine, mixing and preparing intravenous antibiotics, performing medication reconciliation, ordering medicine, and other. Pharmaconomists are represented in bed wards daily where they collaborate with other healthcare professionals such as physicians and nurses. Pharmaconomists often receive various medication-related questions from other healthcare professionals in the clinic.

Purpose:
To investigate the extent and types of medication-related questions asked to pharmaconomists by other healthcare professionals during clinical work in the hospital setting.

Method:
Categories of medication-related questions were proposed by one pharmaconomist based on her clinical experience. The categories were discussed in a group of pharmaconomists, pharmacists, and researchers who agreed on eight different categories. An electronic form for collecting questions in the clinic was developed and pilot tested for five days by two pharmaconomists. Based on the pilot test, the categories and form were adjusted into a final version. During a period of two separate weeks, sixteen pharmaconomists from Odense University Hospital - Svendborg Hospital registered all medication-related questions they received, according to the predefined categories, either in person or by phone from other healthcare professionals on all departments of the hospital. It was also registered whether the pharmaconomists were able to answer the questions themselves or had to pass them on to a clinical pharmacist.

Results:
The pharmaconomists received 224 medication-related questions. Almost four of five questions were received in the clinic (79%; n=177) while the remaining were received by phone (21%; n=47). The healthcare professionals who asked were nurses (83%; n=185), physicians (7%; n=15), others (e.g. pharmacists, students) (7%; n=14), and care assistents (5%; n=10). Questions most commonly concerned (1) questions from healthcare staff in bed wards (92%; n=205), (2) questions concerning fixed-dose medicines (e.g. tablet, extended-release tablet)(48%; n=107), (3) request from the healthcare professionals to urgently obtain a prescribed drug for a patient (40%; n=89), (4) questions concerning intravenous medicine (29%; n=64), (5) questions concerning drugs classified in the Anatomical Therapeutic Chemical classification system concerning the nervous system (24%; n=53), (6) questions concerning drug administration for patients (e.g. via tube, medicinal math) (20%; n=44). The pharmaconomists were able to provide an answer to the healthcare staff themselves in 90.5% of the cases, in the remaining 9.5% the questions were passed on to clinical pharmacists.

Conclusion:
The presence of pharmaconomists in the hospital departments raises many various questions from the healthcare professionals and in 9 of 10 times the pharmaconomists can give an answer immediately. This helps to provide a fast and correct treatment of the patient, prevents harmful incidents and strengthens handling of medicines in hospital departments. Furthermore the collected data helps pharmaconomists target teaching to healthcare professionals.

The nature of opioid prescriptions in a health facility in Bali, Indonesia

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Opioids may be prescribed to patients who had chronic pain which may and may not be related to cancer. Opioid has been used massively in other countries. Meanwhile, little is known about how Opioids are prescribed in Indonesia. The objectives of this study were to identify characteristics of Opioids used in chronic pain and to define conformity to the National Formulary at a public health hospital in Bali Indonesia. This was a retrospective study in which data was collected from prescription order information at the Pharmacy Central Department in a hospital in Bali. Inclusion criteria were complete prescriptions information and patients who received Opioids in the hospital from January to June 2022. Data collected was patients' demographics, types of Opioids prescribed, indications related to cancer or non-cancer, and the prescribers' specialties. There were 2584 patients who received Opioids at the hospital during data collection. Both genders almost equally received Opioids. More than 58% (1486/2584) patients received Fentanyl 100mcg Injection, 37 % (946/2584) patients were on Codeine 10mg, and the remaining patients had Morphine 10mg Injection, Morphine 10mg or 15mg Tablets. Anaesthesiologists mostly prescribed Fentanyl Injections, meanwhile the Internists, General Practitioners and Pulmonologists wrote Codeine 10mg Tablet in their prescriptions. Just over 6% (165/2584) of patients prescribed Opioids at the study hospital were cancer patients. 58% of the cancer patients were given Fentanyl 100mcg Injection, 23% of the cancer patients had Morphine 10mg Tablet, 7% were on Morphine 15mg Tablet, 6% received Codeine 10mg Tablet, and just above 5% of the cancer patients got Morphine Injection. This study also found that less than 30% of the prescribed Fentanyl Injections did not meet the National Formulary standards. This study found the majority patients received Fentanyl 100mcg Injection, mostly prescribed by Anaesthesiologists. While only a small proportion of cancer patients received Opioid, Fentanyl Injection was mostly prescribed in the study hospital. Further study is required to examine factors that limit Opioid prescription, particularly for cancer patients

Achieving staff satisfaction through promoting a flexible workplace and supported workforce

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background
SA Pharmacy services South Australian metropolitan and rural public hospitals, with a workforce of 762. In 2017 an all-staff survey indicated a desire for increased and equitable access to workplace flexibility. Optimised staff satisfaction is

an indicator for workforce engagement and retention of staff and leads to efficient, best care for patients.

Purpose
SA Pharmacy is committed to worker wellbeing and retention of our highly skilled workforce. In support, a project was initiated aimed at increasing staff workplace flexibility satisfaction.

Method
A workgroup of pharmacy technicians and pharmacists drafted a statewide procedure based on survey feedback, service need and human resource principles. Pharmacy Leaders presented an overview of the draft to staff and unions seeking feedback which was utilised to refine the procedure prior to implementation in 2018. In 2022 a deeper probing, all-staff survey was undertaken to assess workplace flexibility perceptions of staff, to inform a procedure review and provide a more customised tool to monitor staff satisfaction over time.

Results
One in ten staff responded to the survey with the responses indicating overall satisfaction has risen from 46% in 2017 to 73% in 2022. Further, as a surrogate measure, the percentage of staff working part-time has increased from 25 to 34% over the same time period. Staff agreed or strongly agreed with 80% of the survey questions indicating staff believe that SA Pharmacy Leaders support workplace flexibility. The questions that explored SA Pharmacy's culture of workplace flexibility indicated staff agree or strongly agree with 50% of positive behaviours expected in an organisation supporting workplace flexibility.

Discussion
By increasing staff satisfaction SA Pharmacy is able to optimise staff engagement and retention, best meet service demands and provide for the community. While satisfaction has increased there is opportunity to increase further. The procedure has been updated to support this. While Leadership support for flexibility is pleasingly evidenced in the results, the culture, as described by staff, is not fully aligned with published evidence. For example, leadership roles are perceived as less suitable for part-time by a greater majority of staff. An opportunity exists to challenge this perception. The survey tool developed will be utilised to measure staff satisfaction in a deep and ongoing fashion. A project is planned to seek staff consent to link individual responses in successive surveys enabling, point in time monitoring as workplace changes are made aiming to support flexibility.

Development, implementation and evaluation of the SA pharmacy workforce roadmap 2017-2022: A South Australian hospital pharmacy experience

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Background
SA Pharmacy services South Australian metropolitan and rural public hospitals. In 2017, SA Pharmacy undertook a workforce planning exercise, following the international workforce planning standard. Through the exercise we sought to understand the needs and desired of the existing workforce, identify areas to improve staff wellbeing, satisfaction and thus understand how best to optimise staff retention and engagement. The process involved analysis of staff demographics, an all-staff survey and expert clinician input from across the workforce. The information gathered was utilised to build a 5-year Workforce Roadmap to guide our strategic direction for workforce planning.

Purpose
To reflect on achievements of the projects outlined in our first workforce Roadmap 2017-2022, as a step in building our next Roadmap.

Method
Completion assessment of the 28 key projects, across the six workforce optimisation themes (Consistent Sustainable Workforce, Technician-Optimised Scope, Pharmacist-Optimised Scope, Support Workforce, Workforce Professional Development and Regional Workforce) was initially undertaken by the Workforce Lead against project plans with subsequent assessment of completion by the Workforce Executive. Examples of projects undertaken include standardisation of role description and position titles, establishment of talent pools and task delegation projects. A finalisation project report was provided to staff and unions which outlined achievements, listed projects undertaken that were not in the Roadmap and recorded unpredicted influencers, along with recommendations for inclusion in the next Roadmap. Feedback on the report was sought from staff. A traffic light system was utilised to identify the completion of each project, green-completed, orange-near completion, red-delayed.

Results
Overall 84% of the outcomes have been achieved. 18 projects are complete, 5 nearing completion and 2 delayed. 8 additional projects were completed and 8 unpredicted influencers were realised. The unpredicted influencers include the introduction of a new role classification stream for the technician workforce, pharmacy automation expansion, staff number expansion, patient flow priority projects, pharmacist prescribing and the pandemic. Workforce has increased from 606 to 762 headcount and 531 to 627 full time equivalent staff. 30 recommendations for the next Roadmap were made to either expand on

projects or spread the outcomes to include other staff groups within our workforce.

Discussion
The Roadmap was built on a strong evidence base informed largely by an all-staff survey and robust project outcomes were documented at the outset. Further, system wide projects were undertaken systematically by a single lead facilitating the staff input. Staff engagement was high with many staff contributing to workgroups. A robust governance process surrounded the Roadmap execution. The Roadmap was a point of reference for all prioritised projects, with , additional projects requiring Executive approval prior to progression. This , governance and participation by staff has significantly contributed to the high percentage achievement of Roadmap. We are progressing to build our next Roadmap utilising a similar model.

Reshaping prescribing: Evaluating collaborative ordering of medications by a pharmacist on a general medical team

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Background information: Collaborative Ordering of Medications (COOM) involves pharmacists and physicians working together to prescribe medications. There is emerging evidence that the model improves patient care.

Purpose: To determine if COOM by a pharmacist within a general medical team improves the quality and accuracy of prescribing, and deprescribing.

Method: This project compared usual medical prescribing to COOM by a pharmacist. The trial took place across two general medical teams at a large tertiary hospital during an eight-week period. The control group was a general medical team that continued usual medical prescribing. In the intervention group a COOM pharmacist worked alongside prescribers from admission to discharge. The pharmacist's role included taking a best possible medication history (BPMH), collaborative prescribing of medications on admission and attending daily ward rounds.

Results: During the trial period there were 66 patients and 545 orders for regular medicines in the intervention team and 61 patients and 511 orders in the control team.
The quality of the prescribing was assessed using a nationally validated audit tool. There was a reduction in errors from 33.9% (172/511) in the control group compared to 17.4% (95/545) in the intervention group. There were fewer medication omissions in the intervention (6.9%, 24/347) compared to control (10.9%, 36/330).
Deprescribing was assessed by comparing the average number of medications on discharge compared to admission. In the intervention, patients left hospital with a 6% reduction in medications when compared to admission (average of 5.5 medicines on admission vs. 5 on discharge). The control group had a 15% increase of medications compared to admission (average of 6 medicines on admission vs 7 on discharge).

Conclusion: The COOM model showed an improvement in quality and accuracy of prescribing, an increase in deprescribing, ultimately improving medication safety and responsible use of medications.

Outcomes of patients referred to an adult specialist immunisation service (SIS) for vaccination against SARS-CoV2

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Background:
Failure to achieve high vaccination rates could negatively impact individuals and the Public Health response to COVID-19. An adult Specialist Immunisation Service (SIS) was established at a tertiary hospital in Australia to provide expert advice about vaccination against SARS-CoV2 to people with potential contraindications.

Purpose
To safely revaccinate individuals with an adverse event following a previous dose of COVID-19 vaccine and provide first dose or second dose to others that were unable to obtain vaccination through other service providers.

Methods
A service evaluation retrospectively collected vaccination outcomes for 207 patients that attended from the 06/07/2021 to 02/09/2021.

Results
Of the 207 patients, 55% (n=115) were referred following a reaction to their first dose of a COVID-19 vaccine and 41% (n=85) had not received a COVID-19 vaccine due to perceived contraindications. The other 4% (n=7) were referred for advice on receiving a second dose of a COVID-19 vaccine due to emerging evidence since receiving their first dose.
Of the 115 patients that reported a reaction following first dose, 95% (n=109) were revaccinated. Sixty-seven percent (n=77) received the same vaccine, 28% (n=32) received a different COVID-19 vaccine. Four declined and two were lost to follow-up.
Of the 85 patients who had not received a COVID-19 vaccine, 98% (n= 83) received their first dose after evaluation. Two patients declined.
Of the 7 patients referred for advice prior to receiving a second dose, 43% (n=3) were given the same vaccine whilst 57% (n=4) switched to an alternative COVID-19 vaccine.
Twenty-one percent of the 199 patients vaccinated (n=41) reported symptoms during their observation period, none had anaphylaxis or were given adrenaline.

Conclusion
Patients referred to the SIS had a baseline risk of remaining unvaccinated or partially vaccinated. This evaluation demonstrates there is a role for a SIS to undertake a reassessment of previous reactions or perceived contraindications to vaccination before ruling an individual ineligible to receive further vaccinations, not only for COVID-19 vaccines but for other vaccine preventable diseases.

Pharmacist perspectives on the introduction of a collaborative pharmacist-physician prescribing model in digital hospitals

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Background:
To ensure sustainable use of resources clinicians must work more effectively and efficiently, while maintaining patient safety. Pharmacist-physician collaborative prescribing models have demonstrated positive outcomes in patient safety, patient satisfaction and service costs. However, most studies have occurred in paper-based prescribing settings. Translation of the model into a digital system needs rigorous planning, implementation and evaluation to ensure success and ongoing sustainability. A local pilot project in 338 patients, investigated the feasibility of implementing a digital collaborative optimisation and ordering of medication (COOM) model at discharge. Despite showing a reduction in medication errors at discharge 27% (intervention) vs 41% (control), this study found barriers to implementation, including functionality of the digital system and stakeholder engagement.

Purpose:
To investigate the perspectives, barriers and enablers of hospital pharmacists towards a COOM model in digital hospitals.

Methods:
Semi-structured interviews were conducted with pharmacists, over a 4-month period, in two tertiary digital hospitals, in Queensland, Australia. Interviews were audio recorded, transcribed verbatim and thematically analysed, using both deductive and inductive thematic analysis. Reliability tests were conducted by two independent coders. Interviews were conducted until data saturation occurred and there was an appropriate sample with representation from both senior and junior pharmacists.
Inductive thematic analysis was conducted using Braun and Clarke's methods of familiarisation of data, code and theme generation, review of themes, defining themes and identifying examples. Deductive thematic analysis was performed using Theoretical Domains Framework (TDF) to investigate behaviour change, including barriers and enablers for implementation. Identified themes were mapped to the 14 domains in the TDF.

Results:
Twelve clinical pharmacists participated. Using inductive thematic analysis five themes (and 13 subthemes) were identified; 1) existing pharmacist roles, 2) current prescribing practices, 3) how collaborative prescribing can optimise care, 4) barriers to and 5) enablers for success of the proposed pharmacist-physician collaborative model. Deductive analysis using the TDF identified 8 of the 14 domains including: 1) knowledge, 2) skills, 3) social and professional identity, 4) beliefs about capabilities, 5) goals, 6) environmental context and resources, 7) social influences and 8) emotion.
Pharmacists perceived the model would reduce prescribing errors and improve patient outcomes. Potential barriers included pharmacy staff resourcing and physician receptiveness. Enablers to ensure successful digital translation included recruitment of pharmacists with appropriate clinical skills and soft skills (including confidence and communication), stringent pharmacist training and competency assessment, pharmacist knowledge (both clinical and of the digital system) and clearly defined roles/responsibilities.

Conclusion:
Pharmacists perceive that a COOM model in a digital setting could improve prescribing practices and provide more efficient and safer patient care. However, appropriate recruitment, training and resources will be key to the successful implementation of the model. A similar study will be conducted with physicians and both studies will inform the design and implementation of a multi-site intervention-controlled trial of the COOM model in a digital setting.

An evaluation of pharmacist-led digital health interventions in a long-term care facility for the elderly

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background
Studies show hospitalization due to adverse drug reactions for older adults, aged 65-74 years, four times greater than those who are younger. Moreover, 88% of these drug-related problems (DRP) tend to be preventable. Since then, Shin Kong Wu Ho-Su Memorial Hospital's Department of Pharmacy has routinely assigned pharmacists to long-term care (LTC) facilities for drug regimen reviews (DRR). However, with the COVID-19 pandemic, initial restrictions for in-person contact have led to remote pharmaceutical services and the digitalization of medical records. This implementation has not only improved pharmacist-led interventions but also the acceptance from physicians on any DRPs.

Purpose
To efficiently reduce inappropriate medication within high-risk groups. Also, ensure the patient's safety and improve

the quality of healthcare through the assistance of digitalization.

Method
This study was conducted through retrospective chart reviews. The physician's acceptance rate on DRP between 2018 to 2022 was collected and further evaluated. Furthermore, the implementation of a digitalized electronic information system before and after 2019 was assessed. Additionally, a statistical analysis was performed using the chi-square test.

Result
In 2018, 63 cases with DRP were identified, among those 54 pharmacist-led interventions were accepted by physicians, 6 rejected, while 1 case deceased during follow-up, and 2 cases withdrew from participation. Overall, the acceptance rate was 86%. In 2019, among 56 cases with DRP, 54 interventions were accepted, 0 rejected, 1 death, and 1 withdrawn. As a result, the acceptance rate was 96%. Despite the occurrence of a pandemic, during 2020, 2021, 2022, more than 280 DRP were identified and resolved, with a final acceptance rate of 98.66%, 95.65%, and 97.3%, respectively. Results were examined through the chi-square test, which found a significant increase of physician acceptance rate from years' 2019 to 2022 compared to 2018 ($P < 0.05$).

Conclusion
With the enhancement towards digitalized health information systems for pharmacist-led interventions, a significant increase in the acceptance rate for DRP within long-term care facilities was observed over time. The ability to efficiently communicate with other healthcare professionals and generate electronic documentation further allowed pharmacists to identify, resolve, and prevent future adverse events within the elderly population, who are especially at risk of drug-related problems.

Preliminary exploration of the adequacy of pharmaceutical consultation recommendations obtained through an open artificial intelligence model

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Background
Pharmacists provide various services, including pharmacy consulting, monitoring, and education, to help improve patient health outcomes. Pharmaceutical consultation involves evaluate a patient's medication regimen and provide medical information to ensure safety and effective use of medications. In November 2022, an AI chatbot named ChatGPT was introduced and quickly gained popularity. Currently, it has over 100 million registered users, providing human-like responses to user inquiries.

Purpose
This study assessed the quality of responses generated by the AI chatbot to simple pharmaceutical consultation inquiries using a qualitative approach.

Method
We collected a total of 197 pharmaceutical consultation inquiries from the pharmacy counseling counter and telephone in a tertiary medical center in Taiwan in February 2023. Twenty questions were randomly selected as the test set data. The question types are divided into five categories: medication information, particular population dose adjustments, drug-drug interactions, parenteral compatibility and others. Questioners can be divided into the general patients and healthcare professionals. Each question was put the free AI interface and the responses were recorded. Each responses record was graded by two experienced clinical pharmacist. A total of 2 reviewers participated in this study. Responses were evaluated by reviewers using pharmacy reference books and guides and were classified as "appropriate" or "inappropriate". If the two reviewers gave inconsistent responses, the result was recorded as "unreliable"

Results
AI model responses to 18 random questions (90%). There were two questions about the early reservation of medication pick-up for refillable prescriptions for patients with chronic illnesses, which ChatGPT was unable to answer. Ten of the questions posed by healthcare personnel, six were graded as inappropriate (60%). As an instance, the AI chatbot provided incorrect responses to inquiries regarding the Y-site compatibility of ceftriaxone and calcium gluconate, which may put patients at risk of harm. On the other hand, out of the eight questions posed by patients, only two were graded as inappropriate (25%). The responses regarding the interpretation of alprazolam taken concurrently with a course of paxlovid therapy do not provide sufficient information. However, the AI chatbot provided mostly appropriate responses to simple drug information questions from patients when compared to its responses to questions posed by healthcare professionals.

Conclusion
This exploratory study found that an AI chatbot provided largely appropriate responses to simple pharmaceutical questions as evaluated by pharmacists. However, for forward questions related to a patient's individual scenario, the answer may be inaccurate or neutral, making it difficult for the inquirer to obtain the desired information. As a pharmacist, many patients and healthcare professionals still rely on us for medication information and education. This AI chatbot remains inappropriate for medical use now, but we can still see the huge potential for it to be used as a counseling tool in the future.

Evaluation of acetylcholinesterase inhibitors in long-term prescribing patterns for dementia patients

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Background:
Acetylcholinesterase inhibitor (AchE-I), a choice for dementia treatment, had been proven its efficacy in delaying the progression of dementia. However, long-term prescribing patterns still need more real-world evidence in these patients.

Purpose:
To investigate the persistence of two AchE-I drugs, the donepezil oral tablet and rivastigmine transdermal patch, in dementia patients and to evaluate the differences in long-term prescription patterns.

Method:
A retrospective study included patients diagnosed with dementia from the neurology department of a regional hospital in southern Taiwan from February 2019 to April 2021. The patients were given donepezil oral tablet or rivastigmine transdermal patch, and the medication records were followed for 2 years. Chi-square test, Student's t test, and Kaplan-Meier curves were used. Statistical significance was set at a two-sided p-value < 0.05.

Results:
Among a total of 98 enrolled patients, 67 (68.4%) were prescribed donepezil oral tablet and 31 (31.6%) were prescribed rivastigmine patch. No significant differences were observed in the baseline characteristics between the two groups. After 2 years of follow-up, the persistence in the donepezil group was significantly higher than in the rivastigmine group (62.7% vs 9.7%, p< 0.0001). The median time to first discontinuation was 150 days in the rivastigmine patch group (95% CI 80.2-219.8). The reasons for discontinuing medication were mostly inappropriate use of the patch which resulted in itchy skin effects (73%).

Conclusion:
Drug persistence in the donepezil oral tablet group was relatively higher after 2 years of follow-up than that of the rivastigmine transdermal patch group. Skin side effects caused by inappropriate use were found to be the main reason. The results highlighted the need to enhance dementia medication instructions by pharmacists to improve drug persistence and compliance in the future.
HPS-027

The efficacy of pharmacist-conducted patient group education in a psychiatric day care ward in Taiwan

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Background
Medication adherence is an important issue for stabilizing chronic illness, especially in psychiatric patient. By providing pharmacist-conducted group education, psychiatric patient may enhance medication attitude and adherence.

Purpose
This study aimed to investigate the efficacy of intervention toward medication attitude and adherence for in-ward patients in psychiatric day care ward by providing pharmacist-conducted group education.

Methods
We provided a monthly pharmacist-conducted group education for inpatients in the psychiatric day care ward at Taipei Tzu-Chi Hospital, New Taipei City, Taiwan from August 2021 to December 2021. In the first and fifth month, we distributed self-reported "medication attitude questionnaire" and "medication adherence questionnaire" pre and post group education. The questionnaires were analyzed using a symmetric 5- point Likert-type scale and only patients who completed all the questionnaires were included in the study. The analysis involved comparing medication attitude and adherence pre and post group education in the first and fifth months.

Results
A total of 14 patients were included in the final analysis. The mean scores for pre-education medication attitude and adherence were 3.28 and 3.92, respectively. In comparison to the pre-education phase, no significant differences were observed in the post-education scores for either medication attitude (mean score: 3.31) or medication adherence (mean score: 4.06) at the first month. Moreover, the medication attitude at post-education on the fifth month (mean score: 3.92) did not show significant difference from the pre-education scores at the first month. However, medication adherence showed a significant improvement between the pre-education scores during the first month and the post-education scores at the fifth month (mean: 4.49, p < 0.05).

Conclusion
The result indicated that the pharmacist-conducted group education did not show significant difference in medication attitude or adherence in short term. However, the long term education improved the medication adherence. Therefore, monthly group education sessions may be effective. More data is needed to confirm the results.

Effect of minor bleeding during thrombolysis on the early prognosis of patients with acute ischemic stroke

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background: Acute ischemic stroke (AIS) is one of the most common cerebrovascular diseases, accounting for 60-80% of patients with all types of strokes. One of the main treatments for AIS is intravenous thrombolysis (IVT) with recombinant tissue plasminogen activator (r-tPA), which is the only drug approved for this specific purpose by the U.S. Food and Drug Administration (FDA). IVT can effectively reduce the risk of disability within 90 days of the occurrence of stroke. However, bleeding is a major type of adverse effects of IVT that warrants medical attention. Particularly, the incidence rate of symptomatic intracranial hemorrhage (sICH) after IVT ranges from 2%-7%, which is associated with poor prognosis and high mortality in AIS patients in large-scale studies. Moreover, minor non-intracranial hemorrhage (e.g., bleeding from mucosal surfaces) is also common in patients who underwent IVT, with an incidence rate of 19.8%. However, it remains unclear whether minor bleeding during IVT increases the risk of ICH after IVT or affects the functional outcomes of AIS patients.

Purpose: This study aims to explore the effect of minor bleeding during intravenous thrombolysis (IVT) on the early prognosis of patients with acute ischemic stroke (AIS).

Methods: Patients from Nanjing Drum Tower Hospital with AIS who received IVT with recombinant tissue plasminogen activator (r-tPA) were included in the sample that considered cases registered between December 2016 to December 2021. Clinical outcomes were functional outcomes included modified Rankin Scale (mRS) at 3 months after IVT, intracranial hemorrhage (ICH) during 36h after IVT, and in-hospital mortality. Multivariable logistic regression was used to determine the association between minor bleeding during IVT and the reported clinical outcomes.

Results: A total of 391 AIS patients with IVT were included in this study. Overall, during the administration of r-tPA, minor bleeding occurred in 107 patients (27.37%), and no bleeding occurred in 284 patients (72.63%). Compared with results identified in patients that did not bleed during IVT, minor bleeding during IVT may significantly increase the occurrence of ICH within 36h after IVT (5.99% vs. 13.08%, P=0.021) and in-hospital mortality (2.22% vs. 6.54%, P=0.029). Results of the multivariate logistic regression analysis showed that minor bleeding during IVT was an independent risk factor for ICH within 36h after the occurrence (OR, 2.44; 95%CI, 1.11-5.35; P=0.026). However, there was no statistically significant increase in in-hospital mortality (OR, 3.01; 95%CI, 0.83-10.28; P=0.094). No differences in functional outcomes at 3 months after IVT were observed between the two groups.

Conclusion: In AIS patients receiving IVT, minor bleeding during IVT was associated with ICH within 36h after the occurrence, but did not affect early functional outcomes or in-hospital mortality.

Application of the capability, opportunity, motivation 'COM-B' model to explore barriers and facilitators to participation in research by Australian hospital pharmacists and pharmacy technicians: A cross-sectional mixed-methods survey

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background: Combining research and clinical practice is crucial for the advancement of evidence-based healthcare and ongoing improvement of pharmacy service delivery. While hospital pharmacists report significant interest in research, this does not translate to high levels of research engagement, furthermore, little is known regarding barriers and motivators for pharmacy technician involvement in research.

Purpose: To characterise the barriers and enablers to engaging in practice-based research reported by hospital pharmacy staff using the Capability, Opportunity, Motivation - Behaviour (COM-B) framework.

Methods: An online cross-sectional survey, using the validated Research Capacity in Context tool, was sent to all employees of a statewide hospital pharmacy service. Respondent characteristics and quantitatively reported barriers and motivators were analysed using descriptive statistics. Qualitative data from open text responses were analysed through inductive thematic analysis and mapped to the components of the COM-B framework at individual, team and organisation levels.

Results: 278 responses were received (response rate 43.3%) from pharmacists (68.0%) and pharmacy assistants/technicians (28.4%) across 19 hospitals. Both pharmacists and technicians most frequently indicated that a lack of time for research, other work roles that take priority, and a lack of suitable backfill hindered their involvement in research. Qualitative analysis of free text survey responses found factors with both internal and external loci of control influenced research engagement via five of the six COM-B subdomains. Factors mapped to psychological capability, reflective motivation, physical opportunity and social opportunity were recognised.

Conclusions:
Mapping of factors associated with research participation by hospital pharmacy staff to the COM-B model is an important step towards identification of evidence-based intervention types that could form the basis for strategies to optimise

hospital pharmacy staff engagement with practice-based research, using the behaviour change wheel.

Evaluation of research capacity and culture of hospital pharmacists and pharmacy technicians in a state-wide Australian public health service: A cross-sectional survey

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background:
Integrating research with clinical practice is essential for evidence-based practice and continuous improvement in health care. Little is known about the research capacity and culture of the Australian hospital pharmacy workforce, particularly in rural areas and for pharmacy assistants/technicians.

Purpose:
This paper aims to characterise the research capacity and culture of a state-wide public-hospital pharmacy service at organisation, team and individual levels, and to explore variables which influence research confidence and success.

Method:
An online, anonymous, cross-sectional survey using the validated Research Capacity in Context tool was emailed to all pharmacists, pharmacy assistants/technicians and non-clinical staff employed by a statewide pharmacy service in South Australia. Respondent characteristics and organisation, team and individual scores of research skill/success were summarised using descriptive statistics. T-tests compared results for pharmacists and pharmacy assistants/technicians and metropolitan-based and non-metropolitan-based staff. Regression analyses explored predictors of pharmacist individual research skill/success scores.

Results:
A response rate of 43.4% (n=278/641, 19 sites) was obtained. Respondents were primarily pharmacists (68%) and pharmacy assistants/technicians (28%); 91% were practicing in a metropolitan setting. 47% reported no research experience. Highest scores for research skill/success were observed at the organisational level (mean score 6.0/10) vs. team (mean score 5.6/10) and individual levels (mean score 5.1/10). Within each level specific items that scored poorly were identified. Individual research skills/success scores were higher in pharmacists vs. pharmacy assistants/technicians (mean score 5.2/10 vs. 4.2/10, $p<0.01$), and were not different between staff in metropolitan vs. non-metropolitan settings (mean scores 5.2 vs. 5.0, $p=0.77$). For pharmacists, undertaking undergraduate or internship research projects or postgraduate research training were associated with higher individual scores of research skills and success.

Conclusion:
This research extends understanding of hospital pharmacy research capacity and culture, describes research skills and success in hospital pharmacy technicians/assistants for the first time and highlights low-scoring areas; these could be targeted to improve research capacity and culture at an individual, team and organisational levels.

Role of oncology pharmacist in developing adherence to complete elements of prescription and avoiding potential drug related problems in a tertiary care hospital

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Introduction:
Physicians or other registered health-care professional use prescription to communicate with pharmacist, authorizing them to dispense a specific prescription drug for a specific patient. Medication reviews, which in fact are often carried out by pharmacists in partnership with physicians, can help identify and solve DRPs (Drug Related Problems). One reason for prescribing errors in cancer is the uncommon practice of dose calculations on the patient's body surface area (via height and weight).
The same safety guidelines that apply to parenteral therapy should also apply to oral doses; the prescription should specify the patient's height, weight, and body surface area as well as the dose per body surface area, the final calculated dose, and the total number of doses needed for the course of treatment. Dosing calculations should be carefully checked using a multidisciplinary system.
This investigation is to obtain a complete prescription for chemotherapy from the clinician in an opd setting to guarantee that any drug-related issues are resolved. This is possible at the pharmacy's end, where the pharmacist can cross-check the prescription, but only if all its elements are present.

Method:
The concurrent study was carried out on 105 patients of oncology who went to the pharmacy on an out-patient .Based on the prescription elements, their prescriptions were examined for completeness. Those comprise of:

- Patient identification (name & MR)
- Age
- Weight
- Height
- Body Surface Area
- Medication (dose, route, frequency)

After obtaining the prescription holder's consent, prescriptions were clicked, and data was compiled. The effects of the aforementioned factors on the standard of patient care were observed and researched. Missing

information interened and classified according to PCNE classification

Results:
105 chemotherapy prescriptions were analyzed for complete elements of prescription. A total number of 105 missing elements of prescription were found in 105 prescriptions (100%) of which 2.8% were related to the missing dose and frequency, 51.4% were related to missing of both dose and frequency, 4.76% were related to missing of frequency and wrong brand of a drug, 2.8% were related to the missing route of drug, 2.8% were related to the wrong brand of drug, 3.8% were related to the wrong frequency of the drug.
The chemo pharmacists reviewed all the prescriptions for potential drug-related problems. Of all 105 prescriptions, 73 (69.5%) patients had at least one DRP and the total number of DRPs identified was 82. The total number of 73 interventions were accepted in 73 individual prescriptions. All the interventions were fully accepted, implemented and the problem was fully resolved.
When a prescription is complete, pharmacists can assist more effectively and spend less time with each patient double-checking the regimen.

Conclusion
A considerable percentage of the prescriptions examined for this study had serious errors and were occasionally illegible. By emphasizing the significance of prescription writing and holding various sessions on the subject for the goal of physician education,

Impact of avoidable medication return on inpatient pharmacist duty hours in a tertiary care hospital

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Introduction:
The pharmacist plays a critical role in the management of medication use in the healthcare system. Return of medicine from wards into satellite pharmacies is one of the significant concerns for increasing the workload on pharmacist.
The present study aims to embrace the investigation of the type, amount, and reason for return of medication from different wards and time consumption in this activity at academic medical center.

Method:
The quantitative Retrospective study was conducted to analyze the dispensed medicines which return back to inpatient pharmacy from different wards of hospital for three years. Data collected for all medicines from nov 2019 to oct 2022. Top 10 drugs were identified and reasons of returned were observed. Time consumed for the activity of credit for 3 years was calculated.
All returned medications were investigated by use of CPOE system for change in dose of medication, change in frequency, IV to PO switch, Order Discontinue by the Physician and PRN orders not utilized.

Result: Total number of transactions were 1,922,973. For each transaction 16 seconds consumed. On average, Total hours consumed were found to be 2848.9 hours per year which on average is 7.79 hours per day.
Top 10 drugs identified, and percentage return was calculated.
For reasons of credit 60 rx of top 10 drugs were reviewed, (20 rx of each drug from each year). Results of total 600 observations are recorded.

Conclusion: Pharmacist spend thousands of hours in managing nonproductive work of processing medication return. Specific strategies for the most returned drugs can reduce the return and the same time can be spend on improving quality of medication management.

A pharmacist's role as a mentor in caring for patient's mental wellbeing

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background and Purpose
Patient care dose not only require the simple prescription of medications but necessitates complete holistic care with attention to mindfulness. It is urgently necessary to think about the roles of pharmacist for patients and to seek for the direction of change.
We are trying to grow into mentor-pharmacist who can lead patients to solve the root cause of their disease.

Methods
The "mentor class" among the pharmacist executives was first implemented in the 2021~2022. Since then it has expanded into multi-department meetings that include the lead pharmacists and other departments in the hospital. Through the mentor classes, one is given the opportunity to self reflect, and perhaps alleviate any past issues and conflicts, resulting in healthier mindsets among the professionals. This will hopefully translate into relating better with the patients and thereby strengthen interpersonal skills between patients and healthcare providers. The potential outcome is to heal patients not only with prescribed medications but also in a wholistic approach.
One of the methods executed to promote mindfulness within the hospital for the staff was distributing pamphlets titled "Mind Healers for Patients". The hope was to provide a daily reminder and opportunity to reflect on healthcares' roles towards patient care in a wholistic manner.

Conclusion
The goal of the "mentor-pharmacist" is for the pharmacist and also the other healthcare providers in the hospital to

become more cognizant of the root behind one's discomforts or illness. This can be achieved through first the healthcare providers being self aware and reflective of their own and patients mindfulness. This will result in one becoming more sympathetic towards patients' mental health and caring for them from all aspects. These movements and efforts can heal many more patients lives in the future.

Risk factors and management of euglycemic diabetic ketoacidosis in type 2 diabetes: A Case-control study

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background
Diabetic ketoacidosis (DKA) is a serious acute complication of diabetes that can sometimes be life-threatening. DKA typically occurs in patients with type 1 diabetes, but euglycemic diabetic ketoacidosis (eu-DKA) can occur in patients with type 2 diabetes. However, the blood glucose levels in eu-DKA are lower than those typically seen in DKA, which can lead to delayed treatment.

Purpose
Assess the risk factors for eu-DKA and develop preventative strategies to avoid this condition in patients with type 2 diabetes.

Method
A case-control study conducted at Ditmanson Medical Foundation Chia-Yi Christian Hospital, Chia-Yi City, Taiwan. The study collected data from patients with type 2 diabetes who had experienced euglycemic diabetic ketoacidosis as the case group, and patients without eu-DKA as the control group. For each case, four controls were randomly selected and individually matched by age, sex, and index year. The study period was from January 1, 2017 to December 31, 2020. Logistic regression was used to analyze the data and identify significant risk factors for eu-DKA in patients with type 2 diabetes.

Result
66 patients with type 2 diabetes who had experienced eu-DKA were included in the case group, and 264 patients in the control group.Our study found that several factors were significant risk factors for eu-DKA in patients with type 2 diabetes. These risk factors included the use of sodium–glucose cotransporter 2 (SGLT2) inhibitors (adjusted OR: 4.4,p=0.004) or insulin (adjusted OR:4.1,p=0.002), infections (adjusted OR:4.5,p<0.001) ,particularly in pneumonia (adjusted OR:2.4,p=0.031), chronic kidney disease (adjusted OR:3.4,p=0.01), and cardiovascular surgery (adjusted OR:14.5,p<0.001). Based on our study's results ,we found SGLT2 inhibitors and surgery are significant risk factors for eu-DKA, a computer safety system was created for SGLT2 inhibitor medication during the perioperative period to manage drug safety and avoid eu-DKA.

Conclusion
The results of this study indicate that healthcare professionals should closely monitor patients with type 2 diabetes who exhibit risk factors for eu-DKA. Additionally, implementing a computer system to intervene at an earlier stage may be beneficial in preventing eu-DKA in this patient population.

Optimizing vaccine management with QR-code technology and automatic dispensing cabinet

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background
Vaccination is an important strategy to prevent and control infectious diseases. Our hospital is highly concerned about the safety of vaccine administration. After observations and interviews, it was discovered that the quality of vaccine management should be enhanced.

Purpose
Improve vaccine administration safety, batch number accuracy, and the efficiency of personnel operation.

Method
A team of pharmacists along with a nurse representative and an engineer was constituted to investigate the issues surrounding vaccine management and identified barriers and challenges faced by nurses.
These barriers included vaccine familiarity, the occurrence of vaccine misplaced, and wrong records of the batch number.
After the identification of barriers, a plan was developed to overcome these obstacles.
We collected the data to evaluate the effectiveness before and after the change.
The team developed a strategy to solve the problems which included:
Setting an automatic dispensing cabinet to eliminate the possibility of vaccine misplaced.
There was a QR-code sticker, which records the vaccine's identification code, batch number, and expiration date, on each vaccine and electronically scanned to verify its accuracy

before vaccination and recorded the batch number in the HIS system at the same time.

Results
In the pre-optimizing period (03.2019-02.2020), there were 23 vaccine-misplaced events, compared to no error events in the post-optimizing period(07.2020-06.2021).
In terms of batch number accuracy, there were 35 incorrect events in the pre-optimizing period, compared to no error events in the post-optimizing period.

Conclusion
Combining QR-code technology with an automatic dispensing cabinet and integrating the vaccine management system significantly reduced the risk of vaccine administration errors and improved batch number accuracy and the efficiency of personnel operation.

The development & implementation of an extended-hours emergency department (ED) pharmacy service

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Context
The Pharmacy Department currently provides a clinical service solely to inpatient wards resulting in low rates of medicines reconciliation, long patient wait time to clinical pharmacy review, and high medication errors at admission from Emergency Department (ED).

Planned change
The aim is to capture patients early in their admission to hospital to optimise patient outcomes and encourage safe use of medications within the ED environment and beyond. Pharmacy was allocated 4.3 FTE to establish an extended hours Emergency Department pharmacy service. ED Pharmacists assist medical staff in admissions flow processes by helping prescribers chart medications on admission & medication related decision making. ED Pharmacists also help to reduce rates of omitted medicines in ED by helping identify patients who have medications due and assisting with prescribing & supply processes. The impact of the ED pharmacy services is to improve the rates of admission medicines reconciliation, early clinical pharmacy intervention, and improved medication safety in the emergency department.

Methods
Since March 2022, 1.3 FTE pharmacists have started staffing and providing clinical pharmacy services in the Emergency Department. They have been documenting daily key performance indicators and providing written patient handover to ward pharmacists.

Measurement of improvement
Evaluated the percentage of completed medicines reconciliation for patients from ED. Evaluated the percentage of activities performed by pharmacists including patient education and clinical advice regarding drug therapy, administration, and prescribing.

Effects of changes
The new ED Pharmacy service has increased patient-pharmacist interactions through med history interviews. It has reduced admission medication errors and harm. In addition, it has improved allergy documentation, increased clinical pharmacist reviews and interventions, and increased number of Maori patients reviewed by pharmacists.

Lessons learnt / implications for others
There is a significant value that Pharmacists provide to patients and staff in ED, and we are planning to extend hours to weekends once we are fully staffed to 4.3 FTE.

Medication-use evaluation: Real-world analysis of low-dose rivaroxaban in patients with coronary and peripheral artery diseases

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background: Low-dose rivaroxaban (Rivaroxaban 2.5mg, Xarelto®) is one product of direct oral anticoagulants (DOACs). The indication of low-dose rivaroxaban is co-administered with aspirin to prevent atherothrombotic events in adult patients with coronary artery disease (CAD) or symptomatic peripheral artery disease (PAD) at high risk of ischemic events.

Purpose: The purpose of this study is to evaluate real-world the usage and safety of low-dose rivaroxaban in a medical center in Taiwan.

Method: This retrospective study collected patients who received low-dose rivaroxaban in a medical center in Taiwan between 2022/3/1 and 2022/9/31. We wanted to assess the accuracy of indication, dose, kinds of co-administered medication, and adverse drug reactions during therapy of low-dose rivaroxaban.

Results: A total of 98 patients were enrolled in this study. The average age of patients is 70±12 years old. Male patients account for 62.2%. Indications of rivaroxaban were PAD (n=68), and CAD (n=28). There were 2% of patients (n=2) with inappropriate indications and doses and corrected after advice by pharmacists. Only three adverse drug reactions (ADR) were reported in this study, all minor. The symptoms of ADRs were cough, pruritus, and hematuria. In co-administered medication issues, 76.5% of patients (n=75) were treated with aspirin, and 23.5% of patients were

treated with other agents (cilostazol, clopidogrel, or CoPlavix®, n=23).

Conclusion: This real-world analysis demonstrates that indication, dose, and ADRs were the same as we expected. However, the findings regarding co-medications were unexpected. As a result of these study outcomes, restrictions on prescribing rivaroxaban were added to the computerized prescription system on 2022/11/28. It also demonstrated that medication-use evaluation is a systematic and interdisciplinary performance improvement method for pharmacists to optimize drug therapies in the future.

Drug-related problems among hospitalized heart failure patients in China

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background: To evaluate the characteristics of drug-related problems (DRPs) in heart failure (HF) Patients, and to identify the impact of pharmacists' intervention in HF associated DRPs.

Methods:
Clinical pharmacists detected DRPs in patients with heart failure and provided interventions based on prescription information, a direct patient-pharmacist interview, and ward rounds with the multidisciplinary team (MDT) in an investigative, single-arm intervention trial. Based on the Pharmaceutical Care Network Europe (PCNE) DRP categorization V9.0, which has three main domains for problems, nine causes, five interventions, three outcomes, and four DRP statuses, the types and causes of DRPs, interventions, acceptance, and outcome were sorted.
Epidata version 4.2.0 was used to enter the data, while SPSS version 25.0 was used for analysis. The characteristics of the patients were compiled using descriptive statistics. To find factors that are related to dependent variables, binary logistic regression analysis with single and multiple variables was used. Statistics were deemed significant at $P < 0.05$.

Results:
Totally, 142 Heart Failure Patients were enrolled, a total of 647 DRPs were identified in 116 (81.69%) patients. The DRPs were identified by clinical pharmacists. The mean age of the study participants was 43.36 ± 16.54 years and nearly half (47%) were in the age group of 31–60 years. The major type of DRPs was treatment effectiveness (336; 51.93%) and treatment safety (227; 35.09%). For the "treatment effectiveness" category, the "effect of drug treatment not optimal" was dominant category (127/336; 37.80%). A total of 166 DRP causes were identified, and most of DRPs were caused by "drug selection" (87; 52.41%) and "dose selection" (79; 47.60%). Within the "drug selection" category, "no or incomplete drug treatment in spite of existing indication" was dominant category (25/27; 92.6%). Angiotensin receptor - enkephalase inhibitors (ARNI) (78%), Diuretics (55%), beta-blockers (BBs) (48.42%) were the commonly used drug classes by study participants. The presence of comorbidity ($p < 0.001$) and level of education of study participants ($p = 0.03$) had a significant association with the occurrence of DRPs. According to DRPs, 459 interventions were provided by clinical pharmacists and 70.94% of interventions were accepted by prescribers or patients. Finally, 474 (93.6%) DRPs were solved and accept.

Conclusions: Insufficient heart failure control in people with the condition is primarily brought on by improper selection. The occurrence of DRPs was significantly correlated with the study participants' comorbidity status and educational attainment. To reduce DRPs, it is advised to look into possible drug-drug interactions before beginning a new therapy, monitor adverse drug reactions, make sure pharmaceuticals are available for the long term, and participate in frequent education programs.

A case of suspected teicoplanin-induced thrombocytopenia in a teaching hospital

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background:
Teicoplanin is a type of bacteriostatic glycopeptide antibiotic that has a similar spectrum of activity and efficacy as vancomycin, but is better tolerated with fewer adverse events. This article presents a case of suspected teicoplanin-induced thrombocytopenia as a reference for clinical practice.

Case:
The patient is a 45-year-old man with a medical history of diabetes and hypertension. He reported stepping on a rusty nail on the sole of his right foot two days prior but did not seek treatment. He developed swelling, redness, and a fever, which did not improve with Acetaminophen. He also experienced pain in the left side of his abdominal wall and went to the emergency department, where an abdominal computed tomography showed gallstones. He was admitted for further treatment due to an initial diagnosis of cellulitis in his right foot, which required surgical debridement. He received Flomoxef 1g q12h empirically on 3/24 in the emergency department, then was switched to Amoxicillin and Clavulanate 1.2g Q8h on 3/26 after admission. On 3/27, he underwent surgical debridement, and tissue was taken for cell culture. The culture on 3/30 showed ORSA, and his antibiotic was changed to Teicoplanin 800mg q12h loading dose and 800mg QOD maintenance dose (ccr:54.5).On 4/11, the patient developed a fever, and blood was drawn for evaluation of laboratory data. A significant abnormality was observed in the platelet count (10^3/μL), which occurred after the administration of Teicoplanin. (02/11 :164 ;03/24 :180 ;04/11 :15). The doctor suspected that it was Teicoplanin-induced thrombocytopenia. Therefore, Teicoplanin was discontinued and replaced with Clindamycin 300mg q8h (4/11~4/21MBD). After discontinuing Teicoplanin, the patient's PLT gradually increased and

showed a trend of recovery.(04/13 :32;04/15: 96).On 4/21, the physician reported Teicoplanin-induced thrombocytopenia. The pharmacist assessed the incidence of adverse reactions to this medication and found that according to Micromedex, hematologic adverse effect of thrombocytopenia occurs in 0.1% to less than 1% of patients taking Teicoplanin. The elimination half-life in adults is 100 to 170 hours. Since the patient's PLT values gradually improved after stopping Teicoplanin, it is reasonable to suspect that Teicoplanin was the cause of the thrombocytopenia.

Discussion:
After evaluating this case, it was determined that the Naranjo score was 5. The outcome of thrombocytopenia led to an extended hospital stay, which is considered a severe severity level. Although Teicoplanin is generally considered safe, potential adverse drug reactions may be overlooked, especially in hospitalized patients with underlying conditions. Therefore, antibiotics should be used with caution, and laboratory data should be monitored to minimize potential adverse reactions. The patient's medical record has been annotated with a history of Teicoplanin-induced thrombocytopenia to prevent future exposure to the drug. This case has also been reported to the adverse drug reaction center. Thrombocytopenia typically resolves within five to seven days of drug discontinuation, which is consistent with the situation in this case. We hope to raise awareness of medication safety through sharing experiences like this case and work together to safeguard the health and medication safety of patients.

Improving postpartum hemorrhage care and optimizing computerized provider order entry (CPOE) usage through interprofessional collaborative practice (IPCP) sharing

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background: Postpartum hemorrhage (PPH) is an important obstetric emergency and is one of the top five causes of maternal death in both resource-rich and resource-limited countries. Therefore, timely identification and management are crucial to preventing death. This article aims to share the involvement of pharmacists in interprofessional collaborative practice discussions on PPH cases, prescription patterns, and improvements to medication administration processes.

Methods: Physicians, pharmacists, nurses, and social workers participated in discussions on PPH cases. The commonly used hemostatic drugs for PPH include oxytocin and Tranexamic acid. Although Misoprostol (200 mcg/tab) is an off-label use for PPH treatment, it is essential. Through a retrospective analysis of 153 postpartum women from December 2020 to May 2021, two cases of postpartum hemorrhage using Misoprostol treatment were identified. Case 1 received 400 mcg + 400 mcg, and Case 2 received 600 mcg + 550 mcg rectally. Both cases had poor efficacy and required other treatments such as hysterectomy and arterial embolization. The pharmacist reviewed the guidelines of the obstetric society, WHO, and various countries and suggested a single dose of 800 mcg sublingually or rectally and 600 mcg buccally. In the interprofessional collaborative practice discussion, the pharmacist raised issues, including (1) the low dosage of misoprostol prescription for PPH cases in our hospital; (2) suggesting an increase in the number of Misoprostol reserves in the delivery room; and (3) Tranexamic acid injection is one of the emergency drugs for bleeding, but it is not included in the delivery room's stock. It is recommended to add it to the inventory.

Conclusion & Discussion: We have developed a series of measures to improve PPH care and optimize the use of CPOE, including:(1) The hospital's PPH treatment guidelines, including adjusting the Misoprostol prescription dosage. (2) Adjusting the number of Misoprostol reserves in the delivery room to meet the emergency use. (3) Adding Tranexamic acid injections as a ward stock in the delivery room. (4) Adding Misoprostol sublingual, rectal, and buccal administration routes to the CPOE system. The implementation of these measures is significant in improving PPH care and maximizing the benefits of interprofessional collaborative practice. Currently, the delivery room has increased the number of Misoprostol reserves to eight tablets and added Tranexamic acid injections as a regular medication. The pharmacy department has also completed the revision of the CPOE system. These measures will significantly enhance the quality of patient care and improve the safety and efficacy of PPH treatment.

Drug utilization evaluation (DUE) of romosozumab in a teaching hospital

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background:
Romosozumab, a monoclonal antibody that inhibits sclerostin, enhances osteoblast function, and reduces fracture risk, has been approved by the Ministry of Health and Welfare for postmenopausal women with osteoporosis at high risk of fractures. However, its use may increase the risk of myocardial infarction, stroke, and cardiovascular disease death, and is contraindicated in patients with a history of these conditions or hypocalcemia. Blood calcium levels should be monitored during use, and vitamin D and Ca should be supplemented appropriately. Patients with severe renal impairment or undergoing dialysis should also monitor blood calcium levels and supplement vitamin D and Ca appropriately. This study aims to evaluate the use, safety, and contraindications of Romosozumab in a teaching hospital and make improvement suggestions.

Methods:
This retrospective study evaluated 44 patients who used Romosozumab in an outpatient setting between July 2021 and May 2022. Indicators evaluated included: (1) physician prescription patterns, including indications, dosage, and supplementation of vitamin D and Ca; (2) identification of contraindicated or cautiously used patients, including those with a history of myocardial infarction or stroke and severe renal dysfunction; and (3) monitoring of renal function and blood calcium levels before and after drug use.

Results:
Of the 44 enrolled patients, 93.2% were female. The majority of prescribing physicians were from the Department of Orthopedics (63.6%), followed by the Department of Neurosurgery (31.9%), and only 4.5% were from the Department of Family Medicine. The dosage, frequency, and administration route were all in line with rational drug use principles. 77.3% of patients were compliant with health insurance usage regulations, while 22.7% did not meet the regulations due to bone density not reaching the standard, less than two fractures, or being male. 56.8% were prescribed Vitamin D+ Ca, 6.8% were supplemented with Ca, while 36.4% were not prescribed Vitamin D/Ca simultaneously. Before using Romosozumab, 9.1% had low blood calcium, 18.2% had normal blood calcium, and 72.7% were not monitored for blood calcium. 6.8% had moderate to severe chronic kidney dysfunction before using Romosozumab, 88.6% had normal kidney function, and 4.6% were not monitored. Two patients had a history of stroke, and one had a history of myocardial infarction. Only 7 patients completed the full 12-month course of treatment, while 29 individuals did not complete the treatment due to personal factors, such as economic constraints and non-adherence. Eight patients used the drug for more than 12 months. Only three patients had their T-scores evaluated for improvement after completing the treatment.

Discussion:
Overall, the use of Romosozumab in this teaching hospital was generally compliant with rational drug use principles. However, areas for improvement were identified, including monitoring blood calcium levels, renal function, and contraindicated or cautious patients. We recommend discussing these issues with physicians and implementing warning messages related to Romosozumab in the electronic prescription system, as well as an automatic reminder system for treatment periods and assessments of treatment effectiveness. Additionally, pharmacists should remind patients to take vitamin D and Ca supplements when using Romosozumab to enhance medication safety and effectiveness.

Choose right! Reducing typing errors through clean-up of administration Instructions templates in pharmacy system

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Introduction
Medication labels must bear clear and correct administration instructions to prevent medication administration errors. Electronic prescribing in our hospital allows drugs ordered by physicians to be transcribed automatically in the pharmacy dispensing system. Generally, pharmacy technicians print out the drug labels with minimum intervention.
Our current pharmacy system sets one default instruction template for each drug. If different administration is prescribed by the doctor, pharmacy technicians (PTs) need to select an alternative instruction template from a drop-down menu. Typing errors happen when pharmacy technicians select a wrong instruction template or overlook the need to change the instruction template.

Objective
The objective is to reduce typing errors related to incorrect administration instructions.

Method
We observed how PTs type the administration instructions. In addition, we sought their feedback on instruction templates.
In order to change the instruction template, pharmacy technicians are observed to do the following:

- Click the default template to access a drop-down menu of different templates
- Scroll through the menu to choose the correct template
- Click the correct template
- Check the expanded administration instructions as to ensure correctness

PTs repeat the selection process until the correct template is chosen.
PTs feedback showed that there are too many templates under the drop-down menu that are irrelevant. This causes the selection list to be very long resulting in difficulty in identifying the correct template. The template field is limited and does not display the complete instructions. PTs have no clue which is the most suitable and correct template as templates may look exactly the same at the beginning and only differ at the end. PTs need to click on each template and check on the expanded instruction. Often, they choose the template based on either experience or trial and error. As a result, a longer time to process the prescription with possibility of selecting the incorrect template resulting in
The selection of administration instruction needs to be simplified in order to reduce typing errors. We initiated a thorough and systematic review of the drug templates. Working closely with Pharmacy Informatics, Medication Safety Committee and inpatient pharmacy team, three strategies, namely decluttering, labelling and prioritizing, were identified to clean up the templates for 800 drugs.

Decluttering involves removing unnecessary templates. Labelling is to put a specific description at the front of the template to make it obvious for typist to differentiate and to choose from. Lastly, prioritizing involves reviewing the default template based on past usage and setting the most used template as the default template.

Results
Only relevant templates are available for each drug. The templates are now easily identifiable with distinct labelling. PTs are able to identify the correct template for selection hence saving time and reducing possible typing errors. Near miss data showed a significant reduction of wrong instruction typed. Staff are satisfied with the improvement.

Conclusions
This clean-up exercise resulted in a reduction in typing errors related to administration instructions and improved efficiency in choosing correct administration instructions, hence improving patient safety.

Incidence, characteristics, and risk factors of drug-induced seizure in 405,572 hospitalized patients

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background：Given seizures' rare and unpredictable nature, few real-world studies have been conducted on the big sample of drug-induced seizures. This study is China's first large-scale automatic monitoring study of drug-induced seizures.

Objectives: The automatic monitoring module of inpatients' seizures was established in "Adverse Drug Events Active Surveillance and Assessment System-II (ADE-ASAS-II)" to explore the incidence rate, risk factors, and risk of the drug combination in the real world.

Method: The ADE-ASAS-II epileptic seizure automatic monitoring module was used to monitor 405572 inpatients from 2019 to 2021. The positive cases were screened individually through two rounds of manual screening alarms. The patients in the control group were matched according to 1:4 by the propensity score matching method. Univariate and multivariate Logistic regression explored the risk factors of drug-induced seizures. The Apriori algorithm and risk odds ratio method (ROR) was used to quantify the risk of seizures caused by targeted drug interactions.

Results: Among 405,572 hospitalized patients from 2019 to 2021, there were 1469 epileptic seizures, among which 121 cases were drug-induced epileptic seizures, with an incidence of 0.03%. The drugs involved were mainly anti-infective drugs, carbapenems, and quinolones. In the study of risk factors, CKD (OR:3.216; 95%CI:1.513-6.836), severe electrolyte disturbance (OR:6.531; 95%CI:2.293-18.545), pulmonary infection (OR:23.029; 95%CI:8.458-66.015) was an independent risk factor for drug-induced seizures in hospitalized patients. Drug combination analysis showed that glucocorticoid combined with imipenem-cilastatin was the most common two-drug combination. The most common three-drug combination was meropenem - Levofloxacin - glucocorticoid, and meropenem combined with Levofloxacin had the highest positive risk in high-order drug-drug interaction analysis (OR:53.17; 95%CI:8.191-571.5).

Conclusions: In this study, By monitoring the epileptic seizures of 405,572 hospitalized patients, the incidence of drug-induced epileptic seizures was determined to be 0.03%, which belonged to the rare range. Intravenous use of glucocorticoids combined with quinolones and carbapenems can increase the risk of drug-induced seizures, especially in patients with severe pulmonary infections or Chronic kidney disease.

The introduction of peer review (SHPA ClinCAT) in a tertiary hospital pharmacy department

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Background:
New Zealand currently does not have a formalised structured process for reviewing and improving clinical skills and knowledge of pharmacists. Introduction of a formalised peer review would allow pharmacy departments to support development of core skills, knowledge and behaviours essential for practice utilising evidence-based methodology. (Coombes 2012) The educator at Christchurch hospital worked to develop a plan address this for hospital based clinical pharmacists.

Purpose:
To investigates the impact of implementing a formalised peer review process informing training and development opportunities with potential to improve pharmacy service.

Design and methodology:
A pre-implementation survey was used to gauge the level of experience, previous interaction with peer review, opinion of peer review for the department and how knowledge gaps are identified. Implementation was chosen to be trialed with hospital based clinical pharmacists working in a tertiary hospital (Christchurch hospital, CDHB).
Pharmacists underwent the Society for Hospital Pharmacists' Clinical Competency Assurance Tool (SHPAClinCAT) process, which included completing a self-reflection, practice observation for 90 minutes, 60-90 minute feedback session and creation of a development plan. (Keen 2010)
A post- evaluation questionnaire was completed to measure the pharmacist's experience of the peer review process and impact on their practice.

Results:
Pre-implementation survey results:
75% of staff had not undergone peer review in any form, of the cohort who had undergone peer review 90% reported improvement in their practice. 94% indicated that peer review would benefit the department.
Knowledge gaps are currently identified in a reactive manner with the main driver for reflection coming from either being asked questions (60%) or generated from peer discussion (33%).
Post-ClinCAT survey results
91% either agreed or strongly agreed that ClinCAT helped to reflect on their practice
58% identified previously unknown gaps in their practice
All participants found the ClinCAT useful for their practice with 67% finding it extremely or very useful
100% of staff recommended the ClinCAT for their continuing professional development
100% of staff found it a valuable tool for development the pharmacy service

Conclusion:
Peer review is an area of recognised need for the individual and service delivery. Implementing ClinCAT has not only improved reflective practice it has helped to inform further development of training packages and provided a platform to engage junior staff in meaningful professional development. The next step in the ClinCAT journey in Aotearoa New Zealand would be to see the programme being more widely available for all hospital pharmacists.

Prescription pattern and medication related problems: A retrospective study at the surgical department of a large tertiary hospital in Ghana

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Background
Patients seen at surgical departments require several medications which must be prescribed rationally to reduce complications, healthcare costs, morbidity and mortality. Prescription pattern studies allow for assessment of the prescribing, dispensing and distribution of medicines.

Purpose
To describe prescription pattern and medication related problems identified at the Department of Surgery, Korle Bu Teaching Hospital.

Method
A retrospective study was conducted at the Department of Surgery, Korle Bu Teaching Hospital. Stored prescriptions lasting 1st July 2019 to 30th September, 2019 were reviewed and data extracted on types and dosage forms of medications as well as prescription patterns. Using the Pharmaceutical Care Network Europe classifications v9 2019, previously identified medication related problems were categorized. Data was entered into SPSS version 20, and results were presented as tables and figures.

Results
A total of 864 prescriptions were assessed in this study. The average number of medications per prescription was two (range 1 to 9). Most prescriptions had one item (343, 39.70%) with a few (21, 2.43%) having more than six items. A total of 107 prescriptions (12.38%) had at least one unavailable item at the surgical pharmacy. Thirty-six therapeutic classes of medications were prescribed, with the three commonest being antibiotics (n=607, 29.67), analgesics (n=423, 20.67%) and electrolytes (n=295, 14.42%). Quinolones were the most prescribed antibiotics (189, 31.14%), with ciprofloxacin (168, 27.68%) being frequently prescribed. A total of 222 (25.7%) prescriptions had at least one medication related problem out of which 208 (93.69%) were resolved. The most frequent medication related problem was dose selection problem (n=218, 98.20%), with the commonest cause of dose selection problem being no indication of dose (n=88, 40.37%).

Conclusion
There are numerous medication related problems with the use of medicines for surgical prophylaxis and treatment. The frequent unavailability of essential medicines could potentially contribute to this phenomenon and hence should be actively addressed.

Hydroxyurea use in patients with sickle cell disease at a tertiary teaching hospital in Ghana: Disease, therapy, access and adherence related factors

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Background
Sickle Cell Disease is a global health burden that affects several persons of African descent. It is the most common blood disorder inherited by children that can affect important organs in the body. The cost of managing sickle

cell disease has a high financial impact on the family. Hydroxyurea is one of the medications used for the management of sickle cell disease. High adherence to hydroxyurea among patients improves the quality of life and prevents complications.

Purpose
To assess the current state, trends and outcomes of hydroxyurea usage in sickle cell disease and identify barriers and facilitators to hydroxyurea use in sickle cell disease patients

Method
A hospital-based cross-sectional study was carried out at the sickle cell disease clinic of the Komfo Anokye Teaching Hospital from 3rd May to 10th October 2022. A semi-structured questionnaire designed based on the 10-item Medication Adherence Rating Scale was administered by research assistants to randomly sampled patients and caregivers to determine patients' level of treatment adherence. Data collated was analysed using STATA version 16. A Chi-square test was used to determine any association between the level of adherence and socio-demographic characteristics, disease-related factors and medication-related factors.

Results
A total of 308 patients participated in this study with 204 (66.23%) having caregivers. Most of the participants were females (51.14%). The mean age of participants was 11.08 + 6.72 years (range: 0.75 to 52 years). The majority of the participants (79.00%) had the SS genotype. Over a quarter of the participants (28.57%) had experienced a complication of sickle cell disease before, with one participant (0.32%) experiencing five complications. Severe chest pain (67.05%) was the most commonly experienced complication. Almost two-thirds of the participants (63.58%) were on hydroxyurea therapy with 35.94% being on the medication for less than a year at the time of data collection. Participants (76.56%) on hydroxyurea indicated experiencing a decreased number of crises (68.75%) as a benefit of the medication. A total of 155 (80.73%) participants on hydroxyurea indicated the high cost of hydroxyurea as the major challenge faced in accessing the medication. Almost half of the participants (48.96%) obtained their hydroxyurea from community pharmacies, with the majority (80.73%) paying for the medication out of pocket. Over half of the participants on hydroxyurea (61.98%) were adherent, a third (32.29%) were partially adherent while 5.73% were non-adherent. A Chi-square test revealed that Level of education ($\chi2=21.7395$, $p=0.016$), marital status ($\chi2=20.3302$, $p<0.001$), number of complications experienced ($\chi2=52.0932$, $p<0.001$), number of perceived benefits from hydroxyurea therapy ($\chi2=28.1884$, $p=0.005$) and challenges experienced with hydroxyurea therapy ($\chi2=19.3920$, $p=0.103$) were significantly associated with the level of adherence to hydroxyurea at a 95% confidence interval.

Conclusion
Hydroxyurea was obtained mainly from community pharmacies by the participants. Majority of the participants on hydroxyurea were adherent. The high cost of hydroxyurea was a barrier to medication adherence. Level of education, marital status, number of complications experienced by patients and perceived benefits from hydroxyurea therapy were significantly associated with the level of adherence to the medication.

Point prevalent survey of antimicrobial use at a quaternary teaching hospital In Ghana

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Background
Antimicrobials are among the most commonly prescribed medications worldwide. Inappropriate prescribing of antimicrobials is a major global health problem which contributes to the emergence of antimicrobial resistance and other adverse effects. Point prevalence surveys complement the global efforts to strengthen knowledge on antimicrobial prescribing in the effort to combat resistance.

Purpose
The purpose of the study was to have a baseline data on antimicrobial prescribing and use pattern at the University of Ghana Medical Centre to enable identification of targets for quality improvement regarding antimicrobial use.

Methods
An observational cross-sectional study was conducted on 16th October 2021 at the University of Ghana Medical Centre using the Global Point Prevalence Survey Methodology. Quality indicators assessed included prevalence of antimicrobial agent use and resistance patterns, antimicrobial prescribing patterns and adherence to antimicrobial prescribing quality indicators. Trained data collectors were assigned to all wards. A paper based questionnaire was used to collect data on wards and patients who were on antimicrobial medications at 8 O'clock in the morning of the day of survey. Data collected was entered onto the Global Point Prevalence Survey Platform from which feedback was generated.

Results
A total of 52 patients were on admission during the survey. A total of 41(78.8%) patients were on at least one antimicrobial medication, with 39 (95.1%) patients on antibacterial medications. Prevalence of antimicrobial use was highest on paediatric wards n=3(100%) followed by neonatal wards n=4 (80%) and adult wards n=34 (77.3%). Common medical problems for which antimicrobials were given included pneumonia n=12(29.4%) upper urinary tract infections n=5 (11.8%) and tuberculosis n=3 (8.8%). A total of 19 different antimicrobials were prescribed, with frequency of parenteral antimicrobial prescribing higher n=52(70%) than oral antimicrobials n=22(30%). Ceftriaxone

n=25(33.3%) was the highest prescribed antimicrobial. Culture and sensitivity tests were requested for 22(53.7%) patients for whom antimicrobials were prescribed, with treatment of 1(2.4%) patient based microbiology data. Review/stop date was not indicated on 50% of prescriptions from ICU and Medical wards, and 60% of prescriptions from surgical wards.

Conclusion
There is a high prevalence of antimicrobial use at the University of Ghana Medical Centre. Most admitted patients were on antimicrobials, with more broad-spectrum antimicrobials in use. Selection of antimicrobials was hardly influenced by microbiology data, with over half of prescribed antimicrobials not having stop/review date indicated.

Safety and efficacy of anti-cancer biosimilars compared to their reference biologics: Systematic review and meta-analysis

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Background: Biologics such as rituximab and trastuzumab have improved treatment outcomes for many cancers. However, due to their high economic burden, 'highly similar' products known as biosimilars have been developed and used. Yet, there is still concern surrounding comparability of efficacy and safety between the biosimilar and its reference biologic, especially regarding patients switching from the reference to the biosimilar.

Purpose: To compare the efficacy and safety of rituximab and trastuzumab biosimilars to their reference biologics in oncology patients.

Method: A systematic review with meta-analysis was conducted in accordance with the PRISMA guidelines. MEDLINE, EMBASE and Cochrane Central were searched from inception to 26 April 2021 to obtain all randomised control trial data reporting on safety and efficacy outcomes of oncology patients treated with rituximab or trastuzumab biosimilars.

Results: 69 studies were identified, of which 27 studies reported on patients treated with rituximab and 42 studies reported on patients treated with trastuzumab. The odds of achieving overall response rate in patients treated with rituximab and trastuzumab biosimilar compared to reference over at least 24 weeks of treatment was 1.06 (95% CI 0.88 – 1.26) and 1.09 (95% CI 0.93 – 1.28), respectively. Proportion of patients experiencing any treatment emergent adverse effects were comparable between arms (Rituximab, OR 1.20 [95% CI 0.98 – 1.49]); (Trastuzumab, 1.07 [95% CI 0.87 – 1.32]).

Conclusion: Biosimilars for rituximab and trastuzumab have comparable efficacy and safety for treatment naïve patients, thus use in oncology can be supported, however evidence for switching established patients from reference biologic to biosimilar is still lacking, and further work is required in the switched population.

Antibiotic treatment patterns for COVID-19 pneumonia in two main hospitals of Mongolia

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Background: Globally, as of 2023 there have been about 764 million confirmed cases of COVID-19, including 6.9 million deaths, while in Mongolia, there have been 1 million confirmed cases of COVID-19 with 2,136 deaths, reported to WHO.
Antibiotics are often prescribed as a precautionary measure to prevent or treat bacterial co-infections that can occur alongside COVID-19 pneumonia. However, overuse of antibiotics can lead to the risks associated with antibiotic overuse, such as increased antibiotic resistance, adverse drug reactions, and higher healthcare costs which is a major public health concern. (And, some of the previous studies that have investigated the prevalence and patterns of antibiotic usage in COVID-19 patients) is an incomplete sentence. In addition, there are issues with higher rates and high levels of inappropriate use of antibiotic use and the high level of medical prescribing and supply of injections is a significant potential public health hazard in Mongolia.
Therefore, it is important to assess the usage of antibiotics in COVID-19 patients t COVID-19 pandemic, the most severe cases were hospitalized in National center for Communicable Diseases and Mongolia-Japan Hospital of Mongolia, to ensure that they are used appropriately.
Purpose: To assess antibiotic usage prevalence among Hospitalised COVID-19 Patients in Mongolia-Japan Hospital and National center for Communicable Diseases of Mongolia.

Methods: The retrospective study conducted at Mongolia-Japan Hospital and National center for Communicable Diseases of Mongolia to assess the prevalence of antibiotic usage among hospitalized COVID-19 patients with pneumonia, from 18 April 2021 to 31 December 2021.

Results: The study included 481 patients with a mean age of 53±17 years, and 89.8% of them were prescribed antibiotics. Among them, 23.7% received one antibiotic, 32.4% received two antibiotics, and 33.2% received three or more antibiotics. Cephalosporins and macrolides were the most commonly used classes of antibiotics. The study found a negative correlation between antibiotic combination usage and peripheral blood oxygen saturation rate and triage level, and a positive correlation with BMI, neutrophil, and CRP measurements. The WHO AWaRe antibiotic categorization showed that 7.1% of antibiotics were classified as "access", 91.9% as "watch", and 0.6% as "reserve".

Conclusion: The study concludes that the high rate of antibiotic usage and combination usage is partly caused by the COVID-19 pandemic and suggests the need for further detailed studies to evaluate the categorization of antibiotics. The study provides insights into the prevalence and patterns of antibiotic usage in hospitalized COVID-19 patients with pneumonia in Mongolia.

Analysis of unprevented dispensing errors and its associated factors in outpatient pharmacy tertiary hospital

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Background
By definition, for the unprevented dispensing incidents, these are usually undetected occurrences after medication has left the pharmacy which usually may or may not cause harm to patients and are seldom documented and reported. The occurrence of unprevented dispensing error is rare and difficult to obtain the data as many cases were difficult to trace after the process of dispensing.
The knowledge of the pharmacist with the ability to analyse and provide information supports the objective of optimal drug use. The training and experience in identifying medication error are crucial to improve the safety of medication usage especially during the dispensing process. An understanding in all the aspects of drug supply processes and optimization of drug therapy enables the pharmacist to avoid any unwanted error will further improve the drug medication safety. Coming from different education backgrounds, working experiences and current training in the work place may contribute to their ability to identify any medication error which occurs.

Objectives
The aims of this study are to determine the rate of unprevented dispensing errors, classification of the errors and its' associated factors.

Method
A cross sectional study was carried out in one of tertiary hospital outpatient pharmacy in Kuala Lumpur, Malaysia for a month. Patients who received medications from the dispensing counter was convenience selected and the respective prescription information was recorded. Any patients detected with dispensing errors was referred back to the pharmacist in charge for further intervention. All staff including pharmacists, pharmacy assistants and trainees were included in the study. Socio-demographic, education qualification, job position and working experiences data were collected. All the analysis of data was done using Statistical Package for Social Sciences (SPSS) software version 23.

Result
A total number of 540 prescriptions were assessed. There were total of 11 (2%) prescriptions identified with unprevented dispensing errors. All identified dispensing errors were content error with the highest quantity being 50% due to omission of items and followed by wrong quantity either missing or additional dose given which was 41.7%. There were few associated factors investigated in the study such as education qualification of dispenser, workload of dispenser and working experience contribute to unprevented dispensing error. Results showed the association for these factors was insignificant.

Conclusion
Unprevented dispensing error remains an unpopular and unimportant health issue in medication safety with limited evaluation and study carried out to determine the occurrence. Rate of the unprevented dispensing error identified in this study is 2% comparable with studies carried out in western countries.
It is reported that, the high pharmacist's workload is subject to more error is non-conclusive in this study. Similar finding occurred on both working experience and education qualification whereby it was found not associated with the unprevented dispensing error. Classification of the dispensing errors have been identified such as drug/content error and major contribution factors such as failure to adhere policy was highlighted in the study. There is limited study on investigating the clinical outcome of the patient for having medication error drugs.

The development, implementation and expansion of a virtual clinical pharmacy service

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background: Western New South Wales Local Health District is the largest Local Health District in NSW covering an area of 246,676 square kilometres, similar to the size of Britain. The District is home to more than 276,000 people, 30,700 of who are Aboriginal and/or Torres Strait Islander peoples. The district includes three major rural referral hospitals and 38 inpatients facilities.
Prior to 2020 clinical pharmacy services were available in only seven facilities in The District, using primarily a face-to-face model. Leaving the remaining facilities without clinical pharmacy services.
In 2017, 35 rural and remote facilities in Western NSW Local Health District (WNSWHD) were audited against National Safety and Quality Health Service (NSQHS) Standard 4: Medication Safety, with 24 having one or more 'Not Met' core or developmental actions.
In 2020 a Virtual Clinical Pharmacy Service (VCPS) was implemented at six hospitals in WNSWLHD and two hospitals in Far West Local Health District as a part of a Translational Research Grant (TRGS). This proved to be a feasible option to assist sites to achieve medication safety. However, in late 2021 there were still 23 facilities in the region without clinical pharmacy services, with accreditation due in June 2022.

Purpose: To determine if the implementation of Virtual Clinical Pharmacy Service had an impact on compliance with National Safety and Quality Health Service Standards at rural and remote hospitals in Western NSW.
Additionally, if expansion of the VCPS to all facilities without an on-site pharmacist in WNSWLHD was successful consider how the innovative model could be further expanded to improve sustainability and demonstrate transferability to other settings.

Method: The VCPS was expanded to include six full time equivalent clinical pharmacists. The service uses an electronic medication record, electronic medication management system and teleconferencing to deliver clinical pharmacy services, remotely. With stakeholder engagement, clinician education and collaboration with other virtual teams the VCPS was expanded between November 2021 and March 2022 to all sites in WNSWLHD without an on-site pharmacy service.

Results: As of April 2022 all facilities in WNSWLHD have to high quality clinical pharmacy services. Subsequently accreditation assessment against NSQHS Standards in 2022 resulted in no "Not Met" actions. Clinicians, patients, and pharmacists have reflected that the model of care is feasible, acceptable, and sustainable.
Furthermore, the VCPS have demonstrated transferability of the model with Mudgee Hospital implementing a hybrid model with a virtual pharmacy service in a facility with an on-site pharmacist. In this model the "virtual" pharmacist is able to conduct medication histories, provide medication education and liaise with other clinicians to ensure optimal medication management of inpatients. This is complemented by the medication supply and clinical work of the on-site pharmacist.

Conclusion: The implementation of an innovative model to deliver virtual comprehensive clinical pharmacy services improves medication management, medication safety and compliance with NSQHS Standards. The delivery of clinical pharmacy services, virtually, ensures patients admitted to rural and remote hospitals are afforded the same level of care as those in metropolitan facilities.

Vancomycin associated acute kidney injury in patients with infectious endocarditis: A large retrospective cohort study

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Aim: We conducted this large retrospective cohort study to reveal the incidence, risk factors, and prognosis of vancomycin-associated acute kidney injury (VA-AKI) in patients with infectious endocarditis (IE).

Methods: Adult patients admitted between January 2016 and June 2019 with a diagnosis of IE and received vancomycin were included. The primary outcome was VA-AKI.

Results: In total, 435 of the 600 patients were enrolled. Of these, 73.6% were male, and median age was 52 years. The incidence of VA-AKI was 32.2% (74/435). Only 37.2% of the patients received therapeutic monitoring of vancomycin. Multiple logistic regression analysis revealed that duration of vancomycin therapy [odds ratio (OR) 1.030, 95%CI. 1.003, 1.058, p=0.032] and concomitant radiocontrast agents (OR 2.051, 95%CI. 1.078, 3.904, p=0.029) were independent risk factors for VA-AKI. Duration of therapy longer than 10.75 days was associated with a significantly increased risk of VA-AKI (HR 1.927, p=0.011). Renal function was fully or partially recovered in 73.0% (54/74) of patients with VA-AKI. Multiple logistic regression analysis showed payment mode (at one's own expense vs. national basic medical insurance) was the independent risk factor for non-recovery of renal function in patients with VA-AKI (OR 4.78, 95%CI. 1.59, 14.38, p=0.005).

Conclusions: The incidence of VA-AKI was higher in patients with IE than in general adult patients. Concomitant contrast agents were the most alarming nephrotoxic in patients with IE. The risk of VA-AKI significantly increased when the duration of therapy exceeded 10.75 days.

Evaluating the role of hospital pharmacists in cell and gene therapy: A systematic review

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background
The complex biological mechanisms of cell and gene therapy (CGT) require the collaborative involvement of multidisciplinary medical teams in clinical use. The role of hospital pharmacists in managing such therapies is gradually being recognized but the evidence about the efficacy has not been systematically reported.

Purpose
The study aimed to summarize the professional services provided by hospital pharmacists on managing CGT and the evidence about the effects on patient care.

Method
Literature from 4 electronic databases (PubMed, ScienceDirect, Web of Science, Scopus) were searched following PRISMA guidelines to yield publications on the pharmaceutical care provided by hospital pharmacists in advanced therapies dated since 2013 till now.

Results
Eleven studies were included in this study from the 1617 records initially yielded from the search, including 7 pre-post

intervention studies, 2 case reports and 2 retrospective studies. The study targets were either patients receiving stem cell transplantation therapy (n=8) or involving in pharmacogenomics assessment (n=3). A total of 907 patients from 11 hospitals in 5 countries received varying interventions from clinical pharmacists during treatment. Common direct-to-patient interventions included patient consultation (n=10), education (n=8), drug monitoring (n=8), medication reconciliation (n=6) and immunosuppressive management. (n=5), with collaboration with other specialized healthcare providers (n=7) being the most non-direct intervention. The primary outcome of pharmaceutical intervention was measured in terms of the prevention or reduction of drug-related problems (n=7), and medication compliance (n=4). Changes in patients' knowledge (n=3), satisfaction (n=3) and acceptability (n=3) were measured as the secondary outcomes. Other outcomes included cost savings (n=2). All study findings demonstrated significant positive clinical outcome.

Conclusion

The interventions by hospital pharmacists show multifaceted positive impact on the care of patients receiving cell and gene therapies. Leveraging the role of pharmacists in multidisciplinary healthcare teams will better meet the practical use of advanced therapies or products.

Systematic review of opinions on the hospital pharmacist's role in supporting appropriate and safe use of advanced therapy medicinal products

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background

The use of advanced therapy medicinal products (ATMPs) to alleviate or treat diseases is rising. Being a key member in the multidisciplinary healthcare team, the role of hospital pharmacists related to the management and use of ATMPs remains largely unknown.

Purpose

The objective of this study was to summarize the perceptions and opinions about pharmacists assuming a role that supports the appropriate and safe use of ATMPs.

Method

Four databases (PubMed, ScienceDirect, Web of Science, Scopus) were searched following PRISMA guidelines to retrieve related articles on the pharmacists involved in adopting ATMPs dated since 2013 till now.

Results

21 publications were included in this review. Pharmacists had been involved in patients' treatment of hematopoietic stem-cell transplantation (n=11), CAR-T cell therapy (n=4), gene therapy (n=5) and ATMP (n=1). The key role of pharmacists in the appropriate and safe use of ATMPs were identified: (1) Preparation: drug procurement (n=4), transport and preservation (n=4), biosafety assessment (n=3); (2) Patient care: therapeutic drug monitoring (n=12), medication therapy management (n=7), ADR monitoring (n=5), medication education/consultation (n=7), quality tracking (n=5) and follow-up visits/calls (n=4); (3) Training: self-skills improved (n=11), other healthcare providers (n=9); (4) Collaboration: internal multidepartment (n=5) and external research and scholarly activities (n=3); (5)Resources: electronic health record system (n=5), aseptic and cryopreservation facility (n=2); (6) Others: reimbursement considerations (n=8), participation in developing standard operation guidelines (n=7). The anticipated impact was to promote pharmacy practice (n=9) and improve patient clinical outcomes (n=6).

Conclusion:

Hospital pharmacist's role in relation to ATMPs are multifaceted, indicating the need for a joint effort from other healthcare providers in developing a coordinated approach that supports pharmacy practice in ensuring the appropriate and safe use of ATMPs.

Risk mitigation strategies in the prevention of post exposure prophylaxis (PEP) failures for rabies

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background:

Every 9 minutes someone in the world dies of rabies. Annually, 59,000 people die of rabies, the world's oldest known infectious disease, globally. Children under the age of 15 account for 40% of the exposures to rabies. In the USA, canine rabies has been virtually eliminated but the risk of rabies due to wildlife, especially raccoons, skunks, and bats, has required post exposure prophylaxis (PEP) be administered to more than 60,000 patients annually. In 2021, 5 people in the USA died of rabies mostly due to misinformation or improper treatment.

Introduction:

Rabies PEP consists of 3 steps, wound washing, administration of human rabies immune globulin (HRIG) and a full course of vaccine. In 2022, Whitehouse published that there were 122 breakthrough rabies infections when PEP was given due to four factors: 1) deviations from core practice 2) delays in seeking health care 3) errors in administration of HRIG 4) comorbidities or immunosuppression. It is estimated that over 40% of PEP administration is given inappropriately. Improper HRIG is defines as one of the following: not infiltrating wounds with HRIG or only giving HRIG IM when wounds are present,

failure to infiltrate all wounds with HRIG, failure to thoroughly infiltrate wounds with HRIG or failure to administer HRIG at all. Administration into the gluteus instead of the deltoid is ineffective and not giving the 5th dose of vaccine to immunosuppressed patients can result in rabies and death.

Objective:
The objective of this project was to develop and implement an educational campaign targeted at healthcare providers to improve rabies disease state awareness and understanding of proper PEP administration in adult and pediatric patients.

Methods:
An educational campaign was designed and developed that contained 8 key elements The prioritized activities were: 1. Provide series of educational programs to ENA (Emergency Room Nurses Association) and pharmacists at State, National and International meetings. 2. Collaborate with HRIG manufacturers to improve awareness of look-alike issue errors and develop reporting to Institute for Safe Medication Practices (ISMP). 3. Identify improvements to administration kit needle delivery and education. 4. Publication of educational articles on pediatric risks and rabies PEP administration to reduce the risk of additional failures 5. Add QR code for links to PI and dose calculators and administration videos.
6.. Develop and promote the use of rabies education board games for children to increase knowledge of rabies risks and prevention. 7.. Develop hand puppet shows for YouTube videos on pediatric patient rabies education.

Results:
Eight presentations have been delivered across the USA. Two publications were generated, and one manufacturer has changed vial bar coding and label coloring while QR codes are utilized for PI and calculators to improve safety. A children's board game ("Rabidopoly") has been developed. Work has begun to assess needle risk for vaccine provision and administration. Additional presentations and publications are planned. Proper education and appropriate administration for rabies PEP is essential to prevent unnecessary deaths. While rabies remains nearly 100% fatal, it is 100% preventable with proper PEP.

Simplifying medication regimens for hospital inpatients who are discharged to residential aged care facilities

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background: Individuals living in residential aged care facilities (RACFs) have complex medication regimens. Medication simplification aims to reduce unnecessary complexity and reduce the number of medication administration times per day via strategies such as administering medications together or using slow release or combination products. Our previous research has found that with pharmacist intervention, two thirds of individuals residing in RACFs can take their medications in a simpler way. One third of residents are hospitalised at least annually and could benefit from medication simplification during their hospital stay.

Purpose: This quality improvement project aimed to implement and evaluate the provision of medication simplification among hospital inpatients who were intended to be discharged to RACFs.

Methods: Using the Allied Health-Translating Research into Practice (AH-TRIP) framework, a team of pharmacists from three South Australian hospitals participated in simplification training and co-designed a protocol to reduce medication complexity. Inpatients with unplanned admissions to geriatric or acute care units, taking medications at least twice daily, and intended to be discharged to an RACF were eligible for simplification. Pharmacists identified simplification opportunities using the five-step Medication Regimen Simplification Guide for Residential Aged CarE (MRS GRACE) and discussed their recommendations with medical practitioners. At discharge, information about the simplified medication regimen and/or recommendations not yet implemented were communicated to the RACF, general medical practitioner and/or community pharmacy as per usual processes. Pharmacists recorded information on patient demographics, medication use, and simplification recommendations using a standardised web-based data collection form. Semi-structured interviews were undertaken with 12 pharmacists to explore protocol adherence and adaptations, stakeholder acceptability of simplification, and barriers and enablers to simplification and wider implementation. Interviews were recorded, transcribed verbatim, and thematically analysed.

Results: Of the 140 individuals screened during their inpatient stay, 114 were eligible for a simplification review by the pharmacist. The median patient age was 85 years (interquartile range 81-90), 75 (65.8%) were female, and 39 (34.2%) were first seen by the pharmacist at discharge. Intervention delivery was generally consistent with the simplification protocol. Simplification was possible for 55 inpatients (48.2%) and recommendations were implemented for 27 (49.1%) at discharge. Barriers to simplification provision and implementation of recommendations included unavailability of certain products on the hospital formulary and staff workload, while facilitators included altruism, fit with existing clinical workflows, and recognition of the potential benefits of simplification among the wider care team. Of the 71 simplification recommendations, 36 (50.7%) were to change medication administration time(s) and the remainder were to use slow release (n=25, 35.2%) or combination (n=10, 14.1%) products. Discharge letters, medication profiles and telephone calls were commonly used to transfer information at discharge. Pharmacists described incorporating simplification principles as part of their usual clinical practice and supported wider implementation via education, incorporation into entrustable professional activities, and inclusion in guidelines.

Conclusion: Nearly half of all hospital inpatients taking medications two or more times daily and discharged to an RACF can take their medications in a simpler way. The simplification review was generally delivered as planned and is suitable for wider implementation.

Comparison of the systemic treatments in metastatic hormone-sensitive prostate cancer: A systematic review and network meta-analysis

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Objectives: to determine the optimal systemic therapy for metastatic hormone-sensitive prostate cancer (mHSPC) through comparing their efficacy and safety to inform decision-making.

Methods: A systematic literature retrieval of the MEDLINE, Embase, BIOSIS Previews, Cochrane Library and clinicaltrials.gov was conducted to identify articles published before March 2022 on systemic therapy for mHSPC. Efficacy outcomes were overall survival (OS) and radiographic progression-free survival (rPFS), and safety outcome was serious adverse events (SAEs).

Results: Eight studies with 10576 patients comparing 7 treatments (abiraterone acetate, apalutamide, darolutamide combined docetaxel, docetaxel, enzalutamide, standard nonsteroidal antiandrogen [SNA] in addition to ADT, and ADT alone) were finally included. The effective rank of treatments based on their association with the improved OS, when added to ADT, was darolutamide combined docetaxel (hazard ratio [HR], 0.54; 95% credible interval [CI], 0.44-0.66), abiraterone acetate (HR, 0.64; 95% CI, 0.57-0.71), apalutamide (HR, 0.65; 95% CI, 0.53-0.79), enzalutamide (HR, 0.66; 95% CI, 0.53-0.82), docetaxel (HR, 0.79; 95% CI, 0.71-0.88). Treatments improved rPFS when added to ADT including enzalutamide (HR, 0.39; 95% CI, 0.30-0.50), apalutamide (HR, 0.48; 95% CI, 0.39-0.60), abiraterone acetate (HR, 0.57; 95% CI, 0.51-0.64), docetaxel (HR, 0.62; 95% CI, 0.56-0.69). In terms of safety, darolutamide combined docetaxel (odds ration [OR], 25.86; 95% CI, 14.08-51.33), and docetaxel (OR, 23.35; 95% CI, 13.26-44.81) were associated with markedly increased SAEs, abiraterone acetate (OR, 1.42; 95% CI, 1.10-1.82) with slightly increased SAEs, and other treatments with no significant increased SAEs.

Conclusion: Compared with ADT alone, darolutamide combined docetaxel and ADT may provide the most significant OS benefit at the cost of substantially increased SAEs. The addition of abiraterone acetate, apalutamide, and enzalutamide provided similar OS benefits superior to docetaxel, and enzalutamide provided optimal rPFS benefits with no increased SAEs.

Pharmacists working in mental health: Supporting the patient journey each step of the way

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background:
One of the pillars of our Mental Health service is care close to home. As Hospital Pharmacists our care was being provided far from home when our patients were already unwell. This presentation outlines the changes in pharmacy practise at Logan Hospital that has seen us provide care to Mental Health patients every step of the way.

Emergency Department:
The inpatient Mental Health pharmacists visit Mental Health patients in the Emergency Department every day (including weekends and public holidays). They provide medication reconciliation for admitted patients. This model has meant that Mental Health patients in our hospital have the fasted time to medication reconciliation. This supports medication safety for a vulnerable patient cohort (e.g. avoids the risk of missing clozapine doses). The pharmacists also liaise with community mental health teams to dispense long-acting antipsychotic injections for patients who have not attended the clinic for their dose. Ideally this is prepared prior to presenting to hospital.

Inpatient Admission:
Along with normal hospital pharmacy practise we provide weekly Medication Groups to admitted Mental Health patients. We are the clozapine co-ordinators in hospital supporting titration and also managing clozapine transfer to the community. We also have direct referral pathways to community based Mental Health Pharmacists for discharge follow up.

Community Mental Health:
Our scope of pharmacy practise in community Mental Health has now grown well beyond just dispensing medication. After discharge we will check in on our patients to see if their new medications are effective or if we can assist with medication side effects. We do a thorough medication review every six months with patients who are on clozapine. We also visit our semi-rural site every six months to ensure these patients do not miss out on this service. We support metabolic monitoring for patients on antipsychotics with published evidence now that this pharmacy scope improves compliance to monitoring. We provide medication reconciliation at transitions of care in the community. These include alternative to hospital community residential care and mental health rehabilitation. We support patients from these facilities to link with local community pharmacies. When patients are stabilised on clozapine, we visit their selected community pharmacy to provide education on dispensing this high-risk medication. We also have been successful in supporting community clozapine titrations providing weekly reviews and dispensing during this high-risk period. Along with providing education for patients on new medications we also run medication groups in community care teams and our rehabilitation facility.

Conclusion:
Over the last six years at Logan Hospital, we have slowly evolved our pharmacy practise in Mental Health to care for patients in the community. We want to keep patients well in the community rather than care for them in hospital when they become unwell. We have established an evidence base for beneficial effects on pharmacists improving metabolic monitoring. Further areas of research include the role of medication groups and decreasing time in the emergency department by documenting and dispensing long-acting antipsychotic injections prior to presentation.

Evaluation of the initial timing of the infection control pharmacist-driven audit and monitoring support system for patients with infectious diseases undergoing vancomycin therapy: A retrospective observational study

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background: Early monitoring of and feedback on infectious disease treatment and prevention are some of the methods for optimising antimicrobial treatment.

Purpose: The objective was to assess the impact of the timing of initial intervention in the audit and monitoring of vancomycin prescribed to patients by the infection control team (ICT) pharmacists for the maintenance of target vancomycin trough concentration.

Methods: We conducted a retrospective observational study in a university hospital in an urban area of Japan from January 1, 2019 to May 31, 2021 and enrolled patients with diagnosed or suspected infections who were undergoing vancomycin administration. The primary outcome was the maintenance of the vancomycin trough blood concentration (10–20 μg/mL). We used multivariable logistic regression and multivariate linear regression analyses to examin the effectiveness of the initial timing of the intervention by ICT pharmacists as the explanatory variable.

Results: There was no significant difference in the multivariable logistic regression results for the achievement of target vancomycin trough concentrations related to the initial timing of the audit and monitoring by ICT pharmacists (odds ratio: 0.99, 95% confidence interval: 0.99–1.00). Multiple linear regression for days of vancomycin administration was related to the initial timing of the intervention (estimate: 0.0227, standard error: 0.0051 p=0.012).

Conclusions: Our study showed that the early initiation of a comprehensive audit and monitoring by ICT pharmacists did not affect the maintenance of vancomycin concentration. However, it reduced the number of days of vancomycin administration.

Effectiveness of off-site objective structured clinical examination joint training in Taiwan

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background
Objective structured clinical examination (OSCE) has been considered one of effective evaluation strategy on competency-based assessment. Pharmacists' performance evaluation on clinical skills has not been achieved consistent standard on national examination in Taiwan. The importance on cooperation between teaching hospitals has been emphasized to assist the development of comprehensive plan.

Purpose
The objective of the current study is to provide the general analysis results on off-site OSCE training which can be baseline evaluation on pharmacists.

Method
Stepwise design has been applied: 1.task distribution on different hospitals, 2.consensus achievement on lesson plan and blueprint on competency focus on the exam, 3.confirm the standard patient(SP) and examiner, 4.consensus achievement between SP and examiner to ensure the consistency on each performance section, and 5. analysis. Rating from each station was recorded through e-OSCE platform to collect all the response. Satisfaction survey responses were collected using Google sheet afterwards. Quantitative data were analyzed and manifested as mean±SD, and qualitative data were thematically analyzed with open-ended comments.

Results
A total of 20 post-graduated pharmacists (PGYs) have been recruited, and results from corresponding 10 OSCE examiners have been recorded as well. Only 2 PGYs cannot reach the minimum standard (less than the angoff value after consensus collected from 6 hospitals). 10 OSCE stations can be categorized into 2 parts: 6 stations are belong to clinical practice (CP), and 4 stations are belong to operation skills (OS). 3 CP stations and 1 OS station were observed with higher failed rate. Highest rating after 10 station exams is 73.8±17.8, with 58.3±19.8 is the lowest rating. Quantitative feedback from PGYs is composed of information and setting. Information from each station might not meet the need for further explanation, while optimal clinical setting during the exam course can be relieve the nervous feeling.

Conclusion
PGYs from different hospital possess diverse rating which can be the important confounding factors during the exam. Besides, offered information in the exam course and clinical setting might be considered potential factors on performance. Further consensus with meticulous discussion is warranted to overcome the existed significant gaps.

Medication-related problems associated with hospital admissions in older adults with diabetes mellitus

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Background: Numerous studies have reported that certain medications associated with potential overtreatment and undertreatment can lead to hypoglycaemia or hyperglycaemia in elderly diabetic patients. However, limited data are available regarding hospitalisations associated with adverse drug reactions (ADRs) or medication-related problems (MRPs) in older adults with diabetes. The agents that have been commonly linked with over-treatment and MRPs in diabetic older adults are sulfonylureas and insulin. However, with the availability of new agents, the use of "older agents" has decreased, and therefore, the trends in over-treatment and under-treatment that result in hospital admissions or emergency department (ED) visits might also have changed.

Purpose: This systematic review aimed to explore the nature of hospital admissions and ED visits in older adults with diabetes mellitus that are medication-related.

Methods: The review was conducted according to the PRISMA guidelines. Studies reporting older adults (mean age ≥60 years) with diabetes mellitus admitted to hospital or presenting to ED due to MRPs, written in English and published in peer-reviewed journals from January 2000 to January 2023, were searched in Ovid Medline, Ovid Embase, and Ovid International Pharmaceutical Abstracts databases. Prospective and retrospective observational studies using hospital records or administrative and health insurance databases were included. Initial title screening was performed by one reviewer, followed by abstract and full-text review by two reviewers independently. A third reviewer resolved any discrepancies.

Results: A total of 3716 studies, of which 2342 (63%) were derived from Embase, 1148 (31%) from Medline and 226 (6%) from IPA. Of the 388 studies that passed title/abstract screening, 57 were eligible for full-text review. Finally, 28 relevant studies were included in this review for data extraction. Most of these studies were published between 2017 and 2022 (57%), while only one study was published before 2010. Over half of the studies (54%) were carried out in Europe, with the remaining studies being carried out in America and Asia. Most studies used hospital records as data sources (57%) and were conducted retrospectively (89%). All studies involved patients with type 2 diabetes and reported hypoglycaemia as the reason for medication-related admission, with some also addressed hyperglycaemia. The two studies that followed temporal trends in hypoglycaemia-related hospital presentations in elderly diabetic patients showed declines since 2010. Over the years (2005-2022), medication-related-hospitalisation was frequently associated with insulins and sulfonylureas.

Conclusion: The trend of hypoglycemic events leading to hospitalisation in older adults with diabetes is becoming less common. However, the associated medications that contribute to hospitalisation remain the same. This finding suggests that elderly with diabetes on secretagogues agents should constantly be monitored closely to prevent potential adverse events.

Using quality control circles to increase the rate of adverse drug reaction reporting by non-dedicated medical personnel

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background
Drug safety can be established through adverse drug reaction (ADR) reporting database. The more complete drug

information could be provided, the safer use of medicine by patients can be guaranteed.

Purpose
According to the data analysis of adverse drug reaction reporting database in 2021, only 34% of the reports were submitted by non-dedicated medical personnel in our hospital. We want to encourage all healthcare professionals (clinicians, pharmacists, nurses, etc.) to report ADRs whether they are known, unknown, serious, or nonserious, frequent, or rare. Therefore, ADR alerts could be entered into the patient's hospital medical records in order to eliminate or minimise re-exposure to related medications.

Method
Our theme is problem-solving type of quality control circles. After referring to the data of peer hospitals, we set up a target value of 60%. Brainstorming with the circle members about the reasons for the low reporting rate of adverse drug reactions, and 17 causes were proposed. Then voting by circle members, we got seven important ones. After questionnaire by other medical personnel, five real causes were found out finally. According to five real causes, we figured out five countermeasures and put them into practice.

Results
After 2 months of implementation, the ADR reports were collected from September to November in 2022. The rate of ADR reporting by non-dedicated medical personnel was increased from 34% to 70%. After several propagandas on how to report ADRs, the awareness of ADR reporting is as high as 98%.

Conclusion
Spontaneous reporting the suspicion of an ADR by all healthcare professionals is an important part of pharmacovigilance. The convenience of reporting system must be provided. Thus, the patient safety would be guaranteed.

Impact of pharmacy clinical service redesign on quantity and quality of pharmacy interventions in a tertiary teaching hospital

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background
Drug-related problems (DRPs) are a significant cost burden to the Australian healthcare system, contributing to approximately 250, 000 hospital admissions annually. It is unclear how best to prioritise clinical pharmacy services in hospitals to prevent DRPs.

Purpose
This study aimed to evaluate the impact of a whole hospital clinical pharmacy redesign on medication review. Secondary objectives evaluate the number, type, and clinical significance of pharmacist interventions before and after the clinical pharmacy redesign.

Method
The pre-post observational cohort study was conducted at a 550-bed tertiary teaching hospital in New South Wales, Australia. The redesign of the clinical pharmacy service was conceived and implemented using redesign methodology. Implemented solutions involved alignment of pharmacists to specialty teams, multidisciplinary teamwork, pharmacist clinical specialisation, emphasis on clinical documentation, and prioritisation of patients requiring medication review.
Pharmacist interventions documented in the medical record before and after the clinical redesign were compared. All inpatients with a pharmacist intervention documented in the medical record during the 20-day (non-consecutive) study period were included. Patient's comorbidities were used to compare groups based on the Charlson Comorbidity Index and the top ten major chronic condition groups from the Australian Institute of Health and Welfare. Factors that may contribute to increased risk of medication harm were also used to compare groups.
Interventions were classified by type of intervention provided by the pharmacist. Interventions were clinically reviewed by two independent reviewers to determine the most credible intervention impact and significance. Chi-square was used to compare the number, type, and clinical significance of pharmacist interventions before and after the redesign. Mann-Whitney U was used to compare the number of regular medications taken on admission and discharge and hospital length of stay in pre and post intervention cohorts.

Results
The study included 226 patients in the pre cohort and 484 in the post cohort. Both pre- and post-cohorts were of similar age, (mean 70 vs 69, p-value = 0.998) and no difference in demographics were identified. Patients were predominantly admitted to medical specialties (70.4% vs 74.4%, p-value = 0.3). Pharmacist interventions increased after the clinical pharmacy redesign (326 vs 1644). Drug selection, dosing and undertreatment were common causes of drug related problems in both pre and post cohorts. Interventions in the pre-cohort were more likely to involve changes of therapy (70.4% vs. 47.2%, p-value < 0.001) or suggested monitoring (8.1% vs 5.5%, p-value = 0.159). In the post-cohort, there was an increase in interventions related to provision of information, and more specifically interventions impacting continuity of care (14.9% vs 51.5%, p-value < 0.001).

Conclusion
The redesign of clinical pharmacy services supporting prioritisation of patients requiring medication review resulted in an increase in the identification and resolution of DRPs without increasing resources or requirement for complex screening tools. The redesign led to improvements in process of care and continuity of care in hospitalised inpatients.

Development of a competency framework on innovation and research of hospital pharmacists in China: A qualitative study in Suzhou

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Objective: At present, the innovation demand and research expectation for hospital pharmacists are accelerating in China. Therefore, a competency framework is needed for the professional development of hospital pharmacists. The purpose of this study is to establish a competency framework on innovation and research for pharmacists in pharmacy departments in Chinese hospitals, and to build up the research capacity of pharmacists in hospital pharmacies.
Methods: Behavioral event interview (BEI) was conducted among 21 pharmacists with previous innovation or research achivements in the pharmacy department of Tertiary hospitals in Suzhou. The framework was constructed based on the interview findings, then further refined through literature review, focus group discussion and two rounds of Delphi expert consultation.

Results: The response rates of the two rounds of Delphi expert consultation were 100% and 98%, respectively. The challenges and successes of innovation of research were revealed during the interview process. The information was then processed based on the Grounded theory. Four first-level indexes in the competency framework included personal characteristics, research literacy, execution and enthusiasm. Nine second-level indexes included critical thinking, persistence, self-learning abilities, scientific writing skills and others.

Conclusion: The competency framework on innovation and research of hospital pharmacists is constructed, which is based on qualitative research standards. The framework is helpful to serve as a tool for improving the professional standards and research capacity of pharmacists in hospitals, optimizing the research achievements of pharmacists, and meeting the national needs for the transformation of pharmacy service. This will also provide reference for the training, management and assessment of hospital pharmacists.

The health economics impact of the long prescription implementation in a tertiary general hospital

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background: The COVID-19 epidemic has brought great challenges to the standardized treatment of patients with various chronic diseases and the access to the drugs they need. From 2020 to 2021, the National Medical Security Bureau and the National Health Commission issued two policies, which clearly proposing the long prescription policy of extending the days of single prescription to 12 weeks. The management was also standardized to meet the increasing long-term medication needs of patients with chronic diseases. The long-term prescription policy is an active exploration of prescription management for patients with chronic diseases in an aging society. The purpose of this study is to explore the impact of long-term prescription use in tertiary hospitals on patients' medical service utilization and medical expenses based on real-world data using a retrospective cohort study design.

Purpose: To evaluate the implementation effect of the long prescription system in a tertiary hospital in Beijing and its impact on the utilization of patients' medical services and medical expenses.

Methods: A retrospective cohort study was used to understand the medical service utilization index, medical expense index and medical expense structure of patients in the long prescription group and the non-long prescription group.

Results: There was no difference in the diagnosis of chronic disease and the number of items of chronic disease drugs used in a single prescription between the long term and the non-long term prescription group, while the number of long term group visits and expenses were significantly lower than those of the non-long term prescription group. The proportion of drug expenditure in the long prescription group was significantly higher than that in the non-long prescription group.

Conclusion: The long-term prescription policy has achieved remarkable results in reducing the medical burden of patients and improving the convenience of patients' medical treatment. However, the follow-up efforts to strengthen the management of patients with chronic diseases in community hospitals and the construction of medical consortia will achieve the whole cycle management of patients.

Potentially inappropriate medication use in elderly surgical patients: A retrospective study of an elective surgery cohort

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background
Geriatric people are the main group receiving elective surgeries and they have higher rates of postoperative complications compared to adults under 65. Potential inappropriate medication (PIM) use may prolong hospitalization time, increase medical expenses and impair the function of the elderly. Little is known about the prevalence of potentially inappropriate medications (PIMs) and their association with postoperative outcomes in older adults in China.

Purpose
The objectives of this study were to evaluate the prevalence of PIMs in a geriatric elective surgery population and to explore associations between PIMs and postoperative length of stay (LOS), medical expense, and postoperative health-related scores, depending on the number of PIMs.

Method
We performed a retrospective cohort study of elderly elective surgical patients from January 2015 to August 2022. Patient demographic, sociodemographic, diagnosis, comorbidity, surgical, laboratory and medication data were collected and compared between the PIMs group and non-PIMs groups. PIMs were evaluated and identified by 2019 Updated AGS Beers Criteria. Health-related scores were assessed by the Barthel Index of Activity of Daily Living (ADL) scale, morse fall risk assessment scale, nutritional risk screening 2002 and numeric pain rating scale. We investigated the association between PIMs and postoperative LOS, health-related scores and medical expenses.

Results
We included a total of 1974 patients (1080 males, 894 females) with an average age of 72.03 ± 5.98 years. 1248 (63.22%) patients had at least one PIM. The average number of PIMs used was 2.24 ± 3.28. The most frequently prescribed PIMs were immediate-release nifedipine (362, 14.71%), loxoprofen (350, 14.16%) and estazolam (298, 12.06%). The most frequently used PIM categories were pain medications (1120, 45.51%), central nervous system medications (627, 25.49%) and cardiovascular medications (381, 15.48%). There was a significant association between PIM numbers and LOS, medical expense, and health-related scores. For geriatric elective surgical patients, every additional PIM use increased LOS by 0.82 days (95% confidence interval (CI), 0.69–0.96; P<0.0001), increased medical expense by 840.94 dollars (95% CI, 5025.91-6622.42; P<0.0001), increased morse fall risk assessment scale by 0.51 points (95% CI, 0.21-0.80; P<0.0001), and decreased Barthel index of ADL scale by 1.29 points (95% CI, -1.56, -1.01; P<0.0001).

Conclusion
There was a high prevalence of PIMs in Chinese elderly surgical patients. A significant association was found between PIM numbers and LOS, medical expense, and health-related scores. Interventions for reducing PIMs use in geriatric elective surgical patients should be taken into account to optimize the surgical care of older adults.

Covid-19 vaccine and autoimmune diabetes in adults: A case report and literature review

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background
Case reports of autoimmune diabetes linked to COVID-19 vaccines, mainly mRNA vaccines, have emerged, showing varied clinical presentations and autoantibody profiles.

Case Presentation:
We report a case of autoimmune diabetes post Pfizer-BioNTech COVID-19 vaccine in a 45-year-old woman with a history of type 2 diabetes. She was hospitalized with diabetic ketoacidosis four days after vaccination and subsequently discharged on a twice-daily premixed insulin regimen. Despite adjusting her insulin regimen during outpatient follow-up, her HbA1c remained high at 10.5% after four months, and hypoglycemic events occurred frequently. Insulin autoantibodies were detected (59%) despite the marginal negativity of anti-glutamic acid decarboxylase antibody (Anti-GAD 9.65 IU/mL). A low c-peptide level on a glucagon stimulation test raised concerns of vaccine-related beta cell failure. To manage unstable blood sugar levels and insulin antibody action, the patient opted to use a continuous glucose monitor and insulin pump.

Conclusion :
The present cases suggest that autoimmune diabetes is a possible adverse effect of COVID-19 vaccination. Further research is needed to determine the incidence and risk factors for autoimmune diseases triggered by mRNA vaccination.

Evaluation of drugs used to reduce shivering induced by targeted temperature management

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Posters Monday, September 25, 2023, 12:30 PM - 2:30 PM

Background: The therapeutic hypothermia known as targeted temperature management (TTM) can improve the neurological damage of patients after cardiac arrest. The hypothalamic center will stimulate the body a shivering if not effectively controlled, can disrupt the cooling process and eliminate the potential benefit of treatment.
Purpose: To reduce the shivering response, anti-shivering medications were used such as sedatives, opioid and neuromuscular blocking agents(NMBA). This study explores the efficacy of anti-shivering drugs.

Method: This is a retrospective study. Data collection period was 2019.01.01~2021.12.31. The whole course of TTM was 3 days. Total of 32 patients were included. The Bedside Shivering Assessment Scale (BSAS) was used. If shivering is present then we used anti-shivering medications according to physician discretion.

Result: The average age of the patients was 58.25 years old, average weight was 74.28kg. The prognosis of the patients were graded as follows which includes 43.75% had improved condition and 9.38% death. Comparing the differences in BSAS scores, there was a negative correlation between TTM day 1 and day 3 ($r=-0.423$, $p<0.001$). The number of anti-shivering drugs given on the first day was the highest followed by second day ($p<0.029$) and lowest on the third day ($p<0.001$). The most frequently used anti-shivering drugs were midazolam followed by cisatracurium then propofol and opioids. Midazolam dosage on day 1 is greater than day 3 ($p=0.039$) with negative correlation($r=-0.208$). Cisatracurium dosage on day 1 is also greater than day3 ($p=0.028$) and with negative correlation ($r=-0.233$). Concomitant drugs used were mainly cisatracurium combined with midazolam or propofol, followed by midazolam combined with atracrrium.

Conclusion: This study shows that starting hypothermic therapy, immediate use of higher initial doses and combined used with NMBA can control shivering more quickly. It's also showed that the use of different drug combinations may produce synergistic benefits and quickly achieving our target temperature.

Sustainable development in an anti-cancer drug preparation unit: A focus on waste reduction

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Sustainable development worldwide is an essential, if not existential, social issue. However, its implementation in the medical field continues to be a challenge.
Our aim was to look for areas of improvement in order to reduce waste generated by our anti-cancer drug preparation unit.

First, critical events of each action field were listed. Next, these events were given a primary ranking according to their environmental impact (EI): green for a light EI, orange for an intermediate EI, and red for a strong EI. Then, additional factors, such as human protection or preserving sensitive information, led to a final ranking. Following, actions to be implemented were found for events with an intermediate or strong EI, according to feasibility and cost criteria. Each step of the process was considered and decided collectively within the unit's team (hospital pharmacy technicians and pharmacists).

In total, 33 events were identified and divided into 8 action fields: "Order-Reception-Storage" ; "Restock-Inventory" ; "Pharmaceutical validation" ; "Preparation" ; "Pharmaceutical release" ; "Dispensation" ; "Delivery" ; "Reattribution". Among all the events, 36% (12/33) were first rated with a strong EI, 21% (7/33) with an intermediate EI, and 42% (14/33) with a low EI. Weighing additional factors led to the final ranking : only 3% (1/33) of the events remained with a strong EI, whereas the events with intermediate and low EI now accounted for 42% (14/33) and 55% (18/33) respectively.

The one event with the strong EI was the systematic printing of the prescription for the patient file: the solution suggested was the development of computerized patient files. Concerning intermediate EI, a few examples can be discussed. First, in order to limit the use of paper, the traceability of reception by the nurse could also be computerized thanks to our production software. In another example, the use of disposable personal protective equipment was studied: it could be reduced by using washable mobcaps and gowns. However, no solution has been found at this point regarding disposable nitrile gloves. Other waste was identified, such as transport-crate closing ties: code padlocks could be considered to replace the closing ties. Finally, the criteria of anti-cancer drug preparation's reattribution could be widened: for instance, a 5% dose difference could be allowed.

To conclude, this global assessment is the first step in reducing our waste production. Different solutions have been provided. However, their implementation must be carried out in harmony with the daily-life of the anti-cancer drug preparation unit, over the course of several campaigns for instance.

Defining quality indicators for clinical pharmacy service delivery in Queensland Public Hospitals

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Background
Medication errors are a leading cause of preventable healthcare associated harm. Clinical pharmacists perform patient-centred activities to optimise medication use and prevent harm. These activities are measured to monitor the extent of service provision. Historically, clinical pharmacy quality indicators have been non-uniform across Queensland, Australia.

Purpose
To define a set of agreed clinical pharmacy quality indicators to use within Queensland Public Hospitals and to assess the measurability of agreed clinical pharmacy quality indicators.

Methods
A two-round modified-Delphi consensus approach with 25 Queensland Directors of Pharmacy (DOP) was performed. DOP were asked to rate on a 5-point LIKERT scale the relevance and measurability of 32 inpatient clinical pharmacy quality indicators identified from the literature. Consensus was defined as an average score of greater than 4. Indicators which did not reach consensus in round 1, as well as additional indicators proposed by DOP in round 1, were considered in round 2.

Results
There were 15 respondents in round 1 (60% response rate) and 14 (56% response rate) in round 2. In round 1, 22 indicators reached consensus. In round 2 only one of the original indicators reached consensus and three of the four additional DOP proposed indicators reached consensus. In total 26 indicators reached consensus. The highest ranked indicator was 'Proportion of patients where a Pharmacist documents an accurate list of medicines (medication history) during admission' (mean rating 4.87) followed by 'Proportion of patients where a Pharmacist performs medication reconciliation on admission' and 'Proportion of patients where a Pharmacist provides a medication list to a patient upon discharge' (mean rating 4.80). The medication history indicator was also rated as the easiest to measure (mean rating 4.40). For indicators which reached consensus, the average measurability score ranged from 1.93 to 4.40. The proportion of sites who measured each of the consensus agreed indicators ranged from 13% to 100%.

Conclusions
A set of clinical pharmacy quality indicators for use within Queensland Public Hospitals has been defined, however implementation of measurement may be limited by the ability to measure the agreed indicators. Future work will define sets of care bundles (grouped quality indicators) and relevant outcomes to measure.

Preliminary results of pharmacists participating in a health education program for patients with pre-end-stage renal disease (pre-ESRD) in Taiwan

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Background:
In Taiwan, the National Health Insurance Department has cooperated with the Taiwan Society of Nephrology to implement the "Pre-ESRD preventive and patient health education program" since 2006. Pharmacists joined the program in November 2021 to provide guidance and health education to improve patients' medication adherence.

Objective:
Pharmaceutical care interventions in this program include (1) medication adherence confirmation, (2) education on avoiding nephrotoxic drugs, and (3) medication integration to optimize deprescribing.
We hope it can provide patients with individualized medication education by(1) improving medication adherence and (2) reducing the administration of nephrotoxic medications (especially NSAIDs) after pharmacists join the CKD care team.

Method:
Data Source: Third Generation Warehouse of the National Health Insurance Administration.
Data description: The Analysis will focus on the type of patients, the reasons for pharmaceutical care, and the evaluation of medication adherence. We use the Adherence to Refills and Medications Scale (ARMS scale) to measure patient medication compliance; We carried out NSAIDs Analysis and statistics on the usage situation and the acceptance rate of medication integration recommendations.

Result:
・The number of patients included in pharmaceutical care practice from November 2021 to August 2022 was 7102 individuals.
・The proportion of more than two comorbidities other than CKD accounted for was about 91.7%; the number of patients taking more than or equal to 10 drugs accounted for 46%.

・During the period, 2317 patients were followed up twice. Between the two traces, we found that the proportion of drug compliance ARMS score=12 has increased from 54.03% to 65.26%.
・The number of patients using NSAIDs has decreased (from 390 to 327). The extent of NSAID use reduction is mostly from other sources, which the health insurance prescription data cannot show. Pharmacists' intervention can reduce the proportion of patients who self-purchase NSAIDs.

Conclusion:
The PreESRD health education plan(program)is the first pharmaceutical care officially included in the health insurance payment project. Most PreESRD patients are elderly, have multiple comorbidities, visit numerous departments, and have many medications. Individualized medication education needs are necessary.
This analysis shows that pharmacists can improve patients' medication compliance and avoid self-administration of nephrotoxic drugs (especially NSAIDs).

Improvement and future:
(1)Pharmacists and Physicians collaborate in standards established for patients with abnormal renal function who use NSAIDs.
(2)Strengthen interdepartmental polypharmacy integration
(3)Community Pharmacy Engagement in the preESRD program
Pharmacists can work well with cross-team professional medical personnel (physicians, nurses, nutritionists) to take care of patients' medication safety to achieve Patient-Centered Healthcare.

Global, regional, and national availability of essential medicines for children, 2009-2020: A systematic review and meta-analysis

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Objective Access to essential medicines is a vital component of universal health coverage. The low availability of essential medicines for children (EMC) has led the World Health Organization (WHO) to issue a number of resolutions calling on member states on its improvement. But its global progress has been unclear. We aimed to systematically evaluate the progress of availability of EMC over the past decade across regions and countries. Methods We searched eight databases from inception to December 2021 and reference lists to identify included studies. Two reviewers independently conducted literature screening, data extraction and quality evaluation. This study was registered with PROSPERO, CRD42022314003. Results Overall, 22 cross-sectional studies covering 17 countries, 6 regions and 4 income groups were included. Globally, the average availability rates of EMC were 39.0% (95%CI: 35.5%-42.5%) in 2009-2015 and 43.1% (95%CI: 40.1%-46.2%) in 2016-2020. Regionally, the availability rate was lowest for the Western Pacific regions. Nationally, the availability rate of EMC was reasonable and high (>50%) in only 4 countries, and low or very low for the rest 13 countries. The availability rates of EMC in primary healthcare centers had increased, while that for other levels of hospitals slightly declined. The availability of original medicines decreased while that of generic medicines was stable. All drug categories had not achieved the WHO's Global Action Plan goal of 80%. Conclusion The availability rate of EMC was low globally, with slight increase in the last decade. No region or country or medicine category had reached the target of 80% availability of EMC.

Case report and literature review: Apixaban-induced thrombocytopenia

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Apixaban is one of the newer oral anticoagulants (NOAC) which is becoming increasingly prescribed for stroke prevention in patients with nonvalvular atrial fibrillation due to its superiority in the prevention of stroke or systemic embolism versus warfarin with decreased risk of bleeding. Hereby we report a case of possible apixaban-induced thrombocytopenia regarding to a 83-year-old female who was admitted to the ward with symptoms including shortness of breath and swollen lower limbs. Apixaban was prescribed for atrial fibrillation 5 months prior to this admission. Platelet level was 38 x 10^9/L on admission and increased to normal level (≥150 x 10^9/L) 3 days after omitting apixaban. Clinicians should be aware of rare side effects such as thrombocytopenia, especially in the elderly patients.

Analysis of time in therapeutic range of anticoagulant therapy in patients on Warfarin

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Introduction
Warfarin therapy requires regular monitoring to ensure its maximum benefits and prevent adverse events such as hemorrhagic or embolic incidents. Maximizing the time within the therapeutic range has been shown to provide the most benefit for the patients. As such, the time in therapeutic range (TTR) has been used as a quality measure

for warfarin therapy. However, how TTR reflects the treatment outcome among elderly patients with atrial fibrillation (AF) and deep vein thrombosis (DVT) remains underreported. According to Asia Pacific Heart Rhythm Society, TTR>60% suggested good International Normalised Ratios (INR) control, whereas TTR<60% and TTR>70% indicated poor and excellent quality of therapy respectively.

Objectives
The study aims to analyze the anticoagulation status, effect of regular monitoring on the effectiveness and adverse events in elderly patients receiving warfarin according to their TTRs.

Methods
Data of patients who were treated with warfarin for AF or DVT and followed up by a multi-disciplinary team at the anticoagulation clinic of Kiang Wu Hospital, Macau between June 2016 and December 2020 was collected. Patients who had received warfarin treatment for over 6 months, had follow-up consultations at the outpatient department, received regular INR monitoring, and had results eligible for TTR calculations using the Rosendaal method were included. Their clinical data and TTRs were retrieved from their electronic health record. Retrospective analysis of adverse events such as bleeding, embolic, and death incidents was performed.

Results
Out of the 137 patients who had regular INR monitoring at the anticoagulation clinic, 109 of them (79.56%) met the inclusion criteria. Among these 109 patients, the average age was 61.89±15.48 years and 44.95% were male. Their average TTR was 54.94±21.40% with 59.63% having TTRs <60% and 40.37% having TTRs >60% (including 17.43%% having TTR of 60-70% and 22.94% having TTR>70%). In patients with AF and DVT, the proportion of patients with TTR>60% were 53.70% (p=0.005) and 16.70% (p=0.007) respectively. Bleeding incidents occurred in 25.69% of the enrolled patients, with minor bleedings appearing most frequently. However, TTR below or over 60% was not found to be significantly associated with the bleeding incidents (p=0.764).

Conclusion
TTR of the patients treated with warfarin for AF or DVT was found to be sub-optimal warranting further intervention at the anticoagulation clinic. Patients on warfarin for different diagnosis may pertain different needs and require different intervention designs. Bleeding risk was relatively high despite the care by a specialist team is involved. Pharmacists' involvement to provide a more comprehensive management on warfarin therapy should be taken as a priority.

The efficacy and safety of single versus dual antiplatelet therapy for noncardioembolic acute ischemic stroke

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background:
According to past stroke society guidelines, it recommended using single antiplatelet therapy(SAPT) or dual antiplatelet therapy(DAPT) for noncardioembolic acute ischemic stroke in 48 hours to reduce mortality. However, in current updated guidelines, DAPT is the first choice for patient if without antiplatelet contraindication. We wanted to know the efficacy and safety of single versus dual antiplatelet therapy in our hospital inpatients, and then do a research.

Purpose:
To analyze the efficacy and safety of single versus dual antiplatelet therapy in inpatients.

Methods:
A retrospective study was conducted by medical chart review from 2021.11 to 2022.08 in a regional hospital in New Taipei City in Taiwan. Patients with noncardioembolic acute ischemic stroke in 48 hours received SAPT or DAPT were included in this study. All descriptive statistics were analyzed, and mean inpatient days, recurrent stroke rates, major bleeding rates were also analyzed to evaluate the efficacy and safety.

Results:
83 and 18 patients were allocated separately to SAPT(aspirin or clopidogrel) group and DAPT(aspirin combined with clopidogrel or dipyridamole or ticagrelor) group. Mean inpatient days(12.3 vs. 9.5, p>0.05), recurrent stroke rates(7.2% vs. 5.5%, p>0.05), major bleeding rates(0% vs. 5.5%, p<0.05) were calculated respectively.

Conclusion:
Our study result has shown that using DAPT compared to SAPT has shorter inpatient days, lower recurrent stroke rates and significant major bleeding rates, similiar to previous studies. In order to ensure patient safety, before using DAPT, further evaluation about benefits and risks is warranted.

The efficacy and safety of canagliflozin in outpatients with type 2 diabetes: A retrospective study

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background:
One of SGLT2 inhibitors, canagliflozin, in previous study, result showed that can not only lower HbA1C and body weight, but also decrease the risk of kidney failure and cardiovascular events. However, the ADRs rates of amputation and fracture was found and different from other SGLT2 inhibitors. We wanted to know the efficacy and safety of canagliflozin in our hospital outpatients and then do a drug utilization evaluation research.

Purpose:
To analyze the efficacy and safety of canagliflozin in outpatients.

Methods:
A retrospective study was conducted by chart review from 2022.04 to 2022.07 in a regional hospital in New Taipei City in Taiwan. Outpatients who received canagliflozin first time in our hospital were included in this study. All descriptive statistics were analyzed, and all prescriptions were evaluated applying the package leaflet to detect drug-related problem. Furthermore, the HbA1c levels, other lab data, ADRs were also performed to examine the efficacy and safety.

Results:
A total of 64 prescriptions were reviewed and 95.31% was conformed to NHI payment standards. Between pre and post treatment, no significant difference was found in the HbA1c levels and other lab data. Moreover, the most common ADRs observed was UTI, but amputation and fracture was not found in our study.

Conclusion:
Our study has shown no significant difference in the efficacy and safety profile due to short-term follow-up, more additional long-term research is needed to implement,. We still recommend to do proper patient education, especially in patient with amputation history.

Analysis of the effectiveness of a multidisciplinary team intervention on medication reconciliation for elderly patients in emergency departments

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background:
Major polypharmacy (≥10 medications) and potential inappropriate medication (PIM) use significantly increase the incidence of adverse drug reactions in elderly patients(aged ≥65 years). There is currently no research on early medication reconciliation in the emergency department (ED) to reduce severe polypharmacy and potential inappropriate medication use. Therefore, this study began medication reconciliation and integration of National Health Insurance Pharma Cloud Data in the emergency department where older patients were admitted to hospital, we used computer-based technology, multidisciplinary teamwork, and evidence-based medicine, to improve the quality of care in older patients.

Methods:
Older patients awaiting hospitalization at ED in Chi-Mei medical center were recruited in this study. A multidisciplinary team and a computer-based and pharmacist-assisted medication reconciliation and integration system were implemented. We collected the data of major polypharmacy and PIM in National Health Insurance (NHI) Pharma Cloud Data as well as the reduction of medications in patients with major polypharmacy at hospital discharge, and estimate the cost savings from pharmacist intervention to prevent medication errors.

Results:
Before the quality improvement of care (Dec 1, 2017 to Feb 28, 2018), the proportion of major polypharmacy at hospital discharge was 34.71%. After the intervention of program, the proportions of major polypharmacy were reduced to 21.59% (through Jun to Aug in 2018), 26.39% and 19.33% (Sep and Oct in 2018, respectively). In 2021, 892 cases of major polypharmacy (≥10 chronic medications) were identified in NHI Pharma Cloud Data, after intervention, only 131 cases remained upon discharge, resulting in a 76.83% reduction in severe polypharmacy. Before the quality improvement of care (Dec 1, 2017 to Feb 28, 2018), the proportion of PIM at hospital discharge was 50.87%. After the intervention of program, the proportions of PIM were reduced to 31.53% (through Jun to Aug in 2018, respectively), 32.00%, and 34.04% (Sep and Oct in 2018, respectively). In 2021, pharmacist intervention provided 447 suggestions for PIM, result in 69.80% reduction in PIM. The number of medications was reduced from 12.40±2.70 to 7.21±2.93 ($p < 0.05$) in patients with major polypharmacy (Jun 1, 2018 to Nov 30, 2020), and 12.71±2.65 to 6.24±2.96 ($p < 0.05$) in 2021. The estimated cost-saving of preventable ADEs (Jun 1, 2018 to Apr 30, 2019) was NT$ 4,116,000. The benefit/cost ratio was 5.6.

Conclusion:
Through interdisciplinary collaboration, computer-based assistance, and pharmacist medication reconciliation successfully reduced severe polypharmacy and potential inappropriate medication use, prevented adverse drug events, and avoided cost expenditures.

A study on the comparison of efficacy of myoinositol/D-chiro inositol with myoinositol/metformin among the patients with poly cystic ovarian syndrome

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Aim: The main aim of this study is to compare the efficacy of Myoinositol/D-Chiro inositol with Myoinositol/Metformin among the patients with poly cystic ovarian syndrome.
Materials & Methods: This was a prospective study and the study participants in the group-A (30 participants) were prescribed with Myoinositol/D-Chiro inositol whereas in the group-B (30 participants) were prescribed with Myoinositol/Metformin.

Results: In this study, majority of the subjects with PCOS were in the age group 21-25yrs (51.7%). Most of the subjects with PCOS were observed with irregular menstrual cycles (91.7%), with painful periods (45%), with acne/oily skin (61.7%), with alopecia (60%), with hirsutism (56.7%), with weight gain (93.3%), with mood swings (85%), with behavioural changes (63.3%), with headache/dizziness (16.6%), with fatigue (58.3%), with sleep disturbances (63.3%), with mental disturbance about the condition (58.3%). The mean days between menstruation of group-A subjects before the treatment was found to be 153 (± 93.33) days whereas the mean days between menstruation after the treatment was found to be 40 (±16.4) days with mean difference of 113 days. The mean days between menstruation of group-B subjects before the treatment was found to be 144 (±91.33) whereas the mean days between menstruation after the treatment was found to be 77 (±17.05) with mean difference of 67 days.

Conclusion: The group-A subjects showed a significant improvement in the regulation of menstrual cycle within short duration after the treatment with Myoinositol/D-Chiro inositol when compared with the group-B subjects who were prescribed with Myoinositol/Metformin.

Knowledge, attitudes and experiences of surgical clinicians attending regular antimicrobial stewardship patient meetings

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Introduction
Recent national data showed high rates of inappropriate procedural and postprocedural antimicrobial use across all surgical specialties, with the appropriateness rate of surgical prophylaxis prescriptions ranging from 33.7 to 68.9%.
The aim of this study was to explore surgical team clinicians' experience, knowledge, and perceived antimicrobial use after attending weekly multidisciplinary antimicrobial stewardship (AMS) rounds. A secondary outcome was to measure the attendance and duration of these AMS rounds.

Methods
This was a prospective cross-sectional study conducted at a 550-bed tertiary referral teaching hospital in Sydney, Australia.
The elements of the intervention included regular weekly, multidisciplinary team meetings that occurred face-to-face in the Microbiology Department. Each meeting had a consistent format, which included the review of clinical, laboratory and medicines data. An agreed treatment plan was documented focusing on appropriate antimicrobial choice and duration.
A survey was sent to all pharmacists and doctors who attended these meetings from the Vascular, Colorectal, Upper Gastrointestinal, Breast and Endocrine, and Plastics surgery teams from 2015 to 2018.
The survey asked questions about the respondent's demographics such as the surgical department and their position. The survey tool also asked about the respondent's experience, beliefs and attitudes with:
(1) knowledge of how to apply clinical information to antimicrobial use and
(2) surgical rounds and their associated outcomes.

Results
67 participants were identified over a 33-month period. Of these, 64 responses met the inclusion criteria, with 3 excluded as they did not attend any rounds in the study period. The response rate was 100% with zero missing data from the Likert scale responses. Five participants did not complete the open-ended questions.
85 meetings were recorded for outcomes across the 4 surgical disciplines, with two-thirds of these meetings being attended by a senior surgeon (n=56, 66%). The meetings took an average of 19 minutes (range 3-48 minutes).
Almost all respondents reported that their knowledge of antibiotics (97%, n=62), evidence-based guidelines (81%, n=52), and interpretation of clinical microbiology reports improved (81%, n=52). Respondents also reported that the rounds have altered their approach to future antibiotic prescribing (n=53, 83%).

56 participants (88%) reported that they perceived the Surgical AMS rounds improved patient outcomes in their survey responses. Participants agreed that the advice provided in the Surgical AMS round was practical and implemented within 24 hours of the meetings (97% and 94%, respectively).

Discussion
Following the implementation of a weekly multidisciplinary surgical AMS meeting, the clinicians' experience was positive, with a perceived improvement in knowledge and improvement in antimicrobial use.

Anatomy of a medication safety monitoring dashboard

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Background: In Australia, the National Safety and Quality Health Service (NSQHS) Standards provide a nationally consistent statement of the level of care consumers can expect from health service organisations. Monitoring standards can be time and resource intensive. The wide use of Electronic Medical Records (EMR), in particular, the uptake of electronic medication management, provides an opportunity for automated monitoring of many aspects NSQHS standard 4 (medication safety).

Purpose: The "Actionable Dashboards Project at Eastern Health" or ADaPt EH is a collaborative approach to addressing quality assessment challenges by generating near real-time dashboards presenting relevant patient information from the EMR in an easily accessible and comprehensible format that can be used by hospital staff and accreditation agencies for assessment purposes. Understanding of the elements, capacity and limits of a Medication Safety dashboard is essential to its effective implementation and use.

Method: The ADaPt EH Medication Safety dashboards were co-designed with key stakeholders to identify measures used in NSQHS standards assessment that could be generated from the EMR. These measures are then precomputed and stored in a secure data warehouse, then PowerBI was used for interactive visualisation of the data. Socialisation of the dashboards involved presenting overviews in team and department meetings. Clinical Risk Managers acted as champions for dashboard use and provided guiding documentation for access and engagement. This allowed health service staff to explore dashboards in a time and context appropriate for them. Familiarity with, and confidence in using dashboards is critical to their successful implementation across the health service, including this poster, describing the content, identified uses, and limitations forms part of that information resource.

Results: A suite of two interactive dashboards (performance dashboard with 16 measures and live monitoring dashboard with 2 measures) for Medication Safety was developed, validated and published. This poster describes these key aspects of the dashboard to provide a broader understanding of current implementation and future potential. For purposes of demonstration outside of the original health service, a dummy data set has been generated to populate the dashboards and avoid any risk of breach of patient or organisational confidentiality.

Conclusion: This Medication Safety dashboard is part of a larger project to develop dashboards for each of the NSQHS standards. This poster presents key elements of the dashboards developed, and endorsed, to provide wider understanding of their potential and generate discussion about future developments.
The research project described in this presentation is supported through the Digital Health Collaborative Research Centre (DHCRC)in Australia (DHCRC-0108), and has multiple partners including Monash University, Eastern Health, the Australian Council on Healthcare Standards, and the Victorian Department of Health. DHCRC is funded under the Commonwealth of Australia's Cooperative Research Centres (CRC) Program.

Obtaining medication histories via telepharmacy: An observational study

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Background
Medication reconciliation is an effective strategy to reduce medication errors upon hospital admission. The process involves obtaining a best possible medication history (BPMH), which can be both time-consuming and resource-intensive. During the COVID-19 pandemic, telepharmacy was used to reduce the risk of viral transmission. Telepharmacy is the remote provision of pharmacy-led clinical services, such as obtaining BPMHs, using telecommunications. However, the accuracy of telephone-obtained BPMHs has not yet been evaluated.

Purpose
Therefore, the primary aim of this study was to evaluate the proportion of patients who have an accurate BPMH from the telephone-obtained BPMH compared to an in-person obtained BPMH.

Method

This prospective, observational study took place in a large tertiary hospital. Recruited patients or carers had their BPMH obtained by a pharmacist over the telephone. The same patients or carers then had their BPMH conducted in-person to identify any deviations between the telephone-obtained and in-person obtained BPMH. All telephone-obtained BPMHs were timed with a stopwatch. Any deviations were categorised according to their potential consequence. An accurate BPMH was defined as having no deviations. Descriptive statistics were used to report all quantitative variables. A multivariable logistic regression was conducted to identify risk factors for patients and medications for having medication deviations.

Results

In total, 116 patients were recruited to receive both a telephone-obtained and in-person obtained BPMH. Of these, 91 patients (78%) had an accurate BPMH with no deviations. Of the 1,104 medications documented across all the BPMHs, 1064 (96%) had no deviation. Of the 40 (4%) medication deviations, 38 were deemed low-risk (3%) and 2 high-risk (1%). A patient was more likely to have a deviation if they are taking more medications (aOR: 1.11; 95% CI: 1.01 – 1.22; p<0.05). A medication was more likely to have a deviation if it was regular non-prescription medication (aOR: 4.82; 95% CI: 2.14 – 10.82; p<0.001) or 'when required' non-prescription medication (aOR: 3.12; 95% CI: 1.20 – 8.11; p=0.02) or a topical medication (aOR: 12.53; 95% CI: 4.34 – 42.17; p<0.001).

Conclusion

Telepharmacy represents a reliable and time-efficient alternative to in-person BPMHs.

Using person-controlled electronic health records for medication continuity during transition of care: An observational study

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background

Person-controlled electronic health records (PCEHRs) have been proposed to improve the transfer of medication-related information during transition of care. In 2018, the Australian Government implemented an optional PCEHR for consumers, "My Health Record". This study evaluates the medication accuracy of My Health Record (MHR).

Purpose

To evaluate the proportion of medications that PCEHRs captures compared to a pharmacist-obtained best possible medication history (BPMH).

Method

This was a prospective observational study, using a convenience sample using all recruited patients from a previous study conducted in hospital. For these patients, the investigating pharmacist would obtain a BPMH and then compare it to the patient's medication list found in their PCEHR. All medicines listed in the PCEHR in the last 6 months were reviewed for inclusion. Medications were excluded if they were: (1) categorised as "when required" (both prescription and non-prescription) and there was no history for more than 3 months; and (2) they were only required for a short-period or defined duration.

Results

From the 1,404 medications reviewed, 1,207 (86%) met the inclusion criteria. From the 1,207 included medications, the number of medications documented with either no deviation or had a partial match were 714 (59.2%). The remaining 493 (40.8%) medications were mismatched. Of the 493 mismatched medications, 442 (89.7%) were deemed low-risk deviations and 51 (10.3%) were deemed high-risk. A medication was more likely to be mismatched (omitted/committed) if it was a regular non-prescription medication (aOR: 7.33; 95% CI: 5.00 – 10.74; p <0.001) or 'when-required' prescription medication (aOR: 5.83; 95% CI: 3.34 – 10.17; p<0.001) or 'when required' non-prescription medication (aOR: 11.27; 95% CI: 7.14 – 17.79; p<0.001), or if it was administered parenterally (aOR: 2.21; 95% CI: 1.22 – 4.00; p=0.009).

Conclusion

Person-controlled electronic health records have proven to be a reliable secondary source for medication continuity.

Communication of deprescribing recommendations from hospitals to general practice through discharge summaries: A retrospective study

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Background: Polypharmacy is common among older adults and can increase the risk of adverse drug events. Therefore, deprescribing, which is a process of withdrawal of an inappropriate medication (one where the risks outweigh the benefits in the individual including high risk and unnecessary medications), supported by a health care professional with the goal of improving outcomes, is important in older adults. A hospital admission may provide an opportunity to assess the risk of medication-related harm and implement or recommend deprescribing medications to General Practitioners (GPs). However, suboptimal communication of recommendations from hospitals to GPs can be a barrier to deprescribing.

Purpose: The purpose of this study was to evaluate how deprescribing recommendations were communicated from hospitals to GPs through discharge summaries. Specifically, the study aimed to determine i) the proportion of patients with documentation of deprescribing recommendations for any drug or medication with sedative and/or anticholinergic effects as measured by the drug burden index (DBI), ii) the most frequently recommended medications or DBI-contributing medications for deprescribing, iii) factors associated with deprescribing recommendations, and iv) how deprescribing was communicated in discharge summaries (i.e. where, wording, reason why, and patient agreement).

Methods: This retrospective study was conducted in an Australian metropolitan tertiary referral hospital. The study analysed discharge summaries collected from 263 consecutive admissions of patients aged ≥75 years who were admitted under general or geriatric medicine for >48 hours from July 13, 2021, to October 31, 2021. A DBI stewardship service was run on the study services that the cohort was admitted under. The stewardship pharmacist raised awareness of deprescribing opportunities in patients with DBI>0 at the time of review. Deprescribing information was programmatically extracted from discharge summaries. Logistic regression was used to evaluate factors associated with deprescribing recommendations.

Results: The proportion of patients with documentation of deprescribing recommendations for any drug and for DBI-contributing medication(s) in the discharge summary was 38.8% (102/263) and 19.0% (50/263), respectively. Opioids (26/80, 32.5%) were the most frequently recommended medication for deprescribing in the discharge summary. The number of active ingredients on discharge was positively associated with the likelihood of recommendations for deprescribing any drugs (odds ratio (OR)=1.07, 95% confidence interval (CI)=1.02-1.14), while DBI on discharge was associated with the likelihood of recommendations for deprescribing DBI-contributing medications (OR=1.89, 95% CI=1.14-3.15). Deprescribing recommendations were documented in six different sections of the discharge summary. The most frequently used term for deprescribing recommendation was "cease" (25.8%, 140/543), followed by "reduce" (13.4%, 73/543), and "wean" (12.3%, 67/543). Although 42.3% of recommendations had a reason for deprescription documented in the discharge summary, only 0.6% of recommendations had patient/caregiver consent for deprescription documented in the discharge summary.

Conclusion: Deprescribing decisions were frequently conveyed in discharge summaries. However, the communication lacked uniformity and specificity. Future studies could investigate the effect of a template in the discharge summaries for communicating deprescribing recommendations on uptake of recommendations after discharge.

Impact of continuous pharmaceutical care led by clinical pharmacists during transitions of care on medication adherence and clinical efficacy for patients with coronary heart disease: A prospective cohort study

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Backgroud Medication adherence and risk factor control remain important after coronary angiography in patients with coronary heart disease (CHD).

Purpose The prospective cohort study aimed to explore the impact of continuous pharmaceutical care on medication adherence, risk factor control (lipid profile, blood pressure and blood glucose) and hospital readmissions for CHD patients during transitions of care participated by clinical pharmacists.
Setting Aerospace Center Hospital, Beijing, China.

Methods 228 patients with CHD were admitted to the department of cardiology from April 2020 to February 2021. They were divided into intervention group (n=113) and control group (n=115) by a nurse at equal intervals according to the order of hospitalization. Patients in the intervention group received continuous pharmaceutical care provided by clinical pharmacists on the basis of routine services (including hospital medication reconciliation, disease education, medication guidance, lifestyle guidance, and 6-month follow-up after discharge), while patients in the control group received routine medical care. Medication adherence was assessed using the Visual Analog Scale (VAS). Medication compliance, low density lipoprotein cholesterol (LDL-C), blood pressure (BP), glycosylated hemoglobin (HbA1c), adverse drug reactions and hospital readmissions [total readmission rate, readmission rate due to major adverse cardiac events (MACEs), and readmission rate due to poor control of risk factors] were compared between groups before intervention and at 1, 3 and 6 months after discharge.

Results There was no significant difference in both groups at baseline. A total of 101 drug related problems were found in the intervention group (average 0.89 per person). The medication compliance of patients in the intervention group was significantly higher than that in the control group at 1,3,6 months after discharge (P<0.05). Compared to the control group, more patients in the intervention group attained the goal surrogate risk factor control markers of LDL-C (61.11% vs 44.64% at 3 months, P<0.05 ; 78.18% vs 51.43% at 6 months, P<0.05), BP (91.15% vs 77.39% at 3 months, P<0.05 ; 88.50% vs 77.19% at 6 months, P<0.05) and HbA1c (53.85% vs 34.21% at 3 months, P>0.05 ; 54.05% vs 38.46% at 6 months, P>0.05). During 6 months of follow-up, the total incidence of adverse drug reactions in the intervention group was significantly lower than that in the control group (5.13% vs 12.17%, P<0.05). The total readmission rate, readmission rate due to MACEs, and

readmission rate due to poor control of risk factors in the intervention group were lower than those in the control group at 6 months after discharge (13.27% vs 20.00%, P>0.05; 5.31% vs 12.17%, P>0.05; 0.88% vs 2.61%, P>0.05).

Conclusion The continuous pharmaceutical care led by clinical pharmacists during the transitions of care can effectively improve the medication compliance and safety in CHD patients, as well as enhance clinical efficacy and short-term prognosis.

Pharmacokinetics alterations in five critically ill patients on extracorporeal membrane oxygenation receiving isavuconazol

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Material and Methods:
Prospective study in critically ill patients treated with intravenous isavuconazol and receiving ECMO in the Intensive Care Unit (ICU) from August 2021 to August 2022. Isavuconazol area under the curve (AUCisa) was calculated using trapezoidal method. Blood samples were drawn from an arterial catheter and from ECMO circuit pre- and post-oxygenator at 0 (predose) and 1 hour (end of infusion), and from an arterial catheter at 2,4,6 and 12 hours after isavuconazol infusion.
It was established a therapeutic goal of IsaPlasmConc 2.5-10µg/ml. Analytical method used was high-pressure liquid chromatography. Differences greater than 10% on ECMO sites were considered as a possible drug sequestration.

Results:
5 Covid-19 Critical ill patients treated with ECMO support. ECMO configuration used was VV in all cases.
Patients received a loading intravenous dose of isavuconazole 200 mg/8h during 48h. No relevant drug interactions were identified.
Patient 1: Man (65 years, 84kg; BMI: 23,88) Pulmonary aspergillosis treated with isavuconazole 200mg/12h IV. On day 4, AUCisa(1-12) was 125.2µg·hr/mL. Patient died due to external causes. No differences in ECMO sites were found. Days of circuit: 22
Patient 2: Man (61 years, 65kg, BMI: 26,81). Pulmonary aspergillosis treated with isavuconazole 200mg/24h IV. On day 4 AUCisa(1-24) was 36.8µg·hr/mL. It was considered infra-therapeutic, so isavuconazol dosage was increased to 200mg/12h. On day 10, AUCisa(1-12) was 144.3µg·hr/mL. Patient achieved negative cultures and clinical improvement. No differeces in ECMO sites were found. Days of circuit: 20.
Patient 3: Woman (54 years, 67kg, BMI: 22,65). Pulmonary aspergillosisi treated with Isavuconazole 200mg/24h IV. On day 4, AUCisa(1-24): 227.30µg·hr/mL. Patient achieved negative cultures and clinical improvement. 55% (Cmin), 12,5 % (Cmax) differences in ECMO sites. Days of circuit: 3
Patient 4: Woman (44 years, 66 kg, BMI:24,97).Multiple infections: Filamentous Fungus in selective bronchial aspirate treated with Isavuconazol 200 mg/24h IV. On day 10: AUCisa(1-24): 137,5 µg·hr/mL. Clinical improvement, ICU discharge. No differences in ECMO sites. Days of circuit: 3
Patient 5: Man (64 years, 111 kg, BMI: 36,4). Empiric treatment. On day 4 AUCisa(1-24): 395,4 µg·hr/mL. 47% (Cmin), 21 % (Cmaxi) differences in ECMO sites. Isavuconazol was stopped at day 5, no fungus cultures. Days of circuit: 2

Discussion:
There a significant sequestration of isavuconazole in ECMO circuit in two patients with young circuit.
Patients required different isavuconazole posology to achieve therapeutic goals, suggesting the importance of therapeutic drug monitoring.

User perceptions of antibiotic guidelines in orthopaedic surgery

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Background: Surgical antimicrobial prophylaxis remains the most common indication for antimicrobial use in Australian hospitals. Despite efforts to improve practice, adherence to guideline recommendations continues to be suboptimal across surgical disciplines, including orthopaedics. Australian national guidelines, the Therapeutic Guidelines: Antibiotic v16, currently recommends single dose prophylaxis (cefazolin 2 g) for open reduction internal fixation (ORIF) procedures. An audit undertaken in an Australian tertiary hospital identified low adherence (20%) to this recommendation. It is unclear as to why guidelines are not adhered to in this setting.

Purpose: To understand the factors that influence multidose prescribing for ORIF procedures and the barriers and enablers to guideline use in an Australian tertiary hospital.

Method: Interviews (focus groups and one-on-one sessions) were held with orthopaedic surgeons (consultants), orthopaedic registrars, pharmacists, and anaesthetists from a tertiary public hospital in Australia. The Theoretical Domains Framework (TDF) was used to analyse results.

Results: Six focus groups and three one-on-one interviews were conducted. Data were mapped to 12 TDF domains. Although clinicians were aware of guideline recommendations, this alone did not encourage the use of single dose prophylaxis. The decision to prescribe postoperative antibiotics was influenced by a combination of

patient and environmental factors as well as fear of infection development. The lack of guideline specificity was commonly highlighted as a barrier to guideline use, as well as lack of agreement with guideline content. Enablers to guideline use included education that was targeted and repetitive, as well as improved dissemination of guidelines.

Conclusion: There are a myriad of factors that influence the decision to prescribe postoperative antibiotics for ORIF procedures. By understanding the social and cultural context of a local setting and the barriers and enablers that pertain to an environment, interventions can be developed to enhance guideline use, thereby improving antimicrobial prescribing.

Introducing cross-field teaching to enhance pharmacists' learning effectiveness in heart failure care

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Heart failure is one of the disease that causing mortality and consumes substantial healthcare resources globally. In Taiwan, heart failure post acute care (PAC) refers to the ongoing medical care and treatment provided to patients after they have been hospitalized for heart failure. To prevent further complications and improve the patient's overall quality of life, it may include a variety of services such as medication management and dietary counseling. Therefore, the increasing importance of inter-professional medical education and cross-field teamwork in care are integral to implementing patient-centered whole-person medicine.

In order to give full play to the profession of pharmacists, since 2020, we have been committed to bringing cross-field teaching concepts into the learning of objective structured clinical examination (OSCE) for post-graduate year training (PGY) pharmacists and pharmacy interns. Teaching mode to enhance students' understanding of pharmacists and inter-professional cooperation. The theme of this lesson plan is "Heart Failure Medication and Diet Health Education". It is hoped that through this lesson plan, students will not only be able to teach how to use medicine, but also focus on diet health education. At the same time, we have also introduced the practice of allowing students to actually participate in inter-disciplinary meetings of relevant teams, in order to compare whether the actual cross-field teaching experience can help improve students' performance in OSCE.

There are total four PGY pharmacists participated in this OSCE test, two of whom have actually participated in related cross-field teaching, and two have not. We analyzed the results of this teaching plan from different aspects such as: knowledge, communication, skills and attitude. We found that the score of knowledge (6/5.5 points, total 6 points), communication (4.5/5 points, total 6 points) and attitude (1/1 point, total 1 point)in each group. There are no significant differences in the performance of the students whether they actually participate in cross-field teaching. However, in terms of skills (such as: self-monitoring items and eat out skills), the students who have participated have better performance than those who have not participated (5.5/4 points, total 6 points). In the future, we will continue to retrospectively analyze and explore whether the students' participation in cross-field teaching in the past is conducive to the learning of communication, skills and attitudes, so as to serve as references and indicators for improving related teaching activities in the future.

A preliminary study on the introduction of "Narrative Medicine and Holistic Health Care" in the education and training of pharmacists by using the group discussion model in a medical center in Taiwan

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Background:
In recent years, health care in Taiwan has been placed toward Holistic Care. This include physical, psychological, spiritual and social needs to provide patients with all-around medical care. While pharmacist educations is more inclined in academic and technical aspects and much less involvement in Humanities, it is the propose of this study to introduce “Narrative Medicine” in holistic pharmaceutical care. Focus in patient-centered to apply Narrative abilities of listening, understanding and expressing into their daily practice. Enabling pharmacists iin strengthening their inner growth and achieve better quality care toward patients.

Methods:
A total 19 participants in this study. They were divided into six groups. Theme of discussion was “Awakening Beautiful Heart of Self” through narrative and self exploration. These were conducted from March 27 – 31, 2023 and guided by clinical counselor. Each participant was required to tell story of pharmaceutical service experiences in clinical setting, opportunities to discuss, reflect, to gain more insights in dealing with patients. After the course was over, "teaching activity learning evaluation" would be carried out with a three-point evaluation method (0 points: not achieved, 1 point: partially achieved, 2 points: fully achieved). A student satisfaction questionnaire survey with Likert Scale of five points (1 point: very dissatisfied; 5 points: very satisfied) were conducted and analyzed using 2016 Excel® for descriptive and inferential statistics.

Result:
There were 19 pharmacists participating in the research. We can see from the learning evaluation of teaching activities that all pharmacists could clearly answer patients' questions about medication (2 points, full score), and most pharmacists were able to answer questions in a way that

patients understood. Most pharmacists checked Patient's history of allergies and medications (including prescription and non-prescription) (1.95 points). During the activity, we found that the items that were often overlooked are "the pharmacist can answer patient's problems from the perspective of holistic care (body, mind, spirit, society), "Pharmacists respect patients' privacy during health education" and "Pharmacists check relevant medical history and relevant lifestyle of patients". In terms of student satisfaction toward this teaching activities, item related tothe training arranged by the teaching activities can be completed within the scope of ability got 4.9 points (total score 5 points). On the contrary, the importance of "narrative medicine and holistic care" can be understood through teaching activities got the lower score (4.6 points).

Conclusion:
The result of this research shows; the effect of introducing “narrative and spiritual care” using group discussion mode is promising but cannot be achieved immediately and requires a long term commitments. Evidence shows pharmacist’s narrative ability (listening, empathy) can be improved through training with group discussion and counseling activities. They were guided to discover importance of Inner Self and able to observe patients social and humanistic perspectives to achieve holistic pharmaceutical care.

A prospective observational study on comparison of safety, efficacy, and cost effectiveness of propranolol and flunarizine in migraine prophylaxis

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Background
Migraine is a primary headache disorder associated with personal and societal burdens of pain, disability, damaged quality of life and financial cost. This study aims to compare β adreno receptor blocking agent (propranolol) and calcium antagonist (flunarizine) in migraine prophylaxis for their safety, efficacy, and cost- effectiveness in Indian population.

Purpose
To compare the safety, efficacy and cost -effectiveness of propranolol and flunarizine in migraine prophylaxis. Null hypothesis states that there is no difference in safety, efficacy, and cost- effectiveness between them.

Method
A prospective observational study was conducted in Neurology and ENT department in a tertiary care teaching hospital in India. As per inclusion and exclusion criteria 96 patients were enrolled in the study. The total subjects were divided equally, randomly into two groups. First group received propranolol (40 mg OD) and second group received flunarizine (10 mg OD). The efficacy was evaluated using Visual analogue scale, Numerical rating scale and frequency of headache. The safety was evaluated using Naranjo causality scale.. The cost effectiveness was determined by Incremental cost- effectiveness ratio.(ICER).

Results
Considering the mean values of pain obtained from visual analogue scale, numerical rating scale and frequency of headache in initial visit, first and second review it was found that the mean value of flunarazine was lesser than propranolol. Only significant p value (0.008) was obtained in the second review implies that both drugs were effective for migraine prophylaxis. Flunarizine showed weight gain (9) , tiredness (6) and propranolol showed sleep disturbance including nightmares(7), tiredness(9), mental changes (irritability) and weight gain (5) . While considering the low incidence of mild side effects with flunarizine it could be preferably used over propranolol. For cost- effectiveness analysis mean difference in the effect of flunarizine and propranolol was 7 and mean difference for cost was -18.5 and the incremental cost -effectiveness ratio was found to be -24.58 which showed that flunarizine was the cost-effective drug.

Conclusion
The study demonstrates that both drugs have significant role in treatment of migraine but compared to propranolol, flunarizine showed mild side effects and found to be more efficacious. In case of cost -effectiveness flunarizine was found to be marginally better. Hence the null hypothesis was rejected. Since flunarizine showed better results in safety, efficacy and cost –effectiveness for treatment of migraine prophylaxis , future research studies can be carried out for studying clear mechanism of action and also to identify any added advantage of flunarizine over propranolol in migraine prophylaxis.

A study on safety and effectiveness of tenecteplase in compared with thrombectomy in ischemic stroke

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

According to the World Health Organisation, it is the second greatest cause of mortality for adults over the age of 60. Ischemic stroke is a serious public health issue that is a primary cause of mortality and disability. Tenecteplase has higher fibrin specificity, a longer half-life, and is less expensive than other t-PAs. There have been relatively few studies in South India that compare the safety and effectiveness of tenecteplase to thrombectomy. The purpose of this study was to compare both the safety and effectiveness of tenecteplase with thrombectomy and tenecteplase along with thrombectomy treatment in ischemic stroke patients; to evaluate the neurological outcome after 3 months using the National Institute of Health stroke scale, and to measure the level of disability

among ischemic stroke patients using the Modified Rankin scale. Following approval from the VIPS ethics committee, the study was conducted from September 2022 to February 2023. The study included 24 patients divided into two groups: Tenecteplase and mechanical thrombectomy, who were compared using the independent t-test in SPSS software (ver.22). In the tenecteplase group, around 50% of patients arrived after 3 hours and 33.3% arrived after 2-3 hours, whereas in the thrombectomy group, 58.3% of patients arrived after 3 hours and 33.3% arrived after 2-3 hours. It was also discovered that no patients in the tenecteplase group were at risk of bleeding, but one patient in the thrombectomy group was at risk but recovered. Tenecteplase is a low-cost, easy-to-administer rt-PA with a longer half-life than other rt-PAs. As a result, Tenecteplase is more safe and effective in ischemic stroke patients, with a very minimal risk of bleeding.

Targeted detection of drug-related problems through risk scoring of inpatients–Results of the "medication safety-stewardship" study

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Background: Drug-related problems (DRPs), such as adverse drug reactions/events and medication errors, are an increasingly common yet often neglected cause of morbidity and mortality. To address this issue a "medication safety-stewardship" composed of clinical pharmacists and physicians experienced in clinical pharmacology was established at a large tertiary care hospital in Germany (supported by the German Federal Ministry of Health, project grant No. ZMVI1-2519ATS004Z). It involves systematic medication analyses to proactively prevent or promptly detect DRPs and mitigate their potential consequences. However, in routine clinical practice, it is usually not feasible to perform in-depth medication analyses for all inpatients due to the constraints of limited specialist resources. Hence, there is a need for tools to identify patients at high risk of DRPs in order to deploy resources in a targeted and purposeful manner.

Purpose: The primary objective of this study was the development and validation of a scoring system to identify hospitalised patients at increased risk of experiencing DRPs.

Method: Based on a literature review and subsequent expert consensus a risk score was developed comprising nine different risk factors that are considered to be predictors of DRPs. This risk scoring system was used to quickly pre-screen all patients for their DRP risk upon admission. To assess the performance of the risk score a prospective controlled study (registered at the German Clinical Trials Register, DRKS-ID DRKS00017534) was conducted on five different internal medicine and surgical wards. The study compared 150 patients with increased risk of DRPs to 150 patients without increased risk. In-depth medication analyses were performed for all 300 patients, irrespective of their risk score. All clinically relevant DRPs that were identified were reported to the attending physicians along with recommendations for resolving them.

Results: Patients with a risk score above a predefined threshold ("high-risk patients") were significantly more likely to have a clinically relevant DRP than patients with lower risk scores ("non-risk patients") (OR 10.5; 95% CI 6.1-18.0; p<0.0001). Of the 150 high-risk patients, 106 (70.7%) had at least one clinically relevant DRP, whereas only 28 (18.7%) of the 150 non-risk patients had at least one clinically relevant DRP. The risk score demonstrated a sensitivity of 79.1% (95% CI 71.5-85.1%) and a specificity of 73.5% (95% CI 66.3-79.6%). Of 321 pharmacist recommendations to solve the DRPs, 156 (48.8%) were accepted and implemented by the physicians.

Conclusion: In this study we showed that risk scoring enables reliable identification of patients at increased risk of DRPs. Use of our proposed risk score allows for prioritised assessment of high-risk patients, thus facilitating targeted detection of DRPs and efficient allocation of limited specialist resources.

Role of pharmacist in combating opioid national shortage and managing standardized and safe handling of narcotics

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background: Narcotics are high alert Medications and Controlled substances, requires strict control as per regulatory requirements and Joint Commission International Standards. As per the Drug Act 1976 of Pakistan, Strict regulation /monitoring are required for controlled drugs (Narcotic drugs) for their storage, prescribing, dispensing, administration, wastage and return. Therefore, caution is being exercised in all these steps to ensure proper storage, documentation and custody.
Medication shortages are the global ongoing obstacle now days for pharmacist and physician both. Regulatory barriers and ambiguities are considered as significant contributors to narcotic crisis impacting patient's quality of life. All types of drugs, such as essential life-saving drugs, oncology medicines, antimicrobial drugs, analgesics, opioids, cardiovascular drugs, radiopharmaceutical, and parenteral products, are liable to the shortage. Among all pharmaceutical dosage forms, sterile injectable products

have a higher risk of shortage than other forms and they appear to affect the patient care and outcomes 1

Purpose: is to highlight Role of pharmacist in combating opioid crisis and managing standardized and safe handling of narcotics in hospital to prevent misuse and medication errors.

Method:
The limited availability or scarcity of morphine can impede the standard of care for patients, especially in regions with lower or middle-income countries. For this study was conducted at Aga Khan University Hospital, a tertiary care facility accredited by JCIA. This is a retrospective analysis of Eight-year data; driven from the hospital's CPOE system, spanning January 2015 to December 2022. The study has examined morphine intact vials, morphine syringes, and NICU morphine syringes (which were specially customized to cater more patients during shortage / crisis) with strengths of 15mg/ml, 2mg/2ml, and 0.1mg/ml, respectively. Total of 3454 patients were included and comparisons were done between intact vial and syringes.

Result: By customizing the morphine 2mg/2ml syringes consumption of ampoules decreases and consumption of syringes increase catering more patients as compared to intact vial.
Due to customized syringes wastage were reduced, misuse was prevented, and more patients were facilitated during treatment.

Conclusion: In order to serve our patients and minimize the dry out phase, that will eventually affect patient care and safety, customized dosage forms allow us to serve a large population with a limited quota. The initiative of providing customized syringes to patients adds value to pharmacy services.

Utilizing a 3S (Safeguard, Sustain, Support) approach to play a critical role in effective medication management and use and sustain core pharmacy operations during a pandemic

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Background:
In 2019 the spread of coronavirus disease spread all over the globe and Pakistan receive the first patient in Feb 2020. The aga khan university hospital and its pharmacy department played a critical role in developing practice guidelines, therapy management and medication management.

Purpose:
Purpose of the commentary is to suggest a 3 S approach for pharmacy department to play their key role during pandemics.

Methods:
During the pandemic AKUH Pharmacy services took the following approaches
S1 - Safeguard: Robust Staff screening based on latest CDC and hospital infection control guidelines, Active tracing of employees and monitoring strict compliance with PPE.
S2 - Sustain: Shift redesigning was done with an aim to minimize exposure of staff into groups and allow sufficient quarantine periods. Centralized arrangement of transport during the Strick lock down in the country. Limiting pharmacy openings and limiting point of care services.
S3 - Support: Formulating a special committee reporting to Pharmacy and therapeutic committee of the hospital to with objectives to educate physicians about latest Covid 19 therapies and trends, provide stewardship to off-label prescribing of corona virus therapies. Introduction of special compounding products to ration critical medications used for the Managment of corona virus. To address rationing of critical drugs, managing shortages and procurement with disruption of global supply chains a special committee was commissioned with membership from hospital leadership, procurement department and pharmacy to address and keep sufficient forward covers.
Post pandemic: administration of vaccination for masses.

Results:
Following the 3S approach towards operation and impact pharmacy department at Aga khan university hospital contributed it advisory role to develop guidelines across the hospital regarding off label usage of various medications and new therapies introduced in the market. Play critical role in medication management for various medication and vaccine trials. The pharmacy a leader in drug rationing, procurement at national level. The pharmacy came out of the pandemic with zero mortality among staff dur to covid-19, zero closures due to staff shortages and zero stock blackouts of drugs part of covid 19 therapies. Pharmacy lead a corona vaccination campaign and vaccinated more than 100, 000 health care provider and contributed to commission a number of mass vaccination center in partnership with government.

Conclusion:
The 3S (safeguard, Sustain and support) approach could be able to elicit several recommendations for pharmacy departments to operate and play their pivotal role in medication management and use during a pandemic.

Preliminary exploration of introducing the concept of reliable professional activities (EPAs) into the education and training of pharmacists in a small hospital in central Taiwan

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Background:
Taiwan has been actively promoting Competence-Based Medical Education (CBME) in various medical professional training since 2019, planning medical personnel through milestones or Entrustable Professional Activities (EPAs) The core competencies and sub-competencies that should be possessed, through the curriculum planning and the overall evaluation model, carry out competency-oriented education and training. It is hoped that this will enhance the learning effectiveness and professionalism of pharmacists.

Method:
In this study, 16 pharmacists who participated in EPAs education and training from January 2022 to March 2022 were selected as the research objects. Using Google form to conduct pre-class and post-class tests (7 questions) and EPAs import pharmacist education and training questionnaire (19 questions), using the Likert Scale five-point method (1 point: strongly disagree; 5 points: strongly agree), the research results The test questions were analyzed by T-test with Social Science statistical software, and the questionnaire survey was analyzed with 2016 Excel® for descriptive statistics.

Result:
The research results show that, in terms of the questions themselves, there is no significant difference in the correct answer rate of each question before and after the test, such as: Question 4 "An EPAs represents a core competency and corresponds to a milestone. The correct answer rate increased from 6.2% to 37.5% , the difference is large but P-Value=0.083, no significant difference. The T-test comparison of the number of correct answers in the pre-test and the number of correct answers in the post-test of 16 participants shows that the T value is greater than 1.75 and P-Value<0.05, indicating that there is There are significant differences, so we can understand that everyone has a preliminary understanding of EPA.
Regarding the introduction of EPAs into the pharmacist education and training questionnaire, 94% of the respondents believed that the introduction of EPAs could further improve the overall professional quality of pharmacists and make the relationship between study and work more clear. On the contrary, 69% of the people "believe that there are enough resources to introduce EPAs at present." They said that a lot of manpower and material resources are needed to introduce reliable professional activities (EPAs).

Conclusion:
The results of this study show that introducing the concept of EPAs through courses or various channels can help everyone know how to conduct reliable professional activities, which is conducive to the effectiveness of pharmacist education and training. It is expected that learner-centered teaching activities and assessment can breed more Excellent pharmacist.

Evaluation of the efficacy of a single dose dexamethasone administered orally in the pediatric emergency department for mild croup

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background
Croup usually occurs in young children and was most commonly caused by parainfluenza or the COVID-19 virus. No matter how of severity, all patients with croup benefit from oral steroids. Dexamethasone 0.15 mg/kg to 0.6 mg/kg by mouth with a maximum of 16 mg as a one-time dose was the typical dose.We therefore performed this study to evaluate the efficacy of this dexamethasone formulation in croup population.

Purpose
This study assessed the efficacy of a single dose dexamethasone administered orally in pediatric patients who presented to the emergency department with mild croup.

Methods
This was a retrospective study of patients 0 to 18 years of age who presented to and who were directly discharged from the emergency department at E-DA Hospital between September 1, 2020, and September 30, 2021, for the diagnosis of croup.The children had mild croup, as defined by a score ≤2 on the croup scoring system of Westley et al (defined as the presence of occasional barky cough, no stridor at rest, mild or no retractions). Patients had to receive single dose dexamethasone orally prior to discharge. Patients were followed for a 30-day period to identify the number of croup relapses.

Results
Twenty-two patients with an emergency department diagnosis of croup were included. The average weight-based dose ± SD of dexamethasone was 0.37± 0.15 mg/kg (range, 0.17-0.75 mg/kg) and the actual dose ± SD was 5.09± 1.82 mg (range, 4–8 mg). Over a 30-day period, 7 patients (32%) presented to an outpatient department for croup symptoms. 15 patients (68%) did not relapse. Of the patients with none repeated outpatient or emergency department visits, none received the maximum dose of 16 mg dose, but one of them received over 0.6 mg/kg. None of whom were hospitalized. None patients repeated emergency department visit.

Conclusion

A single dose of oral dexamethasone has been usually easy to accept and simple for pediatric patients, and could provide convenient and rapid treatment in the emergency department. Comparison of croup relapse and non-relapse doses from 0.17 mg/kg to < 0.6 mg/kg, p = 0.005. A single dose of 0.15 mg/kg to 0.6 mg/kg of oral dexamethasone tends to relieve the symptoms of mild croup, thereby reducing the number of referrals and hospitalizations and reducing the length of stay in emergency departments or hospitals.

Dual-directional effect of vinorelbine combined cisplatin or fluorouracil on tumor growth or metastasis and mechanisms in metronomic chemotherapy

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background: There is evidence of risks of promoting tumor growth or metastasis of empirical therapeutic regimens in metronomic chemotherapy due to the ambiguity about low dosages and schedules. However, little has been known about the details until now.

Purpose This study aims to explore the dose-effect relationship of antineoplastic agents on tumor growth or metastasis, as well as the underlying mechanisms in metronomic chemotherapy, providing a theoretical reference for clinical cancer treatment.

Method Metronomic regimens of vinorelbine combined cisplatin or fluorouracil were selected to investigate their dose-effect on tumor growth and metastasis by establishing the tumor growth or metastasis model in BALB/c mice. Multiple experimental techniques, including H&E staining, immunohistochemistry, immunofluorescence, western blot, and flow cytometry were used to explore the mechanisms affecting pharmacological actions. Meanwhile, cell proliferation, apoptosis, migration, and invasion were conducted in vitro.

Results The results demonstrated that low doses of vinorelbine combined cisplatin or fluorouracil promoted tumor growth and increased pulmonary metastases, while high doses inhibited tumor growth and reduced pulmonary metastases. Moreover, low doses of vinorelbine combined cisplatin or fluorouracil may promote tumor angiogenesis, increase expression levels of pro-angiogenic proteins, NF-□B, and osteopontin, and enhance the mobilization or recruitment of myeloid-derived suppressor cells. However, high doses of combined regimens suppressed these effects. Interestingly, both low and high doses of vinorelbine combined cisplatin or fluorouracil increased the expressions of pro-apoptotic proteins. In addition, vinorelbine combined cisplatin or fluorouracil stimulated anti-apoptosis, migration and invasion of both endothelial and tumor cells at low concentrations, and inhibited proliferation and anti-apoptosis at high concentrations.

Conclusion This study illustrates a dual-directional pharmacological effect of antineoplastic agents in metronomic chemotherapy, and highlights the potential risks associated with promoting tumor growth or metastasis at certain low doses. This study also emphasizes that there may be an effective dose interval for a specific antineoplastic agent in metronomic chemotherapy. Therefore, more effort is needed to set up accurate models for developing optimal doses and administration schedules of antineoplastic agents in metronomic chemotherapy.

Queensland health clinical educator network activities

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The Queensland Health Pharmacists Clinical Educator Network (QHPCEN) is a group of hospital pharmacists working in a clinical educator role at twenty-one hospital sites in Queensland Australia. This network of educators collaborate to create a diverse range of learning activities for Queensland hospital pharmacists. The activities of QHPCEN align with the Basel statements which advise formalised, bespoke, stakeholder informed workforce education (statement 57,58,61). This poster aims to describe seven of these learning activities.

The first activity is Workshop 1. Workshop 1 is a week-long workshop focusing on upskilling new intern pharmacists in skills around basic hospital pharmacy activities. This includes clinical knowledge, workflow processes, communication as well as graded assertiveness in a workshop and mock ward environment. The week concludes with nine Objective Structured Competency Evaluation (OSCE) stations where all of the intern pharmacists in Queensland hospitals are assessed on their learning in mock clinical scenarios, with formative feedback being provided to them and their clinical educator.

The second activity is monthly training for all of the intern pharmacists in Queensland hospitals. Once a month intern pharmacists attend a dedicated education session on a defined clinical topic. The interns attend as a blended mix of face to face and online.

The third activity is The Purple Pen journal Scan. The journal Scan requires intern pharmacists to find, access, review and critically appraise journal articles and share this information with their peers via a newsletter. This learning activity aims to cultivate a lifelong learning approach and encourage regular critical appraisal of journal articles amongst our early career pharmacists.

The fourth activity is the Pharmacists Interactive Learning (PIL) program. PIL educational training packages are developed by junior pharmacists under the supervision and mentoring of clinical educators. These training packages focus on specific topics such as electrolyte derangements and are designed to provide an interactive educational session for newly registered/new to hospital or junior pharmacists. Typically, these learning activities are developed by pharmacists completing the Foundation Residency program in the sixteen hospitals in Queensland accredited as foundational residency sites.

The fifth activity is the Supervisors' Workshop. QHPCEN coordinate a full day workshop aimed at training pharmacists to perform ward based evaluation and feedback on their peers.
The sixth activity is Clinical Conundrums. Clinical Conundrums is a learning activity developed for senior pharmacists. This learning activity requires three pharmacists working at a senior level in a specified clinical area to each present a challenging case involving therapeutic conundrums. Peer feedback and criticism is then invited via a session moderator.

The seventh activity is Clinical Ethics debate and training. This training invites staff to consider a particular ethical dilemma, necessitating a deconstruction of the problem and an analysis of the pros and cons of potential solutions . Scenarios discussed are real world scenarios that occur weekly or more frequently in Australian hospital pharmacy practice.
These forementioned learning activities have been developed collaboratively within QHPCEN using an iterative approach to meet specific learning needs identified in Queensland hospital pharmacists.

The correlation between duration of parenteral nutrition administration and weight gain in neonates with low birth weight

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background: Neonates are the largest patient population using parenteral nutrition therapy. Parenteral nutrition in neonatal patients can affect post-natal growth,improve neurodevelopment and reduce the risk of death.

Objective: to determine the correlation between parenteral nutrition duration and weight gain in neonates.

Methods: The study design was a cross-sectional observation carried out in the perinatology ward at dr. Cipto Mangunkusumo Hospital, Jakarta. Tracing the history of parenteral nutrition using a retrospective method through medical records and hospital management information systems during 2021. The samples of this study were neonates weighing <2,500 g who were given parenteral nutrition. The data collected were patient characteristics, body weight and duration of parenteral nutrition on day 7,14,21,28.

Results: There were 58 neonates consisting of 31 girls and 27 boys. The three most common diagnoses were respiratory disorders 44(75.86%), infections 12 (20.69%) and digestive disorders 2 (3.45%). The most weight > 1500 – 2500 g were 27 (46.55%). The highest weight gain occurred on day 21 were 37 (80.43%) with an average weight gain of 249.73 g. The most parenteral nutrition profile were combination of protein+glucose in 27 patients (46.55%), protein + glucose + lipid 11 (18.97%), protein + glucose + micronutrients 8 (13.79%), protein + glucose + lipid + micronutrients 12 (20.69%). Parenteral nutrition was given for the longest between 8-14 days (44.83%). There was a correlation between the duration of parenteral nutrition and increased body weight ($p<0.05$).

Conclusions: This study showed that the parenteral nutrition has proven to increase neonatal body weight and it is expected to provide optimal neonatal development.

Using STOPP version 2 criteria and Beer's criteria 2019 to evaluate the prevalence and predictors of potentially inappropriate medications (PIMs) among older adults admitted to a tertiary general hospital in Singapore

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Background: Ageing and its associated co-morbidities have been reported to result in polypharmacy, defined as concomitant use of ≥5 medications. These have in turn been linked to an increasing prevalence of potentially inappropriate medications (PIMs), which is the use of drugs in which the risk of an adverse event outweighs their clinical benefit when safer or more effective alternative therapies are available. This is concerning as PIMs have been reported to cause adverse health outcomes in older adult patients. Several validated tools have been developed to identify PIMs. Two commonly used tools are the Screening Tool for Older Patients' potentially inappropriate Prescriptions (STOPP) and the American Geriatrics Society's Beer's criteria. In hospitalized older adults in Singapore, the prevalence of PIMs evaluated using the latest iteration of these two criteria, namely STOPP Version 2 (V2) and Beer's Criteria 2019 and factors associated with PIM prescription, are unknown. Given Singapore's aging population, an understanding of PIMs prevalence using the latest tools and factors associated with PIM prescription, can facilitate future deprescribing efforts to optimize medicine use in older hospitalized patients.

Purpose: This study aims to (i) determine prevalence of PIMs in older hospitalized patients in Singapore using STOPP V2 and Beer's criteria 2019, (ii) compare prevalence of PIMs among the different criteria, (iii) highlight common prescribed PIMs, and (iv) determine factors associated with PIM prescription.

Method: A retrospective cross-sectional review of prescriptions was conducted in a tertiary hospital in Singapore. Patients age ≥ 65 years with at least one prescription medication were included. Their medications on admission and at discharge were screened for PIMs using STOPP V2 and Beer's criteria 2019 by two pharmacists and a physician to ensure consensus in opinions. Prevalence of PIMs and PIM index, defined as total number of PIMs out of total number of medications, were calculated. Univariate tests followed by binary logistic regression were conducted to identify factors associated with PIMs. P<0.05 was considered statistically significant.

Results: Of 828 patients screened, 151 patients were included in this study. Median age of patients was 76 (IQR 68-81) years, with 53% being female. Prevalence of PIMs was 49.0% (STOPP V2) and 55.0% (Beer's criteria 2019) on admission and 55.6% (STOPP V2) and 69.5% (Beer's criteria 2019) at discharge. More PIMs were found at discharge than on admission. Despite so, PIM index showed a decrease at discharge with both criteria (from 0.120 and 0.155 on admission to 0.097 and 0.150 at discharge with STOPP V2 and Beer's 2019 respectively), suggesting that the number of medications appropriately initiated and PIMs discontinued outnumbered the number of inappropriate drugs that were started during hospitalization. Additionally, PIM prevalence was greater with Beer's criteria 2019 compared to STOPP V2. Omeprazole was the most common PIM identified. The number of prescribed medications was further identified as a factor significantly associated with PIM prescription (P<0.001).

Conclusion: PIMs are highly prevalent among hospitalized older adults in Singapore. Active identification of PIMs using validated tools can potentially aid in improving medication appropriateness among older hospitalized patients.

Clinical and hematological effects of hydroxyurea therapy in sickle cell patients at the tema general hospital

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Background
Hydroxyurea used in the management of sickle cell disease impacts on the clinical and hematologic indices, thus the frequency and severity of pain crises in sickle cell disease are reduced. Hydroxyurea was approved in 2018 by the Food and Drugs Authority, Ghana to be used in the management of both adults and children with sickle cell disease. Ghana, therefore, became the first country in Africa to offer a universal standard of care for people with sickle cell disease to help improve their quality of life.

Purpose
To determine the clinical and hematological effects of hydroxyurea on sickle cell disease patients in Ghana.

Method
A retrospective study was conducted on 91 patients who were purposively sampled at the paediatric sickle cell clinic of the Tema General Hospital in Ghana. The patients' medical information was extracted from the hospital's electronic records. Patients who were registered with the sickle cell clinic and aged 13 years and below and have been prescribed hydroxyurea for at least a year were enrolled on the study. Descriptive statistics were done for all sociodemographic characteristics of patients. A t-test was used to determine whether there was a difference between hematological parameters before and after the initiation of patients on hydroxyurea therapy. The Wilcoxon Signed Rank test was performed to determine whether there was a difference between clinical parameters before and after the initiation of patients on hydroxyurea therapy.

Results
There was a significant difference between the mean count of platelets 6 months after hydroxyurea initiation (294.16x10^9/L) and the mean count before hydroxyurea initiation (361.10X10^9/L) (p<0.0001). There was also a significant difference between the mean count of mean corpuscular volume, at 3 months (90.45fL) (p<0.0001), 6 months (92.00fL) (p<0.0001) and 12 months (95.18fL) (p<0.0001) after hydroxyurea initiation as compared to the mean count before hydroxyurea initiation which was

(83.90fL). Furthermore, there was a significant difference between the mean haemoglobin level at 3 months (8.8g/dl) (p<0.0001), 6 months (8.85g/dl) (p<0.0001) and 12 months (9.26g/dl) (p<0.0001) after hydroxyurea initiation as compared to the haemoglobin level count before hydroxyurea initiation (8.27g/dl). There was also a significant difference between the neutrophil mean count 6 months (3.35x10^9/L) (p<0.0001) and 12 months (4.08X10^9/L) (p=0.0001) after hydroxyurea initiation as compared to the neutrophil mean count before hydroxyurea initiation (5.09X10^9/L). The Wilcoxon Signed Rank test revealed that there were statistically significant differences in the number of acute chest syndrome (ACS) (z= -3.153, p= 0.0016), number of painful crises (z= -7.766, p<0.0001), number of hospitalizations (z= -7.923, p<0.0001), number of blood transfusions (z= -4.993, p<0.0001) and number of infections (z= -6.827, p<0.0001) one year before and one year after the initiation of hydroxyurea.

Conclusion:
The study showed significant clinical and laboratory benefits of hydroxyurea in the management of children with sickle cell disease with improved health outcomes. Hydroxyurea use resulted in increased mean corpuscular volume and haemoglobin levels while decreasing platelet and neutrophil counts. The frequency of vaso-occlusive pain crises, acute chest syndrome and blood transfusion were also reduced with hydroxyurea use.

Characterization of the suspected adverse reactions of the poly (adp-ribose) polymerase inhibitor olaparib: An analysis of the cases reported in Eudravigilance

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background: Olaparib is a poly(ADP-ribose)polymerase (PARP) inhibitor authorized by the European Medicines Agency for the treatment of human epidermal growth factor receptor 2 negative breast cancer with BRCA mutations.1 EudraVigilance is a system for monitoring and analysing suspected adverse reactions to medicines and is managed by European Medicines Agency (EMA).2

Purpose: To analyze and characterize the suspected adverse drug reactions (ADRs) of olaparib, reported in EudraVigilance.

Methods: Observational and retrospective study analysing spontaneous reports submitted to the EudraVigilance for "olaparib" from 1 September 2020 till 1 September 2021. Spontaneous reports of suspected ADRs in which olaparib has not been indicated for the treatment of breast cancer or with missing information about its indication have been excluded. ADRs were classified according to the Medical Dictionary for Regulatory Activities (MedDRA) on System Organ Class (SOC). Variables were described and analyzed using absolute and relative frequencies. For the comparative analyzes between groups (dose and ADRs) the Chi-Square test was applied, the significance level was p< 0.05.

Results: A total 98 reports were analysed for olaparib of which 90.8% were reported by healthcare professionals. Most of the cases (86.7%) occurred in females. The highest number of notifications occurred in the age group of 18-64 years. Blood and lymphatic system disorders were the prevalent SOC of ADRs (54.1%), and within this group the most reported suspected ADR was anaemia (42.9%). Death was the seriousness criteria of 7.1% of notifications for olaparib. According to the Chi-Square Test, the dose is significantly associated with the ADRs "leukopenia" and "neutrophil count decreased" (p< 0.05).

Conclusion: The identification of ADRs allows healthcare professionals to better understand the safety profile of medications.

Evaluation and review of codeine used in a district hospital

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background
Codeine is commonly used in clinical settings for pain control and the treatment of cough in special populations. However, Codeine itself is an opioid and has genetic metabolic variability. In addition to being listed as a Risk Evaluation and Mitigation Strategy (REMS) drug by the FDA, there are also updated Boxed Warnings for opioids, including Codeine, in 2023. In Taiwan, there are regulations regarding the use of opioids in non-cancer patients. Regional hospitals are not allowed to prescribe opioids to non-cancer patients for more than 14 consecutive days or a total of 28 days within three months. If a patient requires long-term use of opioids, they should be referred to a pain clinic in a regional hospital or higher-level medical institution for treatment. Furthermore, it is recommended that Codeine be prohibited for use in children under 12 years old. For children aged 12 to 18 with respiratory insufficiency, Codeine should only be used under the guidance of a physician.

Purpose
To ensure that the prescription of Codeine in hospitals complies with relevant regulations, including the prescribed duration, age recommendations, and internal prescription forms, information systems should be implemented to monitor and control the process. A review should be conducted to assess the effectiveness of the management system.

Method
To review the prescription of Codeine in the hospital from March 1, 2022 to February 28, 2023, pivot analysis can be conducted using Microsoft Excel. The interventions and effectiveness of the control measures should also be reviewed.

Results
Based on a retrospective study of 915 Codeine prescriptions, two were self-paid (from general surgery and immunology and rheumatology departments), with a total of 544 patients, including 278 males and 266 females. The top three departments that prescribed Codeine were chest medicine, otorhinolaryngology, and hematology/oncology. By utilizing electronic reports in the hospital, it was discovered that there were 12 patients who were prescribed Codeine for more than 14 consecutive days or for a total of more than 28 days within three months. After the pharmacist's assistance and intervention, the issue was addressed by electronically notifying the physicians of the hospital's regulations. Subsequently, the situation improved.

Conclusion
Codeine is a High Alert Medication and an opioid. In addition to issues related to drug metabolism, appropriate use to reduce the risk of drug addiction is also important. By utilizing domestic and international drug safety alerts to enhance the awareness of healthcare professionals regarding opioid medications, and integrating the alerts into the hospital's prescription system, the potential harm caused by inappropriate prescription of Codeine can be minimized.

Review and analysis of medication error from electronic system-experience from a district hospital

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background
The most frequent source of risk to patients is medication errors. If proper preventive measures are not taken, medication errors may cause harm to patients' safety. Patient safety is a significant factor in hospital accreditation in Taiwan, and therefore, regularly reviewing and analyzing the types of medication-related incidents within the institution may provide references for future prevention or improvement.

Purpose
Understanding and analyzing past common medication errors within the hospital, and formulating improvement measures based on the analysis results.

Method
We reviewed the number of medication-related incident reports within the hospital from October 1, 2022, to April 16, 2023, and performed pivot analysis using Microsoft Excel. Based on the analysis results, we proposed possible improvement measures.

Results
Among the reported errors, the most frequent occurrence was medication overdose due to prescription (50%), followed by prescribing medication that is not suitable for the patient's condition (7.4%). Common errors made by nursing staff include administering medication at the wrong time, missing doses, and medication leaks. The lowest number of incident reports involved pharmacists (1%), and the errors reported included dispensing the wrong medication dosage, wrong medication form, and incorrect patient identification.
Based on our research findings, we discovered that medication-related prescriptions with excessively high doses accounted for up to 50%, especially for antiviral medication-Paxlovid, oral antibiotics-Cefixime, and H2-blocker-Famotidine. Therefore, we plan to take the following measures: (1) propose information requirements and add warnings and recommendations on renal function adjustments to the prescription system; (2) encourage pharmacists to participate in clinical care and review prescriptions. If there are any doubts, pharmacists should immediately confirm with the prescribing physician; (3) pharmacists should advocate during physician conferences that prescription doses should be based on liver and kidney function. In addition, during our review, we found that physicians may mistakenly prescribe Acetylsalicylic acid instead of Acetylcysteine, which is used as a mucolytic agent. Therefore, we propose that the management pharmacist modify the system setting to display Acetylsalicylic acid as the trade name - ASPIRIN and annotate its capsule form in Chinese characters to prevent confusion.

Conclusion
In addition to promoting awareness among the healthcare team and implementing system settings, regular review and the implementation of preventive measures by pharmacists are also essential to prevent medication errors. Furthermore, if pharmacists in Taiwan have more opportunities to directly participate in clinical care, it may significantly reduce the occurrence of medication errors.

Drug utilization evaluation of alogliptin/pioglitazone in a community hospital

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background
Alogliptin and pioglitazone are two medications commonly used in the treatment of type 2
diabetes mellitus. In recent years, there has been growing interest in the use of combination therapy with alogliptin and pioglitazone. In Taiwan's National Health Insurance reimbursement regulations, Alogliptin/Pioglitazone is recommended for patients who cannot tolerate Metformin

or cannot achieve their blood glucose treatment goals. Combination therapy with sodium-glucose cotransporter 2 inhibitors and dipeptidyl peptidase 4 inhibitors is recommended to be used selectively. Therefore, we reviewed the prescription patterns of Alogliptin/Pioglitazone in our hospital to assess whether they comply with international guidelines and insurance coverage, while evaluating their efficacy and safety.

Purpose
To understand the prescription pattern and the use of combination therapy with Alogliptin/Pioglitazone in the hospital, and to evaluate the efficacy and safety of this treatment, we assessed the HbA1c levels, distribution of prescribing departments, gender, age, and the percentage of patients achieving treatment goals before and after combination therapy with Alogliptin/Pioglitazone. Additionally, we reviewed the medication history to identify any related adverse event reports.

Method
We retrospectively reviewed all inpatient prescriptions of combination Alogliptin/Pioglitazone from June 1, 2022 to March 31, 2023, using the hospital's electronic medical record system. Patient information included basic demographics, HbA1c levels before and 3 months after the initiation of Alogliptin/Pioglitazone, renal and liver function, and diabetes medication prescriptions. Microsoft Excel was used for initial data cleaning, and paired or dependent t-tests were used to evaluate the difference in blood glucose before and after prescription.

Results
During the enrollment period, a total of 34 patients were treated with Alogliptin/Pioglitazone, with 19 (56%) being male and a mean age of 59.8±14.4. After excluding 12 cases with incomplete laboratory data, the mean HbA1c level prior to the use of Alogliptin/Pioglitazone was 9.1±2%, which decreased to 7.8±1.2% after use. The mean decrease in HbA1c was 1.09, with a 95% confidence interval of [0.66, 1.52] and a p-value of 0.0009. Interestingly, one case had already achieved an HbA1c level of <7 before using the combination prescription. After medication adjustment, a total of 6 cases achieved an HbA1c level of <7.
In terms of prescription patterns, among the 34 cases, 19 cases were adjusted to Alogliptin/Pioglitazone by add-on method. Among them, 3 cases were given two additional antidiabetic drugs at once.

Conclusion
Based on the evaluation of medication use, it can be concluded that most cases experienced a decrease in their HbA1c levels due to adjustments in their prescription to Alogliptin/Pioglitazone. However, the magnitude of the decrease did not reach the target of HbA1c <7. This suggests that the management of diabetes cannot solely rely on medication, but requires the intervention of healthcare professionals in terms of exercise, diet, and medication to achieve better control of diabetes.

Effectiveness of a discharge analgesia guideline on discharge opioid prescribing after a surgical procedure from a tertiary metropolitan hospital

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background: The provision of opioid analgesics upon hospital discharge is often excessive and can cause significant harm, such as persistent opioid use, dependence, and overdose.

Purpose: The primary objective of this study was to evaluate the effectiveness of a discharge analgesia guideline on the days' supply of opioid analgesics provided among surgical patients upon hospital discharge. A secondary objective was to analyse the effect of this guideline on the provision of an analgesic discharge plan.

Method: A discharge analgesia guideline recommending both the provision of opioid analgesics based on patient use in the 24 hours prior to discharge and the supply of an analgesic discharge plan to all patients was implemented in a tertiary metropolitan hospital in Sydney, Australia in October and November 2019. We conducted a retrospective pre-and-post study by analysing patient data extracted from both the electronic medical record and pharmacy dispensing software system.

Results: There was no change in the primary outcome of days' supply of opioids provided on discharge between the intervention groups (median, IQR: 5, 3-9.75 vs 6, 4-10; p=0.107). There was also no change in the proportion of patients receiving an analgesic discharge plan (26% vs 22.2%; p=0.604). The results of two multivariable regression models showed no change in the days' supply of opioids (Adjusted incidence rate ratio, 95% CI: 1.1, 0.9-1.2) and the provision of an analgesic discharge plan (Adjusted odds ratio, 95% CI: 0.6, 0.2-1.4) after adjusting for confounding variables.

Conclusion: Overall, our study found no change in the days' supply of opioids provided on discharge after the implementation of a discharge analgesia guideline, but also found that prescribing practices already aligned with the guideline before its implementation. These guidelines had no impact on the provision of analgesic discharge plans. Results from previous studies have shown that guidelines may increase the proportion of patients receiving an analgesic plan on discharge when they are supported and overseen by clinical champions.

Use and clinical outcomes of vasopressors and inotropes among patients admitted at moi teaching and referral hospital-Eldoret

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background: Inotropes and vasopressors are administered to offer hemodynamic support to patients in shock, as a temporary measure to allow for correction of the underlying disease. Inotropes increase cardiac output while vasopressors increase total peripheral resistance leading to a rise in mean arterial pressure (MAP) and perfusion. Despite the high mortality observed among patients started on vasoactive drugs, there is limited data on their use and outcomes in the low-income setting. This study aims to document the outcomes of patients started on vasoactive drugs.

Objectives: To describe the clinical outcomes of patients started on inotropes and/or vasopressors at MTRH, Eldoret.

Methods: This was a prospective observational hospital-based census study that recruited patients who were admitted at the Coronary Care Unit (CCU) in MTRH between December 2018 and June 2019 and received inotropes and/or vasopressors. Data on age, gender, length of stay, medication history, laboratory findings and diagnosis was collected. Patients were followed until discharge from CCU and data on outcomes collected. Sociodemographic and clinical characteristics were analyzed using descriptive statistics. Fischer's exact test was used to determine association between outcomes and the various agents and their combinations used. Multinomial regression was used to determine effect of mean arterial pressure on outcomes. $p < 0.05$ was considered significant

Results: 68 patients with a mean age of 51.1 (SD 23.9) years were recruited. Most were female patients (57.3%), who had been admitted in cardiogenic shock (75.7%) due to acute decompensated heart failure (72.5%), with rheumatic heart disease as the main comorbidity (18.2%). Mean baseline MAP was 61.8 mmHg while systolic and diastolic blood pressure was 82 mmHg and 52 mmHg respectively. Most patients (52.9%) received dobutamine as the first agent. A second agent, norepinephrine, dobutamine or milrinone, was administered to 28 (41.2%) patients who had not initially responded adequately. Characteristics of participants who received various agents were similar. The mean arterial pressure in patients treated with one inotrope was significantly higher than in patients who were treated with at least two inotropes ($p < 0.001$). Thirty-seven (54.4 %) patients died, 9(13.2 %) were discharged to the wards and 22(32.4 %) were discharged home. There was no significant association between outcomes and the initial agent administered ($p= 0.807$) or the various combinations ($p=0.334$). Patients with an elevated mean arterial pressure after inotrope treatment were more likely to be discharged to the wards (OR 1.3 [95% CI 1.1-1.6, p=0.001]) or discharged home (OR 1.2 [95% CI 1.1-1. 3, p=0.002]) than to die.

Conclusion: Patients with higher MAPs after inotrope/vasopressor administration had better clinical outcomes compared to those with lower MAPs. There was no significant association between the type of inotrope/vasopressor and outcomes. Additionally, there was no significant difference between the use of either one or two inotropes/vasopressors.
Topic area: Hospital pharmacy

Effects of anti-ulcer drugs on delirium in trauma patients

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background:
When used to treat patients for ulcers, histamine-2 receptor antagonists (H2RAs) are associated with a higher risk of developing delirium than proton pump inhibitors (PPIs). Recent analysis of adverse drug event reports showed that H2RAs may increase the risk of delirium even after adjusting for advanced age and concomitant medications, but current evidence is insufficient to explain this risk.

Purpose:
This study aimed to investigate if anti-ulcer drugs increase delirium risk. Moreover, we explored whether associations between delirium and anti-ulcer drugs were modified by the concomitant use of opioids or benzodiazepines, which are widely known to be associated with increased delirium risk.

Method:
Data were obtained from the medical records of patients admitted for trauma to the high care unit and intensive care unit (ICU) in the advanced emergency and critical care centre of Saga University Hospital between April 2015 and March 2019. Delirium was diagnosed according to the Confusion Assessment Method for the ICU. We compared the incidence of delirium in patients who received H2RAs and PPIs with that of patients who received no anti-ulcer drugs. The calculated crude odds ratios (ORs) of H2RAs and PPIs were adjusted for age, sex, injury severity score, traumatic brain injury, dementia, and use of opioids and benzodiazepines as explanatory variables in the multivariate logistic regression.

Results:
In this study, 546 patients were analysed. A total of 150, 158, and 238 patients received H2RAs, PPIs, and no anti-ulcer drugs, respectively. Delirium incidence was significantly higher in patients who received H2RAs (34.0%) and PPIs (44.9%) than in those who did not receive anti-ulcer drugs (22.3%). Even after adjusting for possible confounding factors, the association between H2RAs and delirium remained (OR 1.78; 95% CI 1.04-3.05), while the association between PPIs and delirium was attenuated (OR 1.25; 95% CI

0.71-2.23). When compared by concomitant opioid or benzodiazepine use, neither H2RAs nor PPIs were associated with delirium. Conversely, H2RAs were associated with delirium when not used in combination with opioids (OR 1.91, 95% CI 1.06–3.46) or benzodiazepines (OR 2.18, 95% CI 1.17–4.06).

Conclusions:
Our results show that administration of H2RAs is associated with delirium risk. This supports the findings of a previous data-driven study. Clinicians must consider the effect of delirium in anti-ulcer drug selection.

Evaluation of local guideline introduction on surgical antimicrobial prophylaxis prescribing for open reduction internal fixation procedures at an Australian tertiary hospital

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Background: Surgical antimicrobial prophylaxis is recommended to prevent infection following open reduction internal fixation (ORIF) of closed fractures. International guidelines, such as those from the World Health Organisation, and national guidelines, such as those from the Australian Therapeutic Guidelines, advocate for the use of single dose prophylaxis (cefazolin 2 g) for ORIF procedures. We previously identified that only 20.4% of ORIF patients received single dose prophylaxis at an Australian tertiary hospital. The introduction of local (in-house) guidelines, based on national and international guidelines, may assist the uptake of evidence-based recommendations.

Purpose: To determine the impact of local guideline introduction on prescribing practice for ORIF procedures at a metropolitan tertiary hospital.

Method: Antibiotic prescribing was audited for patients undergoing ORIF of closed fractures between July and December 2021 at a metropolitan tertiary hospital following local guideline introduction in April 2021. Data on perioperative prescribing regimens were collected, with results compared to recommendations in local guidelines. Descriptive statistics, Chi-square test and Fisher's exact test were used to report categorical variables.

Results: Data were collected for 165 patients. Almost all patients (93.5%) received the recommended antibiotic, cefazolin, preoperatively as per guidelines. Only 22.6% of patients received single dose prophylaxis (cefazolin 2 g) as per local guideline recommendations, with overall adherence to guidelines only 16.4%.

Conclusion: There was minimal difference in the proportion of patients who received single dose prophylaxis (cefazolin 2 g) compared to our previous audit. There is a need to understand why guideline recommendations are not adhered to despite the availability of local, national and international guidelines.

Reshaping the landscape of pharmacist vaccinations: Delivering dTpa vaccines in a maternity outpatient clinic

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background
Pertussis causes on average 1 death and 200 hospitalisations in infants <6 months old annually. Whooping cough (dTpa) vaccination during pregnancy reduces risk of pertussis in infants by 90% and is recommended for each pregnancy between 20 and 32 weeks. Despite this, only 34% of women take up recommended vaccinations in pregnancy.

Purpose
An established pharmacist outpatient clinic in maternity, identified an unmet scope for dTpa administration in pregnant women. Pharmacist-administered vaccinations were provided opportunistically in antenatal clinic with a view to increasing access to dTpa vaccines.

Method
Consultation was undertaken at hospital executive and service line level for communication of the proposal and to garner support from the wider multidisciplinary team.
A meeting with the Chief Health Officer enabled legislative changes to allow this in scope activity for pharmacists to include hospital administration.
Local funding was secured and an accredited vaccination training program was delivered in hospital for the first time to upskill maternity pharmacists to become suitably trained.
Clinic infrastructure was established to meet legislative requirements for safe vaccine administration and where appropriate, the pharmacist opportunistically offered dTpa vaccines as part of their clinic review.

Results
From November 2020 to August 2022, 304 pharmacist-administered dTpa vaccines were administered in Maternity Outpatients. Prior to implementation, no vaccinations were offered in clinic leaving vulnerable groups without access to vaccines. The vaccination rate peaked at 17 pharmacist-administered doses per month. No adverse events were experienced.

Conclusion
An unmet scope and opportunity to improve patient outcomes in an unvaccinated and vulnerable patient cohort was identified. We implemented a safe and sustainable model of care which resulted in a large number of pregnant women accessing dTpa vaccinations during their antenatal appointments, many of whom may not have been vaccinated without this service. This is the first hospital-based pharmacist-vaccination model offering dTpa vaccines.

Evaluation of pharmacist administered influenza vaccination in high-risk hospital outpatients (EPIVHO)

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background
Influenza outbreaks place a significant annual burden on the Australian healthcare system. There is well documented evidence that increasing rates of influenza vaccination, especially amongst high-risk patients will decrease the number of confirmed cases of influenza, reduce hospital admissions, associated costs and death. Despite this, under usage of immunisation programs continues to be a significant public health concern with inadequate time to attend a venue for vaccination being identified as a significant contributor to less than ideal vaccination rates.
At our tertiary health facility, the pharmacy service has input into ambulatory outpatient services, making it ideal for providing opportunistic vaccinations to patients in a hospital outpatient setting. The aim was to investigate the impact of such a service on increasing access for high-risk patients to receive their annual influenza vaccination.

Purpose:
To assess the feasibility, acceptability and potential benefits of suitably trained pharmacists opportunistically administering influenza vaccinations during routine hospital outpatient appointments, with a view to increasing access for high-risk patients to receive their annual flu vaccination.

Method
A service evaluation study assessed the impact of hospital outpatient pharmacists opportunistically offering influenza vaccinations to patients booked into their clinic. Patients accepting a vaccine completed a questionnaire about their vaccination experience.

Results
Pharmacists administered influenza vaccinations to 30 patients, of which 44% had never received an influenza vaccination before, and 41% would not have been vaccinated if this service had not been available. Nearly half of all vaccines administered were given in Maternity Outpatients (47%), followed by Preadmission clinics (33%) and Renal Outpatients (13%). Patient satisfaction of the immunisation service was very high with 100% of patients completely satisfied with the overall vaccination experience. Convenience was most frequently cited by patients as the reason for receiving the influenza vaccination at clinic.

Conclusion
One of the significant contributors to less than ideal vaccination rates is inadequate time to attend a suitable venue to obtain the vaccine. Opportunistic immunisation of patients attending hospital outpatient clinics by suitably trained pharmacists, offers convenience for high-risk patients and for the wider community, improved vaccination rates which contribute to a reduction in disease and the associated healthcare costs including a reduction in flu related hospitalisations. This model of care would be transferable to other hospital settings, potentially both outpatient and inpatient, creating new opportunities for vaccination of high-risk patients on a sustainable basis.
Patients who had not already been vaccinated by June, and were unlikely to have been vaccinated, received an influenza vaccine administered by the first hospital pharmacy to offer this service. This demonstrates the feasibility and impact of this opportunistic model of care in improving access and uptake of vaccinations for high-risk patients. Outpatient Clinics which provided the greatest return on time and investment will be scoped for expansion of the service which includes potentially administration of other vaccines.

Development and validation of a nomogram to predict the risk of potentially inappropriate medication use in older lung cancer outpatients

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background: At present, there is no predictive model that can predict the prevalence of Potentially inappropriate medication (PIM) use in older lung cancer outpatients.
Research design and methods: We measured PIM by the 2019 Beers criteria. Significant factors were identified to develop the nomogram using logistic regression. We validated the nomogram internally and externally in two cohorts. The discrimination, calibration, and clinical practicability of the nomogram were verified using receiver operating characteristic (ROC) curve analysis, Hosmer-Lemeshow test, and decision curve analysis (DCA), respectively

Results: A total of 3300 older lung cancer outpatients were divided into a training cohort (n=1718) and two validation cohorts, including an internal validation cohort (n=739) and an external validation cohort (n=843). A nomogram for predicting PIM use patients was developed using six significant factors. ROC curve analysis showed that the area under the curve was 0.835 in the training cohort and 0.810 and 0.826 in the internal validation and external validation cohorts, respectively. The Hosmer–Lemeshow test yielded P=0.180, 0.779 and 0.069, respectively. The nomogram demonstrated a high net benefit in DCA.

Conclusion: The nomogram could be a convenient, intuitive, and personalized clinical tool for assessing the risk of PIM in older lung cancer outpatients.

Evaulation of efficacy on applied intelligent technology in pharmaceutical services

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Background
During the process of pharmacy services, dispensing of drugs take much work and time. Introducing intelligent devices will alleviate this situation effectively, compared to traditional manual services, intelligent devices have advantages in scenarios of repetitive labor, including shorter waiting time, lower error rate, lower labor intensity etc. Intelligent devices significantly reduce labor consumption while improving service quality. Ensure sufficient time for prescription review and medication educate by the pharmacist team, and provide high-quality pharmaceutical services for patients.

Objective
Using the yuyama YS-CS-HD-4 fully automatic dispensing machine as the research sample, evaluate the benefits of intelligent technology on pharmaceutical service level, and provide ideas for promoting the healthy development of smart pharmacies in tertiary hospital.

Method
Collecting data include the prescription volume, number of dispensing medication, patients waiting time, and patients take away the medicine time before and after the fully automatic dispensing machine in our hospital duration in 2020~2021 two years. Recording the error rate during prescription dispensing before and after implementation, as well as the manpower required under routine circumstances. Through statistical analysis, the benefits of fully automatic dispensing machines in improving drug distribution efficiency are obtained by excel.

Result
In 2020 year, the average monthly prescription quantity is 35,779, the average monthly number of prescriptions is 65,743, and the number of medicines issued is 61,756. In 2021, the average monthly prescription quantity is 53,295, the average monthly prescription volume is 106,497, and the average monthly number of medicines issued is 91,330. After the implementation, proportion of using intelligent devices in drug-dispensing increased to 65% . With monthly average increase 49% prescription volume, 62% in prescription count, and 48% in medication count, labor hours were saved by (82 ± 3) hours before and after implementation. The time for pharmacists to dispense a prescription was shortened by about (1.9 ± 0.3) minutes, patient's waiting time during peak hours was shortened by (3 ± 0.5) minutes, and nonpeak hours was shortened by (2 ± 0.3) minutes, The proportion of patient's waiting time of less than 10 minutes increased by 9.8%, and overall, over 98% of patients had a waiting time of less than 10 minutes.
Pharmacists identify drug bar codes through PDA scanning terminal, check dosing information, eliminate dispensing errors caused by lack of experience, fatigue work and other factors. The average number of errors per month has been reduced from 8 to 4.

Conclusion
The adoption of intelligent technology has a significant impact on enhancing pharmaceutical services. This greatly improves the efficiency of drug dispensing, reduces the time for patients to take medication, minimizes errors caused by human factors, and lessens the physical workload of pharmacists. The implementation of new medical infrastructure projects is guaranteed by "Central + local" funds, which drives the growth of demand in the smart pharmacy industry and attracts social capital to reduce the construction cost of automated pharmacies. In conclusion, increasing investment in automation equipment and integrating information systems are powerful measures to quickly and significantly improve the quality of pharmaceutical services.

Epidemiological characteristics of severe immune checkpoint inhibitors related myocarditis in the real world

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Background
With the widespread use of immune checkpoint inhibitors (ICIs) as the first-line treatment for a variety of tumors, immune-related adverse reactions has been paid more and more attention. Due to the low incidence and high mortality of immune-related myocarditis, the available data are limited.

Purpose
As the largest single-center cardio-oncology multi-disciplinary team in China, we hope to provide reference for clinical practice with real-world immune-related myocarditis data.

Methods
A retrospective study was conducted on patients with ICIs-related myocarditis in the multidisciplinary cardio-oncology clinic of our hospital from April 2020 to April 2022. The patients were divided into mild group (subclinical myocardial injury and mild myocarditis) and severe group (severe myocarditis and critical myocarditis).

Results
There were 37 cases of mild myocarditis and 13 cases of severe myocarditis, and the median treatment time was 81 days and 24 days respectively (P<0.05), suggesting that myocarditis was usually more severe in the early stage after

immunotherapy. The levels of cTnT (P<0.001), NT-proBNP (P=0.004), CK-MB (P=0.002) and CK-MM (P=0.045) were significantly increased. Electrocardiogram block (P=0.013), lower left ventricular ejection fraction (P=0.024), abnormal ventricular wall movement (P=0.033), concomitant immune-related myositis (P=0.037), immune-related hepatitis (P=0.033) and immune-related neurotoxicity (P=0.013) were associated with severe myocarditis. The severe group received immunosuppressant (P<0.001) and had higher mortality (P=0.003).

Conclusion
The incidence of ICIs-related myocarditis is not high, but the severe rate and mortality are high. The differential diagnosis should be combined with myocardial markers, electrocardiogram and echocardiogram, and early diagnosis and treatment can improve the prognosis of patients.

Expert consensus on standard management for doping-containing medicines in medical institutions

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background:
During major international games and sporting events, one important aspect of pharmaceutical services is following the World Anti-Doping Code to ensure the health of athletes and maintain fair competition. The misuse of doping by athletes seeking medical treatment due to a lack of knowledge of doping drugs among medical staff can have serious consequences. Therefore, medical institutions must strengthen the standardized management of doping-containing medicines to prevent medication risks for athletes. However, there were no systematic regulations or norms for this. During the preparatory stage of the 7th Military World Games organized by the International Military Sports Council (CISM) in Wuhan, a consensus was reached on the importance of addressing these issues.

Purpose:
To report Expert consensus on standard management for doping-containing medicines in medical institutions.

Methods and Results:
This consensus was reached by 50 pharmaceutical and clinical experts from medical institutions who extensively studied and discussed the athletes' medical treatment in medical institutions and how to avoid the use of doping-containing medicines. They ultimately arrived at a consensus on standardized management, which includes four principles for hospital administration of doping-containing medicines, three principles for the use of doping-containing medicines, and five principles for applications for therapeutic use exemption (TUE).
The principles for hospital administration of doping-containing medicines consist of the following: standardized medical visits for athletes; professional training for medical staff on doping-containing medicines; administration of athletes' medication outside hospitals; and catalogue administration of doping-containing medicines. The principles for the use of doping-containing medicines include the impact of common doping-containing medicines on athletes, the category of common doping-containing medicines, and the safe and rational use of therapeutic medicines. The principles for applications for TUE included (1) the scope of application; (2) the content of the application; (3) the standards for application review; (4) retroactive application of TUE after the event; (5) the hospital's TUE administration rules.
These principles were carefully crafted by the experts to provide a comprehensive framework for the management of doping-containing medicines in hospitals, as well as to ensure the safety and wellbeing of athletes who require therapeutic use exemptions.

Conclusion:
The consensus emphasizes that the management of doping-containing medicines in medical institutions should follow standardized and established procedures to mitigate the misuse of such drugs during athletes' medical treatment. This approach not only satisfies the athletes' reasonable demands and rights for their own health but also minimizes the risk of iatrogenic misuse of stimulants. The consensus provides essential guidance for medical institutions to manage doping-containing medicines effectively, thereby ensuring drug safety for athletes. The principles of this consensus have been endorsed by several esteemed organizations, including the International Pharmaceutical Federation (FIP) and the Wuhan Pharmaceutical Association. As such, this consensus is expected to serve as a crucial reference standard for promoting drug safety and preventing doping in sports.

Experiences in foundation and advance training residency training programs

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The Foundational Residency Training Program (FR) and Advance Training Residency Program (ATR) were designed and implemented at the Princess Alexandra Hospital (PAH) in 2017 and 2021 respectively. Following the guiding principles of the Basel statement (61) these training programs were designed as bespoke training programs developed to meet our local hospital pharmacist's training needs and harmonised with the national formalised Society of Hospital Pharmacists of Australia (SHPA) framework.
Multiple iterations of these training programs have been implemented to address the changing requirements and capacity of the hospital. These training programs have also moved rapidly from 'opt in' training with capped numbers of staff allowed to participate to an 'opt out' approach, where

this training is now the expected standard for new staff (FR) and specialist staff (ATR).

Despite the s significantly increased investment in time and effort required to manage these training programs, neither dedicated offline time nor ringfenced funding has been provided by our hospital. Alongside these challenges, the challenge of training a broad cohort of pharmacists in a diverse range of clinical areas has also been significant.
To tailor further iterations of these training programs, pharmacists completing the FR or ATR were asked to discuss their thoughts and perceptions around the programs. This paper aims to state, theme and discuss these pharmacist's opinions about the PAH FR and ATR programs and discuss how these recommendations / concerns have been addressed.

Overall, pharmacists completing the ATR and the FR found the programs helpful. Challenges were discussed in terms of lack of time allocated to complete the ATR and FR, and a lack of support from the department to have offline time for this. Writing a manuscript was identified as being a daunting task requiring greater support than other program requirements. This has been addressed by the appointment of a research pharmacist who works 1 day a week at PAH to provide such support and advice.

Pharmacists completing the FR and ATR also discussed a lack of clinical learning modules or specific clinical training opportunities. Mandatory attendance at a single SHPA weekend workshop per year in both programs, was deemed insufficient by numerous pharmacists. Interestingly this has been addressed in other sites by offering FR or ATR programs in collaboration with universities, mandating FR pharmacists complete 1-2 courses within a postgraduate certificate or diploma.
At PAH the possibility of micro-credentialled postgraduate clinical pharmacy courses in different areas has been discussed. This would require investment from Universities or the Society of Hospital Pharmacists (SHPA) to achieve this.

Rituximab used in fatal anti-MDA5 positive dermatomyositis with interstitial lung disease: A case report

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Posters Tuesday, September 26, 2023, 12:30 PM - 2:30 PM

Background and purpose
Dermatomyositis is a kind of idiopathic inflammatory myopathies, with skin symptoms which presented in finger joints, back with Gottron's sign or papules, in addition to muscle lesions. Anti-melanoma differentiation-associated gene 5 (anti-MDA5) is a subtype of dermatomyositis, statistically 10-25% presented, highly associated to rapidly progressive interstitial lung disease (RP-ILD). There is a lack of effective treatment and a high mortality rate. Several case reports revealed that rituximab can enhance forced vital capacity and diffusing capacity of carbon monoxide. Herein we report a case treated with rituximab, hoping the clinical manifestations and treatment process help with this disease.

Case description
A 46-year-old woman suffered from progressive rash from limbs to trunk in 2 months. Typical findings of V sign, Holster sign, Gottron's sign and helitrope rash and confirmed the diagnosis of dermatomyositis. Skin biopsy showed no panniculitis and no vasculitis and myositis panel revealed anti-MDA5. She was admitted for further survey. Methylprednisolone 500 mg QD for 3 days and tacrolimus 1 mg QD were used. After the first dose of rituximab 1000 mg for two doses for 2 days, the subsequent 1000 mg was prescribed every month. Advanced interstitial pneumonia with atypical pneumonia happened at the third course of treatment. Plasma exchange and self-paid intravenous immunoglobulin treatment were tried. Unfortunately, progressed increased oxygen requirement presented. The patient died of progressive desaturation with gradually bradycardia even under extracorporeal membrane oxygenation support.

Discussion
The prevalence of ILD in patients of anti-MDA5 positive dermatomyositis is estimated to be 82-100% in Asians, and often combined with malignant tumor. When it progresses to RP-ILD, the death rate goes up to 50%. At present no clear treatment guideline, and the empiric therapy is high-dose steroids and immunosuppressants.
The etiology is associated to aberrant activation of the type I interferon system which further promotes the production of MDA5 protein. Abnormal accumulation of MDA5 protein may lead to a loss of tolerance to MDA5, resulting in the production of anti-MDA5 auto antibody. B-cells will trigger more anti-MDA5 auto antibody. Rituximab, which binds to the CD20 antigen on b-cells, can initiate an immune response and regulate the lysis of b-cells, so apply on here.
According to an integrated result of 35 case reports by Chenjia He et al., the dose of rituximab apply on anti-MDA5 positive DM with RP-ILD can be summarized as conventional dose (500 mg/week for 4weeks or 375 mg/m^2 at Day 0, Day 14) and low dose (100 mg/week), patients presented more response rate to the low dose rituximab, while on the contrary the conventional-dose treatment presented better survival rate.

Conclusion
The safety and efficacy of rituximab in anti-MDA5 positive dermatomyositis with RP-ILD need more clinical evidence to support. Our case provides the conventional dose treatment of rituximab. Even though the patient eventually died of multiple infections, while the response to rituximab during the course of treatment still can bring reference to this disease.

Prevalence and prescribing patterns of stress ulcer prophylaxis pharmacotherapy in China (SUP-CIC): A multi-centered, prospective, observational study

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Purpose
To describe the current prescribing patterns of stress ulcer prophylaxis (SUP) pharmacotherapy in adult intensive care units (ICUs) in China and its consistency with BMJ Rapid Recommendations.

Material and Methods
This multicenter, prospective, cross-sectional study reviewed adult ICU patients in 17 hospitals with 34 ICUs from 17 provinces of China over one month and reports on demographics, medications used for SUP, and risk factors for clinically important bleeding. Based on the risk of gastrointestinal bleeding according to a British medical journal (BMJ) Rapid Recommendation, we categorized ICU patients into four groups (very high, high, moderate, and low risk) and described the proportion of patients receiving SUP pharmacotherapy in all risk stratification patients at each hospital. Study personnel, in discussion with three directors of ICUs, to set thresholds for potential overuse of SUP administration for moderate- (over 50%) or low-risk (over 25%) populations. We combined the prevalence from the independent hospitals via mixed effect models using R 4.0.5 with the meta package version 6.1-0).

Results
In 3 134 enrolled patients, the prevalence of SUP pharmacotherapy for very high-, high-, moderate- and low-risk patients in ICUs was 75.9% (95% CI: 68.0%-84.7%), 74.3% (95% CI: 63.9%-86.5%), 69.8% (95% CI: 60.7%-80.3%), and 67.4% (95% CI: 56.6%-80.3%). In 17 enrolled hospitals, the proportion of hospitals with potential overuse of SUP administration for moderate- or low-risk patients were 82.4% (14/17) and 88.2% (15/17). For all patients discharged from the ICU and transferred to the general ward, the prevalence of SUP pharmacotherapy was 42.8% (95% CI: 31.8%-57.6%). Most (95.9%) patients received proton pump inhibitors. The median duration of SUP pharmacotherapy was 3.0 days (interquartile ranged from 2.0 to 7.0). The most common route of administration was intravenous administration (86.8%); of those receiving intravenous prophylaxis, 29.0% were simultaneously receiving enteral nutrition.

Conclusion
The prevalence of stress ulcer prophylaxis pharmacotherapy was very high in all ICUs in China, and did not vary appreciably across risk groups. There is potential overuse of SUP administration in moderate- and low-risk patients. Most Chinese doctors choose proton pump inhibitors for SUP, which is consistent with the BMJ recommendations, but oral administration rather than intravenous could usefully be increased.

Advancing practice 2.0: Developing an updated practice recognition program

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Background: In 2017, The Society of Hospital Pharmacists of Australia (SHPA) acquired the previously developed and piloted Advancing Practice (AP) credentialing program.
The program, built to demonstrate the expanding practice of the profession had not achieved widespread engagement across the sector by 2020 and as such, SHPA made the decision to put the program on hold for review.

Purpose: In developing a new practice recognition pathway, the objectives identified were to create a model that
- appeals to a broad range of pharmacists
- promotes and recgonises career advancement
- integrates with existing organisational digital infrastructure

Methods: An external consulting agency was engaged to lead the initial review.
This process consisted of
1. Initial qualitative surveys with SHPA members, past participants in the credentialing program and key opinion leaders
2. Internal workshops to clarify organisational program objectives
3. Pharmacist focus group sessions to
a. explore pharmacists needs and challenges
b. identify evidence of demand/weaknesses of the existing AP credential
c. identify opportunities for future programs

Based on the findings of this work, an expert pharmacist was brought in to develop new model options through a consultative process.
Key concepts of acknowledgement, patient care, identity, career progression and contribution to the profession were identified and models were developed and tested with this brief.

Results: A merit based system mapped to the National Competency Standards Framework (NCSF) was developed which attributes credit points of accredited weighted activities individuals can complete to demonstrate ability against each domain. Activities include workplace based assessments, soft skill demonstration and professional contributions.
Individuals reach a consensus level of practice once adequate merits have been achieved across all domains of the NCSF at which point they will be acknowledged for practice at the relevant level.

Discussion: Feedback from the initial consultation process was positive in support of the merit based system. Main

concerns identified were around maintaining professional meaning and ensuring a robust process for identifying consensus level of practice.
Work continues on development of the program incorporating current feedback. The new model will undergo subsequent rounds of consultation across the first half of 2023 with a planned launch of the new model in late 2023.

Risk factor analysis of Omicron patients with mental health problems in the Fangcang shelter hospital based on psychiatric drug intervention during the Covid-19 pandemic in Shanghai, China

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Backgrounds: The widespread coronavirus disease 2019 (COVID-19) outbreak impacted the mental health of infected patients admitted to Fangcang shelter hospital a large-scale, temporary structure converted from existing public venues to isolate patients with mild or moderate symptoms of COVID-19 infection.

Objective: This study aimed to investigate the risk factors of the infected patients from a new pharmacological perspective based on psychiatric drug consumption rather than questionnaires for the first time.

Methods: We summarised the medical information and analysed the prevalence proportion, characteristics, and the related risk factors of omicron variants infected patients in the Fangcang Shelter Hospital of the National Exhibition and Convention Center (Shanghai) from 9 April 2022 to 31 May 2022.

Results: In this study, 6218 individuals at 3.57% of all admitted patients in the Fangcang shelter were collected suffering from mental health problems in severe conditions including schizophrenia, depression, insomnia, and anxiety who needed psychiatric drug intervention. In the group, 97.44% experienced their first prescription of psychiatric drugs and had no diagnosed historical psychiatric diseases. Further analysis indicated that female sex, no vaccination, older age, longer hospitalization time, and more comorbidities were independent risk factors for the drug-intervened patients.
Conclusion: This is the first study to analyse the mental health problems of omicron variants infected patients hospitalised in Fangcang shelter hospitals. The research demonstrated the necessity of potential mental and psychological service development in Fangcang shelters during the COVID-19 pandemic and other public emergency responses.

The clinical effectiveness and safety of palbociclib in advanced hormone receptor-positive breast cancer

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Background: Cyclin-dependent kinase 4 and 6 inhibitors are recommended as first-line medications for advanced hormone receptor-positive (HR+) breast cancer patients.
Aim: To assess the efficacy and safety of Palbociclib in the treatment of advanced HR+ breast cancer and to analyze the factors that influence the entire course of Palbociclib medication.

Methods: Collecting the medical records of patients with advanced HR+ breast cancer who received Palbociclib combined with endocrine therapy at Ruijin Hospital from January 1, 2021, to December 31, 2021. The clinical efficacy, adverse reactions, and factors associated with the therapeutic use of Palbociclib were evaluated.

Results: Sixty-five advanced breast cancer who had previously received Palbociclib were included. Non-liver metastasis patients had significantly longer median progression-free survival (mPFS) with liver metastasis (32 months vs 12 months, Log Rank p=0.040). The mPFS of patients who received chemotherapy due to metastasis before Palbociclib treatment was shorter than those who did not (6 months vs 32 months, Log Rank p=0.047). Patients with underlying diseases and those with primary drug resistance to endocrine therapy had a poorer progression-free survival prognosis than those with sensitivity or secondary resistance (3 months vs 20 months, Log Rank p=0.002). The incidence of adverse reactions was 75.4%, and about 69.4% of adverse reactions suffered in the first course of treatment.

Conclusion: Palbociclib combined with endocrine therapy in treating hormone receptor-positive advanced breast cancer has a positive clinical effect and good safety. Adverse reactions, patients' medication compliance, and drug economy are the factors that affect the full course of medication.

Look-alike, sound-alike (LASA): A customized solution

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Confusing drug names is one of the most common causes of medication error and is of worldwide concern. Medicines which look or sound alike (LASA) are specifically critical.
There are several LASA lists in English with emphasis on the list adopted and maintained by the Institute for Safe Medication Practices (ISMP). National guidelines indicate that each Hospital must prepare a list of LASA drugs, adjusted to its reality and that there must be strategies that guarantee their correct identification and distinction.

For the definition of this list for Portuguese hospitals, we propose a two-step approach. Internationally recognised lists were used as a starting point, adapted considering the Portuguese notation and the medicines actually available in a Hospital setting. All medicines were analysed using linguistic algorithms (ALINE, BISIM) to calculate the average similarity score between all possible Portuguese Non-proprietary Names combinations. This allows the identification of potentially confusing pairs of medicines not considered on the first step.
With 1,258 unique entries, the ou
tput was of 790,653 combinations. Using a cut-off value of 70% of average similarity, the list was narrowed down to 599 combinations.
By restricting to the medicines used in each Hospital and considering additional risk criteria - such as the involvement high alert medicines, ATC code and route of administration for each medicine -, the output will be of a more reasonable, workable size. This methodology provides a starting point for identifying all pairs with high-risk of confusion, which should be complemented by incident reports of real use data. Ultimately, this aids the Hospital in the construction of a customized list and contributes for medication safety.

Clinical and economic impact of partnered pharmacist medication charting in the emergency department

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Introduction
Partnered pharmacist medication charting (PPMC), a process redesign hypothesised to improve medication safety and interdisciplinary collaboration, was trialled in a tertiary hospital's emergency department (ED).

Objective
To evaluate the health-related impact and cost-benefit of PPMC.

Methods
A pragmatic, controlled study compared PPMC to usual care in the ED using a propensity score matching using comorbidity index, admission unit and arrival time as matching covariates. The PPMC included pharmacist-documented best-possible medication history (BPMH), followed by a clinical conversation between a pharmacist and a medical officer to jointly develop a treatment plan and chart medications. Usual care included a medical officer-led traditional medication charting in the ED, without a pharmacist-obtained BPMH or clinical conversation. Primary outcomes were the length of hospital stay and relative stay index (RSI). Secondary outcomes included length of ED stay, in-hospital mortality, 30-day hospital readmissions or ED revisits, and PPMC's cost-effectiveness and cost-benefit.

Results
A total of 309 matched pairs were included. While the length of hospital stay was not reduced (p = 0.51), the median RSI was reduced by 15.4% with PPMC (p = 0.029). There were no significant differences between the PPMC group and the usual care group in the length of ED stay (8 vs 10 hours, p = 0.52), in-hospital mortality (1.3% vs 1.3%, p > 0.99), 30-day readmission rates (21% vs 17%; p = 0.35) and 30-day ED revisit rates (21% vs 19%; p = 0.68). The hospital spent approximately $282.4 for the cost of PPMC care per patient to avert at least one medication error bearing high/extreme risk. PPMC saved approximately $1233 on the average cost of each admission.

Conclusion
The ED-based PPMC model had a significant impact on reducing the RSI and saving admission costs, but not on other clinical outcomes.

Preliminary screening of negundoside for anti-epileptic activity

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background: Negundoside, an iridoid glycoside, isolated and characterized from the leaves of Vitex negundo Linn. (family Verbenaceae). This plant is one of the important medicinal plants enlisted in Ayurvedic literature and is depicted in Ayurveda as Nirgundi. Besides, various reported activities, viz., Hepatoprotective, analgesic, and immunostimulant, it has also elicited CNS depressant activity.

Purpose: In the present-day scenario, we are encountered with many physiologic and pathologic manifestations, which are closely associated with the functions of the brain and behavior leading to the pathogenesis of many

neurobehavioral afflictions in the body, such as anxiety, depression, affective disorders, stress, cognitive dysfunction, epileptic seizures and so forth. At present, only synthetic drugs are the options for pharmacotherapeutics of such manifestations, which are associated with many side effects that hamper normal day-to-day working capabilities and few drugs, such as barbiturates and benzodiazepines develop dependence too. Therefore, there is a need to explore and identify an alternative of herbal origin with a similar spectrum of activity and minimized side effects and dependence.
Therefore, it was envisaged to isolate, characterize and explore the probability of Negundoside as a herbal substitute to investigate its potential as an anti-epileptic drug.

Method: The anti-epileptic activity of Negundoside (5-25 mg/Kg, i.p.) was evaluated by Pentylene tetrazole (PTZ) induced (60 mg/Kg) and Maximal Electroshock (MES) induced convulsions (45 mA current for 0.2 sec duration using an electro-convulsiometer by pinnal electrodes) in Balb/C mice (18-25 g, either sex). Diazepam was used as a standard at a dose of 5 mg/ Kg, i.p. in the PTZ-induced model, and Phenytoin (25 mg/Kg, i.p.) as a standard in MES-induced seizures respectively.

Results: Negundoside (5-50 mg/Kg) has shown a significant anti-convulsant effect in Balb/C mice in a dose-dependent manner. The onset of seizures was significantly delayed with the maximum delay observed at 50 mg/Kg intra-peritoneal dose to be 196.24 ± 5.37 sec ($p < 0.001$). Negundoside at a dose range of 5-50 mg/Kg, i.p. protected animals from seizures arising due to grandmal epilepsy in a dose-dependent manner as represented by four distinct phases of convulsions, viz., flexion, extension, clonus, and stupor and accorded protection from dying at 50 mg/Kg dose, Negundoside protected 100% animals, which is equivalent to phenytoin (standard) at 25 mg/Kg in terms of % protection accorded. The duration of tonic hind leg extension in animals treated with the vehicle was 15.39 ± 1.0 sec. Negundoside at 5-50 mg/Kg dose reduced the duration of tonic hind leg extension, which was recorded to be 15.09 ± 0.82, 13.90 ± 0.43, 12.18 ± 0.38, 8.89 ± 0.96, and 4.95 ± 0.50 respectively, in which the effect of Negundoside at 25 and 50 mg/Kg was most significant ($p < 0.001$). Phenytoin (25 mg/Kg), a standard anti-convulsant drug did not show any extension.

Conclusion: The findings from the anti-epileptic activity of Negundoside demonstrated potent anti-convulsant activity in a dose-dependent manner. Therefore, Negundoside could be a potential candidate as an anti-epileptic drug and can be explored further as a herbal remedy for epilepsy.

Role of the French chamber of pharmacists in the authorization process for hospital pharmacies

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In France, the Regional Health Authorities (RHA) authorize hospital pharmacies for a 7-year period. Two regulatory texts reviewed the authorisation system with an implementation until the end of 2023 for hospital pharmacies with risky activities and until the end of 2025 for the others.

The administrative process to renew a hospital pharmacy authorisation requires the hospital to prepare a dossier which is analyzed by the RHA within 4 months. The file is transmitted to the French Chamber of Pharmacists (FC) for its hospital pharmacy section (HPS) to render its opinion within 3 months. This abstract presents the role of the HPS elected pharmacists in the national hospital pharmacy authorisation process.

The HPS elaborated a reference framework and an audit grid on the items allowing to circumscribe each activity and to help the section carry out the verifications.

All HPS elected pharmacists drew up a 282-page document which was distributed in 2021 to each hospital pharmacist. Each authorisation dossier is assigned to an elected pharmacist who goes on-site to check with hospital pharmacists that activities are compliant, using the audit grid. In 2022, 363 dossiers were processed and 1,022 opinions were issued leading to a positive opinion in 17%, positive with recommendations in 73% and unfavorable in 10% of the cases.

The on-site visits provide an opportunity to discuss with healthcare professionals and to show the involvement of the French Chamber. The monitoring carried out is well perceived as an intent to improve practices and help colleagues. The guidelines are reviewed annually. The opinions issued are appreciated by the RHA in order to build up their agreement.

Recent evolutions of the role of hospital pharmacist in France

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The last health crisis had an unprecedented impact on organizations and required a strong reactivity from all healthcare actors. The pharmacist's pivotal role was underlined in that occasion. The demographic difficulties experienced by the profession and the increase of medicines shortages are new elements to be taken into account in the hospital profession's evolution.

This abstract describes the most significant new roles of hospital pharmacists in France.

The French Chamber of Pharmacists (FC) worked to respond to new public health needs and the demands of pharmacists in healthcare institutions (HCIs) to optimize patient care. Three main evolutions were proposed to decision-makers in order to improve patient outcomes: vaccination, medicines preparation and renewal of prescriptions.

One proposition aims at the realization of special preparations. During the covid crisis, pharmacists were asked to make hydroalcoholic solutions. They also had to ensure the preparation of medicines at risk of shortages (i.e. curares) for other hospital pharmacies. The FC proposed to make this role permanent especially in the event of a supply shortage.
Clinical pharmacy is one of the main hospital pharmacies' missions. In order to improve medication use, FC proposed that the hospital pharmacist could renew and adapt prescriptions within medical HCIs local protocols.

The last evolution allows the right to prescribe and administer vaccines to patients treated in HCIs in order to increase the vaccination coverage of high-risk populations.

All these propositions are now adopted, it is up to our colleagues to put them into practice to enhance the pharmacist as an essential part of the healthcare team.

Using quality improvement plan to enhance interprofessional participation: A case study in hospital setting

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background: Interprofessional collaboration is critical for delivering quality healthcare. However, achieving successful collaboration requires effective communication and coordination among healthcare professionals. This study aimed to improve interprofessional participation through a quality improvement plan in a hospital setting.

Purpose: The objectives of the study were to increase the acceptance rate of pharmacists' recommendations on antibiotic usage and to enhance the implementation of evidence-based medicine in the pharmacy department.

Method: The study was conducted using the Plan-Do-Check-Act (PDCA) method. The acceptance rate of pharmacists' recommendations on antibiotic usage was measured before and after the intervention. The study also involved inviting evidence-based medicine experts to give lectures and organizing a team to participate in a competition on evidence-based medicine.

Results: The acceptance rate of pharmacists' recommendations on antibiotic usage increased from 57.98% to 91.95%, resulting in a reduction of 180 hospitalization days and cost savings of 1702.5 US dollars. The study team also won the potential award in the evidence-based medicine competition.

Conclusion: The quality improvement plan effectively increased interprofessional participation in the hospital setting. The study highlights the importance of using a systematic approach and involving experts to promote evidence-based medicine and interprofessional collaboration.

Reduced mortality within 3 months of CCRT in head and neck cancer patients

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background
In 2022, the national oral cancer core measurement index showed that the proportion of deaths within 90 days after starting synchronous chemotherapy and radiotherapy for oral cancer patients in our hospital and the whole country

was 2.43% and 7.1%, respectively, which is about three times higher than the national level.

Method

1. Patients received Induction C/T or weekly C/T +R/T X for seven weeks. CCRT patients were arranged to receive treatment in the tumor ward after surgery and were provided with oral care cleaning kits, hygiene education, and monitored for their food intake and weight loss by 1.4%/week.
2. The patient's BT & BW were measured during R/T every week.
3. The nutritionist monitored the patient's BMI <20 before treatment, and when the BW dropped by 1.4%/week during the treatment, they would actively remind the doctor.
4. After 7 weeks of CCRT, when the pharmacist provides medication consultation and the patient returns to the outpatient clinic for follow-up, they need to return to the ENT & Tumor and R/T clinics to track the relief of CCRT chemoradiotherapy's side effects.

Result

1. Patients with head and neck cancer can receive Induction C/T & weekly C/T treatment in the tumor ward or the chemotherapy room of the tumor clinic, and each patient is provided with an oral care cleaning package and health education instructions.
2. The blood test met the treatment standard (WBC 3000 or ANC 500) for patients receiving C/T.
3. The patient's weight is monitored weekly, and if there is no decrease of 1.4%/week, the attending physician is actively notified.
4. If the patient's BMI is <20, and the BW drops by 1.4%/week during the treatment, the nutritionist will take the initiative to contact the physician to suspend the treatment.
5. After completing CCRT treatment, all patients will return to the ENT & Hematoma & Radiation Therapy Clinic to check the relief of CCRT's side effects.

Conclusion

Individual supervisors reported the implementation results in the department every quarter. In the first quarter of 2023/01-0428, there were three CCRT patients with head and neck cancer, and the mortality rate was 0%. The head and neck cancer team and the oncology team reached a consensus to formulate a layered care model for each team where the ENT department is responsible for surgical care, and the oncology department is responsible for patient chemotherapy safety and health education. Other teams also set up routine SOPs. The nutrition team monitors the patient's nutritional supply and loss timings, and actively responds to the attending physician. Nursing & personal management provides patients with oral care cleaning kits and hygiene education. The CCRT survival rate threshold for head and neck cancer in our hospital was redefined to be 2%, consistent with the national standard.

Developing an intelligent antibiotic clinical decision support system with automated dose adjustment to improve medication safety in a medical center

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background:

Antibiotics are critical drugs used to treat bacterial infections. However, their overuse and misuse can lead to the development of antibiotic-resistant bacteria and other adverse effects. Therefore, it is essential to ensure that antibiotics are used appropriately and at the right dose. A clinical decision support system (CDSS) is a computerized tool that can assist healthcare providers in making informed decisions about medication use. The CDSS have been rarely used in antibiotic stewardship and even less integrated in computerized physician order entry systems (CPOE). Utilizing CDSS to improve the quality of antibiotic prescription may be beneficial for the efficacy of the treatment and minimize the risk of adverse events.

Purpose:

The purpose of this study is to describe the development of a CDSS integrated in COPE specific for antibiotic prescribing in a medical center. Also, this study tends to investigate the effectiveness of CDSS with automated dose adjustment capability on subsequent impacts in medication safety for hospitalized patients.

Method:

An intelligent antibiotic CDSS was designed as a rule-based CDSS with a web-based user interface integrated into the existing CPOE. It was implemented in a medical center in January, 2022. Patient-specific data are used to provide real-time dosing recommendations that are tailored to individual patients. The CDSS considers factors such as the type and severity of the infection, antibiotic sensitivity, patient age, weight, gender, renal (creatinine clearance) and liver function (AST/ALT), ideal body weight for obesity, types of hemodialysis and potential drug-drug interactions. Dose adjustment is based on established guidelines and published evidence. By taking these factors into account, the CDSS can recommend the most appropriate antibiotics and dosage for each patient. After determining the prescribed antibiotic dosage, the CDSS can also automatically calculate the infusion rate for an IV drip antibiotic drug based on patient's weight, volume of solution and the length of time for administration suggested by medication label or package insert. The CDSS can also notify prescribers about the appropriate timing for drawing blood sample to determine the trough concentration of Vancomycin. All the above information can be shown on the medication orders of electronic medical record (EMR).

Results
After implementing the CDSS for one year, the near-miss of medication dosage error was significantly reduced from 2.95% to 0.79%. The average number of hospitalized patients whose trough concentration of Vancomycin exceeding the target concentration range (10-20 mg/L) was largely decreased from 31 patients per month to 17 patients per month (-45%). In other words, the dose adjustment function of the CDSS helped the antibiotic concentration to stay within the target therapeutic level and avoid potential toxicity.

Conclusion:
The implementation of an intelligent antibiotic CDSS has the potential to revolutionize the way antibiotics are used by providing dosing recommendations that are tailored to individual patients. By considering patient-specific factors, CDSS can improve the efficacy of antibiotic treatment and minimize the risk of adverse events.

Case series evaluation: Eltrombopag for the treatment of children with immune thrombocytopenic purpura

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background and Objectives :
Immune thrombocytopenic purpura (ITP) is a rare autoimmune disorder, the main goal of treatment is to maintain platelet counts and reduce bleeding symptoms. The oral thrombopoietin receptor agonist eltrombopag is a second-line agent used to treat ITP in children.Currently, there are limited data on its safety and efficacy in pediatric cohorts.In this study, a case-series model was used to analyze the efficacy and safety of Eltrombopag in the treatment of children with immune thrombocytopenic purpura.

Methods:This was a retrospective cohort study including 5 pediatric patients with ITP administered eltrombopag between February 2022 to April 2023.Data regarding eltrombopag first administration including the starting dose and platelet count were collected.The primary outcome was overall response rate,duration of treatment and adverse events.

Results and Discussion:
A total of 5 children with ITP were retrospectively enrolled and eligible for analysis. 2 patients (40%) were males and 3 patients (60%) were females.The median age at the first dose of eltrombopag was 10±3.5 years.All patients required one or more concomitant ITP medications during the first 6 months of treatment with eltrombopag.Eltrombopag started with an initial dose of 25 mg/day and the maximum dose was 50mg/day.The median duration of eltrombopag treatment was 9±1.5 months. The overall response rate was 80%.3 patients (60%)achieved the median time to PLT count ≥50000/μLwas 14 days.20% achieved complete response. The first time to achieve a platelet level above 30000/μL和50000/μLwas7.5 and 12 days, respectively. the overall response rate was 60% at 6 months .The common adverse events included elevated serum bilirubin (20%) and dizziness (20%).

Conclusion :
This study showed that 80% of the patients had a good curative effect after the first dosing cycle , and 20% achieved a complete response. In terms of safety, common adverse reactions were relieved after reducing the dose or symptomatic treatment. Due to the small number of cases received and the short follow-up time, the establishment of efficacy needs to be confirmed by more large-scale studies.

Pharmaceutical services in long-term care facility in Taiwan

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background:
According to United Nations statistics, the population aged 65 and over will account for 16% of the global population by 2050. In 2022, the proportion of people aged 65 and over in Taiwan has reached 17.56%. Previous studies have shown that older people are more likely to experience polypharmacy due to multiple illnesses. Polypharmacy may have negative impacts on health, such as increasing the risk of falls, adverse drug reactions, hospitalization, and even mortality. Residents of long-term care facilities are also more prone to serious injuries due to medication-related problems. Implementing pharmaceutical services by pharmacists in long-term care facilities can improve patient medication safety and reduce inappropriate medication use.

Purpose:
To evaluate the effectiveness of pharmacists' involvement in medication assessment, pharmaceutical care, and problem-solving related to medication therapy for residents in long-term care facilities.

Method:
This study is an observational study that analyzes the results of pharmaceutical care services provided by Taipei City Hospital-affiliated Zhongxing Accommodation Long-Term Care Facility in 2022. This includes an analysis of medication use categories, average number of medications used, and medication counseling results.

Results:
A total of 72 assessments were conducted in 2022, with an average of 14 medications used per resident. Pharmacists provided a total of 118 medication counseling sessions. The most commonly used medication categories were laxatives (111 times, 10%), followed by antihypertensive drugs (91 times, 9%), and antacids (70 times, 7%). The top three medication counseling topics were checking for expired or

deteriorated medication (42 times, 36%), explaining medication side effects (33 times, 28%), and explaining medication contraindications and precautions (25 times, 21%). During the study period, a total of six medication therapy problems were identified, with improper grinding of medication being the most common (three cases, 50%), followed by inappropriate medication dosages (two cases, 33%), and medication interactions (one case, 17%). The acceptance rate after referral to a physician was 100%.

Conclusion:
Pharmaceutical care services provided by pharmacists in long-term care facilities can identify potential medication therapy problems and intervene, thereby reducing the occurrence of medication-related issues.

Mento-pharmacist of the smart hospitla that are safe for patients

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Despite the remarkable development of modern medical care, it is a reality that patients visiting hospitals are still at risk. Johns Hopkins, the world's best medical institution, also tried to solve the problem of patient safety by introducing checklists or involving patients in rounds, but more importantly, it was cultural factors such as lack of communication, failure of teamwork, and authoritative hierarchy that were prevalent in the medical field. do.

Korea's medical institution operation system, which handles a huge amount of medical care, ranked first among OECD countries in terms of medical accessibility, is highly evaluated worldwide. The paradigm is also being actively pursued. In particular, it is essential for large hospitals to apply cutting-edge technology in order to operate many medical departments, activate multidisciplinary medical care, and efficiently utilize medical resources. Voice recognition-based medical records and medical records are being created rapidly, and advanced technologies such as robot delivery of medicines, artificial intelligence (AI)-based digital imaging, and digital pathology reading as well as the use of ICT (information and communication) are being used in various medical fields. is used in In addition, some hospitals have introduced smart hospitals that link all available resources of the hospital to a digital virtual hospital and then apply the current situation of the hospital to operate the necessary resources at the right time in the right place, improving the quality of clinical treatment and medical care, and improving patient experience. are trying to improve Accordingly, this year, the Ministry of Health and Welfare is supporting the creation of a safe medication environment as a smart hospital leading model development support project.

In the pharmaceutical business of medical institutions, 60 to 70% of the dispensing work is using and expanding automated devices, and the work of reviewing the appropriateness of prescriptions is also seeking work changes from various angles through research using artificial intelligence. For this change in work, it is necessary to change the perception of managers in other positions such as hospital executives, nurses, office workers, and health workers, and communication for this must be accompanied. It will be possible to create a safer medication environment in the process of treating patients by replacing repetitive and inefficient tasks with robots or AI instead of humans and focusing on the task of directly caring for patients. Rather than prioritizing surgery or drug prescription, mentoring is needed to help patients find the cause of their disease, abandon their bad habits, and participate in disease treatment on their own initiative to prevent chronic disease development or other diseases. If pharmacists can play a central role in medical mentoring, they will be able to establish themselves as pharmacists respected by the people. Since changes in pharmacists' work should begin with changes in education at the pharmacy college, we need to pay more attention to the education required in the medical field and continue communication with the university and the field.

The role of clinical pharmacists in monitoring medical interventions in an intensive care unit

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Background:
A clinical pharmacist is an essential member of a multidisciplinary team, being directly involved in processes such as monitoring and improving medication therapy.

Purpose:
Our intention was to underline the role of clinical pharmacists in the prevention of clinical significant medication errors in the intensive care unit of an emergency clinical hospital in an European capital.

Method:
For 6 months, clinical pharmacists together with residents of this specialty monitored medical observation forms and communicated the appropriate interventions that have to be made by the medical staff. They proposed various interventions in order to improve medication therapy avoiding therefore clinically significant interactions.

Outcomes:
Following an analysis of the medical observation forms of patients hospitalised in the intensive care unit of Bucharest

Clinical Emergency Hospital, the clinical pharmacist communicated to the members of the multidisciplinary team a significant number of interventions intended to individualise therapy considering patients' particularities.
The total number of pharmacological interventions carried out by the team composed of clinical pharmacists and residents was 675 for 540 critical patients, with a total of 8,694 medical prescriptions. The clinical pharmacist was involved in monitoring the therapy 18.51% (n=125), the plasmatic concentration for various medicines 4.5% (n=30), the renal 22.3% (n=150) and hepatic 2.5% (n=17) functions and the cardiac indices 6% (n=41). Furthermore, the clinical pharmacist proposed to improve doses 12% (n=81), to review the therapy in order to replace or discontinue the treatment 22% (n=148) if needed.
Plasmatic concentrations were monitored for medicines with a low therapeutic index, such as amikacin, vancomycin, aminophylline, amiodarone, colistin and digoxin, so as to avoid overdosing or underdosing.
Monitoring creatinine and serum potassium is necessary for evaluating the renal function. For old patients, patients with renal disorders or in cases of dehydration, these markers of the renal function may undergo alterations. Therefore, there are numerous medicines that can affect the renal function and, moreover, some medicinal interactions have been identified as potentially worsening the imbalances linked to these biomarkers.
The hepatic function may be altered by a series of medicinal substances and their metabolites (for example: hypocholesterolaemic drugs – statins), which upholds the importance of monitoring the hepatic function.
Following the monitoring of cardiac indices such as EKG, blood pressure and cardiac frequency, medication errors were identified, which required the improvement of doses for amiodarone, amlodipine and phenytoin. Moreover, after the identification of some major interactions, the clinical pharmacist proposed to immediately discontinue the treatment.

Conclusion:
The importance of clinical pharmacists is upheld by the high number of pharmacological interventions over a 6-month period. The expertise of clinical pharmacists in various branches of pharmacology, such as pharmacokinetics, pharmacodynamics and pharmaceutical toxicology, support their essential role within a multidisciplinary team. Moreover, direct cooperation between the pharmacist and the other members of a multidisciplinary team is necessary for improving the patient's quality of life and also for avoiding prolonged hospitalisation in an intensive care unit.

Impact of the Covid-19 pandemic on antibiotic prescriptions in a primary care center

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background:
During the 2020 pandemic, the WHO expressed concerns that the healthcare system's impact would lead to an increase in the emergence of antibiotic resistance. Published data showed that antibiotic use increased by 40% in hospitals but decreased by 40% in primary care centers during the pandemic waves. However, it is uncertain whether the trend of reduced antibiotic prescription in primary care centers continued beyond 2020.

Purpose:
To study the evolution of antibiotic prescriptions in a primary care center in Barcelona from 2019 to 2022 and analyze the impact of the pandemic on antibiotic prescription patterns.

Method:
A retrospective study was conducted on patients who were prescribed antibiotics between January 2019 and September 2022 at the primary care center CIS Cotxeres (Barcelona, Spain). The information was collected from the prescription program, including variables such as sex, age, dosage, treatment length, and the ATC code. The study included all prescriptions made in the ATC J01 group, which corresponds to systemic antibiotics. It did not include prescriptions made in the hospital setting or non-systemic antibiotics. Data was analyzed using Microsoft Excel.

Results:
The study included 41,738 patients who received 56,965 antibiotic prescriptions between January 2019 and September 2022. It was observed that from 2019 to 2020, there was an 11.6% decrease in prescriptions (interannual variation). Although prescriptions increased in 2021 and 2022, they have not yet recovered to the levels of 2019. The prescription of reduced-spectrum antibiotics in the primary care centers also decreased by 11.6% from 2019 to 2020. This group includes broad-spectrum penicillins, penicillins sensitive to beta-lactamases, beta-lactamase-resistant penicillins, and fosfomycin. Although the prescription of these antibiotics increased in 2021 and 2022, it has not yet reached the levels of 2019. In 2019, 76.9% of patients received only one course of antibiotic treatment, 15.5% received two courses, and 7.6% received three or more courses. These percentages remained similar in 2020, 2021, and 2022.

Conclusion:
The pandemic led to an abrupt reduction in antibiotic prescriptions in primary care centers worldwide. As the pandemic situation improved, the adoption of these measures was removed, resulting in a gradual increase in antibiotic prescription levels. At the onset of the pandemic, broad-spectrum antibiotics such as third-generation cephalosporins or fluoroquinolones were preferred over reduced-spectrum antibiotics such as amoxicillin. Antimicrobial stewardship guides and antimicrobial resistance awareness and the difficulty of making progress towards the achievement of many Sustainable Development Goals may have had a positive effect in the reduction of antibiotic use during these years, despite the pandemic. Further studies are needed to evaluate the long-term effects of the pandemic.

Pharmacists' role in hazardous drugs management around the world

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Background:
Hazardous drugs (HDs) are classified as drugs that possess one of the following characteristics: carcinogenicity, teratogenicity, reproductive toxicity, organ or other toxicity at low doses, genotoxicity, and any new drugs with structures and toxicity profiles similar to drugs already determined hazardous by the criteria above. The management of hazardous drugs can have an important role to play in the development of actions for the implementation of Sustainable Development Goals.

Purpose:
To assess the current worldwide situation of the management of HDs from the hospital pharmacy perspective.

Method:
A web-based survey was conducted from January 15th to February 24th, 2023, including 33 questions on different topics related to HDs. Recruitment was performed via email, sent through the network of the International Pharmaceutical Federation of Hospital Pharmacy Section. The survey was available in English and also in translated versions in Portuguese, Spanish, French, simplified Chinese, Arabic, and Russian.

Results:
The survey received 54 replies, of which 53 were completed. With 654 emails sent, the response rate of the survey was 8.3%. 80% of the respondents had a list regarding HDs, with 43% affirming that it was done internally and 32% stating that it was done by an external agency or institution. 28% used an international agency/entity (i.e., United States NIOSH Hazardous Drug List) and 25% used a national agency/entity. Regarding the existence of prior knowledge about HDs and how to handle them, 42% affirmed that there was none, and most of it is taught through specialized health and safety courses or postgraduate training, and 21% said they only had awareness of what Hazardous drugs and Human Medicinal Products are.
The survey showed that the areas where HDs were mostly identified were storage (79%), preparation (75%), clinical/non-clinical waste management (74%), administration (70%), and transportation (68%). A written protocol for handling HDs or HMPs drugs was present in 74% of the institutions of the respondents, with 34% of them having protocols for all stages and 34% having only some of those stages. For the preparation of parental HDs, the most used systems were needles and syringes (32%) and Air-cleaning Closed System-Drug Transfer Device (CSTD vented) (24%), with spikes only used by 8% of the respondents. Regarding the monetization of surface contamination by HDs or HMPs in the work areas, 38% of the respondents did not perform it at their institutions, 25% executed it because it is mandatory, and 25% did it even though it is not mandatory. According to the survey, within the hospital, the department responsible for the HD surface contamination monitoring was mostly the pharmacy department (40%).

Conclusion:
The survey showed some disparity in how each country and institution deals with HD management and in how they prevent any type of contamination. Hospital pharmacists are playing a relevant role in the implementation of HD management measures in almost all countries. However, there is a need for global guidelines development on the management of HDs as a strategy for implementation of the 2030 Agenda Sustainable Development Goals.

Drug shortages during the Covid-19 pandemic in Colombia

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Background
The sudden increase in hospital activity and its consequences on the increase in the drug consumption led to drug shortages around the world during the Covid-19 pandemic.

Objective
To analyze the reports of drug shortages between January 2020 and May 2022 issued by the national health control entity in Colombia.

Materials and methods:
A descriptive analysis was performed on the databases of drug shortages of the National Institute for Drug and Food Surveillance of Colombia. Study variables were ATC classification, drug, year of report, the type of registration and cause of declared shortage.

Results
The main cause of shortages was increased demand (50%) followed by product discontinuation, insufficient suppliers, problems with the acquisition of raw materials and manufacturing problems. The 7 therapeutic groups with the highest number of related drugs shortages were N05-psycholeptic, N01-anesthetics, B01-antithrombotic agents, B05-blood substitutes and perfusion solutions, M03-muscle relaxants, C01-cardiac therapy drugs and V03-all other therapeutic products, which accounts for medicinal gases. The pharmaceutical forms of unavailable essential drugs with the highest stock-outs were injectable solutions: 2020 at 45% and 2021 at 77% of all reported shortages.

Conclusion
Contributing factors to the shortage of medicines during the Covid-19 pandemic in Colombia were increased demand, dependence on imports of both medicines and raw materials, and lack of suppliers. The unprecedented pandemic situation in Colombia makes it possible to identify the logistical shortcomings related to the entire supply chain cycle, as well as the importance of strengthening the national industry, in order to propose medium and long-term solutions to improve access to essential medicines for the entire population.

Pharmacological thromboprophylaxis in patients with total knee and hip replacement: A retrospective cohort study in 2700 patients

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Background: Venous thromboembolism (VTE), which includes deep vein thrombosis (DVT) and pulmonary embolism (PE), is a major complication for patients undergoing total knee replacement (TKR) or total hip replacement (THR).

Purpose: The objective of this study was to assess prescription patterns and compare the effectiveness of pharmacological thromboprophylaxis in major orthopedic surgery.

Methods: Patients who underwent TKR or THR surgery between January 2017 and December 2021 were enrolled in the study, excluding revision cases. Demographic data, comorbidities, clinical characteristics, and symptomatic venous thromboembolism (VTE) events within one year following the surgery were extracted from in-patient medical records.

Results: A total of 2,700 patients who underwent TKR (n=2,093, 77.5%) and THR (n=607, 22.5%) were included in the analysis. Of the total number of patients, 812 (30.1%) received pharmacological thromboprophylaxis. The proportion of patients receiving pharmacological thromboprophylaxis increased from 18.4% in 2017 to 61.1% in 2021. Aspirin was the most commonly prescribed agent (53.9%), followed by rivaroxaban (43.8%). The pharmacological thromboprophylaxis group showed a significantly higher proportion of patients who were age ≥65 years, female, underwent TKR, operation time >120 minutes, American Society of Anesthesiologists (ASA) classification ≥3, perioperative use of tranexamic acid, use of tourniquet, wearing of graduated compression stockings, and enrolled in the disease-specific care program compared to the non-pharmacological thromboprophylaxis group. However, the pharmacological thromboprophylaxis group also had higher body mass index (BMI) and D-dimer levels. The incidence of overall symptomatic VTEs during the one-year follow-up after surgery was 0.30% (8/2700), with six cases of PE and two cases of DVT diagnosed. There was no significant difference in the incidence of symptomatic VTEs between the pharmacological thromboprophylaxis group and the non-pharmacological thromboprophylaxis group (0.3% versus 0.4%; p=0.704). Moreover, patients who developed symptomatic VTEs had a significantly higher median BMI (32.4 versus 27.1 kg/m2; p=0.023) and a higher rate of receiving spinal anesthesia (75.0% versus 32.6%; p=0.018) compared to those without symptomatic VTEs.

Conclusion: Our analysis suggests that there is no significant difference in the incidence of symptomatic VTE between the pharmacological thromboprophylaxis group and the non-pharmacological thromboprophylaxis group following TKR and THR. However, we identified a higher number of confounding factors in the pharmacological thromboprophylaxis group, which could potentially affect the efficacy of symptomatic VTE prevention.

Effectively managing adverse outcomes: Implementing an intelligent alert system to prevent ADR and contrast-induced renal failure in contrast patients

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Objective
Contrast-induced nephropathy (CIN) is a major cause of acute renal failure among hospitalized patients. The prevalence of renal dysfunction ranges from 0.6% to 2.3% globally, reaching up to 20% in high-risk populations. As a result, prompt monitoring is crucial for mitigating adverse drug reactions (ADRs) following contrast administration. This study aimed to evaluate the effectiveness of an advanced alert system integrated into a computerized physician order entry (CPOE) platform for ADR assessment in patients receiving contrast agents, its impact on patient safety, clinical workflow, and potential areas for improvement.

Methods
A prospective observational study was conducted from October 2020 to December 2022. A comprehensive alert window was implemented in the CPOE system, prompting clinicians to assess ADRs one hour and 72 hours post-contrast agent administration. The system included an allergy assessment reference guide to aid physicians in identifying potential ADRs efficiently. Data were analyzed utilizing Excel 2016 and Power BI Desktop for statistical and visualization purposes. The study also considered clinician feedback to understand the system's usability and efficacy.

Results
A total of 7,385 patients were monitored, averaging 356 per month. The top three contrast agents administered were Iopamidol 755.3 mg/ml (36.8%), Omnipaque 350mgI/ml (30.9%), and Ioversol 370 100ml/vial (Iopromide) (9.6%). Monitoring results revealed that 73.2% experienced no allergic reactions, 25.8% ignored the alert, and 1.0% exhibited allergic reactions. The allergy assessment reference guide usage rate was 1.9%. Pharmacists reported seven non-serious ADRs for further evaluation, emphasizing the alert system's role in timely intervention. Clinician feedback indicated that the alert system was user-friendly and contributed positively to their workflow.

Discussion
The study results suggest that implementing an advanced alert system integrated into a CPOE platform can significantly improve patient safety by promoting timely assessment of ADRs. The high acceptance rates of the alert system by physicians indicate that such systems can be a valuable tool for mitigating adverse outcomes in clinical practice.
The study also revealed opportunities for improvement, particularly in enhancing the accuracy and specificity of allergy reaction alerts. Improving the system's capabilities to encompass a broader range of medications and patient populations can further improve patient safety.

Conclusion
The innovative CPOE-based alert system demonstrated exceptional management of ADRs in patients receiving contrast agents, achieving 100% patient safety and high physician alert acceptance rates. This automated alert system effectively reminded clinicians to assess ADRs, optimizing time management, and minimizing the risk of overlooked evaluations. Future interventions could focus on enhancing the accuracy and specificity of allergy reaction alerts, expanding the system's capabilities to encompass a broader range of medications and patient populations, and integrating machine learning algorithms to improve alert personalization and relevance. Additionally, continued evaluation of clinician feedback will ensure that the system remains aligned with clinical practice and effectively addresses emerging challenges in patient safety.

Effectiveness of tabletop game teaching model in teaching drug safety concepts in communities and schools

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Background
Tabletop game games are social activities that can be enjoyed by all ages. It can be used in teaching to improve learning motivation and achieve effective learning. It has always been a popular teaching mode. This project is to use the tabletop game model to design simple learning materials and analyze learning effects.

Method
This project will apply the concept of drawing ghost card tabletop game games to confusing patent medicines, indication medicines and prescription medicines, and make a total of 40 playing cards with medicine icons. Game rules: (Step 1) the lecturer first explains the key points of drug grading and the drug grading of each playing card. (Step 2) divide into groups, every 4 people form a group, and randomly distribute playing cards to participants, about 8-10 cards per person. (Step 3) the trainees check the poker cards, make a pair of poker cards with the same drug grade, and let the participants explain their drug grade. (Step 4) take the remaining poker cards in their hands, and each person draws poker cards from each other in a clockwise order. If they are the same If you use the drug grade, repeat the action of step 3, and the person who only has the joker

in the hand at the end is the loser. The assessment of learning effectiveness is the participants' self-assessment of learning effectiveness and their satisfaction with the teaching of the board game mode. The assessment is based on (Likers scale).

Result
The participants were about 400 people from 8 communities and 60 people from 2 elementary school classes. After learning and training, questionnaire evaluation was conducted: 95% of the participants were self-evaluated learning satisfaction (The average assessment score is 4.85). 92% of the participants self-evaluated the learning effect after learning as very satisfied(The average assessment score is 4.78), 100% of the board game learning mode can improve the learning effect and are very satisfied (satisfaction 5.00).

Conclusion
Tabletop game teaching materials can make the interaction between teachers and students closer, and students can achieve better learning effects through game learning, which can increase the interactive learning mode.

Impact of video-assisted pharmacist-led first chemotherapy education in cancer patients

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background
Chemotherapy is commonly used to treat cancer, but it causes side effects in over 80% of patients, which can decrease their medication adherence. Pharmacist-led education has been shown to improve medication adherence and patient self-efficacy. Various materials, such as print media and videos, are used in pharmacist-led education. Informational videos can assist pharmacists in educating patients about indications, potential adverse effects, and daily care reminders. With limited pharmacy resources, the impact of informational videos on education is increasingly crucial. However, the impact of the videos on the efficiency of pharmacist-led education for patients receiving first chemotherapy remains unknown.

Purpose
To evaluate the impact of video-assisted pharmacist-led education on patients receiving chemotherapy for the first time, including time required, patient comprehension, and patient satisfaction.

Methods
The study involved cancer patients admitted to the study hospital for first chemotherapy. These patients were divided into two groups (video-assisted or traditional standardized face-to-face education). The education process consisted of two parts. Patients would be provided with educational leaflets and receive a video or face-to-face education. The video produced by the pharmacy team was provided on a tablet device, demonstrating indication, potential adverse events and reminders of daily care. Pharmacists were available in both groups if patients had any additional questions (Q&A). After the education, patients were asked to complete a 4-question questionnaire (0-100 points) and a satisfaction survey (7-42 points). Time spent on education, patient comprehension, and satisfaction scores were collected and compared between the two groups. The analysis used the Student's t-test to compare variables and was performed using Microsoft Excel 2019.

Results
A total of 32 patients were recruited, with 16 (50%) patients in each group. Patients who received video-assisted education had a significantly shorter education process time, with pharmacists spending less time overall (mean±SD: 2.9±4.3 mins vs. 10.3±6.4 mins, $p<0.001$) and a trend towards less time spent on Q&A (mean±SD: 2.9±4.3 mins vs. 4.2±4.3 mins, $p=0.431$) compared to face-to-face education. There were no significant differences between the two groups in terms of patient comprehension scores (mean±SD: 98.4±39.1 points vs. 90.6±33.1points, $p=0.245$) and patient satisfaction scores (mean±SD: 39.9±10.0 points vs. 37.1±13.5 points, $p=0.3$).

Conclusion
The results suggest that video-assisted education can be an efficient approach for cancer patients receiving first chemotherapy, with less time spent on education, similar levels of patient comprehension and satisfaction compared to traditional face-to-face education.

Effect of pharmacist-led interventions on control of blood sugar for poorly controlled type 2 DM patients taking multiple hypoglycemic medications

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background:
Type 2 diabetes mellitus (T2DM) is a common chronic condition worldwide, and poorly controlled blood glucose levels over a long term can lead to organ damage, particularly to eyes, kidneys, cardiovascular and peripheral nervous system. This study aims to investigate the effect of pharmacist-led interventions on poorly controlled T2DM patients who are taking multiple hypoglycemic medications.

Method:
This cross-sectional study was conducted between August 2020 and October 2022 in a single hospital pharmacy. Participants were required to meet the following inclusion criteria: (1) T2DM adults (≧ 20 years-old), (2) treated with three or more hypoglycemic agents in the past three months, and (3) glycated hemoglobin (HbA1C) levels of >7% for those aged under 75, or >7.5% for those aged 75 and over in the past month. Pharmacist-led interventions were conducted as an individual interview for each participant referred by the physician cooperating in this study. Data were collected from a survey and medical records, and the variation between HbA1C levels in the initial, third, and sixth month was compared to investigate the efficacy of the pharmacist's intervention.

Result:
A total of 50 participants were included, one participant was excluded due to a change in treatment that did not meet the original inclusion criteria, and one participant was lost to follow-up, leaving a final analysis of 48 participants. The average age of the participants was 61.2 years-old, with 29 males (61.2%). Although most participants (93.6%) had received relevant educational programs before, 11 participants (22.9%) believed that their blood sugar was well-controlled.
The initial average HbA1C was 8.7, and after the pharmacist-led educational intervention, follow-up data analysis showed that the average HbA1C levels of participants in the third and sixth months were 8.2 and 8.0, respectively. The results showed that the average HbA1C significantly decreased after the pharmacist-led intervention ($P<0.05$). Approximately 25% of participants achieved the treatment goal in the third month, and 35% in the sixth month. No significant personal characteristics were found to be associated with poor glycemic control in this study.

Discussion and Conclusion:
Previous evidence was suggested that health literacy plays a significant role in diabetes knowledge and treatment outcomes. However, no studies have focused on poorly controlled T2DM patients with multiple treatments. Our study results indicate that pharmacist-led interventions are effective in improving treatment outcomes, with about one-third of patients achieving good control of HbA1C levels. Although the limited population size and potential bias prevented us from obtaining other findings on special risk factors that influence patients' behaviors, it is still believed that pharmacists can provide more adequate knowledge and advice to enhance patients' health literacy and medicine adherence. How to provide more support for these populations to complement treatment, as well as reduce the risk of complications and unnecessary medical expenditures, will be significant issues in the future.

UVA-induced cytotoxicity of new quinolones to T-cell lymphoma

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background:
New quinolone antibiotics (NQLs) are well known to have adverse effects but are activated by UVA and exhibit cytotoxicity to leukemia cell lines (1). Thus, local UVA irradiation after NQLs treatments would lead to damage cancer cells without systemic side effects.

Purpose:
The aim of this study is to verify the possibility of drug repositioning of NQLs to anticancer drugs.

Methods:
We measured singlet oxygen ($^1O_2$) production by the combined use of NQL and UVA in the in vitro study using reduction in the absorbance of N,N-dimethyl-4-nitrosoaniline. Furthermore, using the HUT78 cells, derived from Sezary syndrome, we compared the proliferation rates up to 48 h after treatment with no treatment, NQL alone, UVA alone, and NQL and UVA treatment.

Results:
Combining NQLs with UVA results in significant production of $^1O_2$, which was known to be cytotoxic. This $^1O_2$ production tended to be dependent on the concentration of each NQL. No $^1O_2$ production was observed in no-treatment, NQLs alone, and UVA alone treatment. UVA single treatment and NQLs single treatment inhibited proliferation by about 20% compared to untreated cells. On the other hand, the NQLs and UVA combination treatment was found to inhibit growth by about 80%. The effects $^1O_2$ production and the inhibition rate were different.

Conclusion:
The cell damage by NQLs was significantly enhanced by UVA irradiation, which may suggest reactive oxygen species plays a primary role in photodynamically induced cytotoxicity.
Acknowledgement:
This work has been supported by Grant-in-Aid for Scientific Research (C), Grant Number JP 22K07288.

Sterile compounding: Determining beyond-use dates

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background: Revisions to USP General Chapter <797> Pharmaceutical Compounding – Sterile Preparations will

become official on November 1, 2023. The way of determining beyond-use dates (BUDs) has changed from the currently official chapter which was last revised in 2008. The revised chapter takes into account the environment in which compounding occurs, how the compounded sterile preparation (CSP) is stored, and whether stability and sterility testing is performed when assigning BUDs for CSPs.

Purpose: The purpose is to identify requirements for assigning beyond-use dates in the revised USP General Chapter <797> Pharmaceutical Compounding – Sterile Preparations

Methods: Risk levels in the currently official USP <797> are being replaced with Categories of Compounding in the revised chapter. Three categories of compounding are primarily assigned based on the environment in which compounding occurs. Category 1 compounding may be performed in a segregated compounding area (SCA) and has the shortest BUD limits. Category 2 and 3 compounding must be performed in a cleanroom suite. Category 3 has additional requirements pertaining to personnel, cleaning and disinfection, and environmental monitoring but has the longest BUD limits. Other considerations when assigning BUDs include whether stability and sterility testing is performed and how the CSP is stored.

Results The complexity of the USP <797> revision with regard to assigning BUDs to compounded sterile preparations supports the use of a decision tree to help determine specific requirements for each category of compounding.

Conclusion: Assigning BUDs requires the compounder to consider both the stability of compounded sterile preparations and the sterility assurance of the compounding process based on the compounding environment, personnel, and compounding procedures. The revision of USP <797> describes the requirements necessary to meet these criteria when assigning BUDs to compounded sterile preparations.

Uncovering distributions of candidate vaccine targets and resistance features of invasive group B streptococcus using whole genome sequencing: A multicenter, population-based surveillance study

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background. Group B Streptococcus (GBS) is a leading cause of morbidity and mortality in young infants worldwide. This study aimed to investigate distributions of candidate vaccine targets, virulence factors, antimicrobial resistance determinants.

Methods. We used whole genome sequencing to characterize the invasive GBS isolates among infants <3 months of age obtained from a multi-center population-based study conducted from 2015–2021 in China.

Results. Overall, seven serotypes were detected from 278 GBS isolates and four of these serotypes (Ia, Ib, III, V) accounted for 97.8%. We detected 29 sequence types that were grouped into six clonal complexes (CCs), the emergence of CC651 was a novel finding. A total of 98.9% (275/278) of isolates harbored at least one alpha-like protein gene. All GBS isolates contained at least one of three pilus backbone determinants, the most prevalent pilus type was PI-2b (41.0%). The 111 serotype III/CC17 GBS isolates were all positive for hvgA. Most of the isolates (75.2%) were positive for serine-rich repeat glycoprotein determinants (srr1 or srr2). Almost all isolates possessed cfb, c1IE, lmb or pavA gene. Seventy-seven percent of isolates had more than 3 antimicrobial resistance genes. Almost all the isolates carried the macrolide non-susceptibility gene mreA (277/278), while 72.7% (202), 28.1% (78) and 28.1% (78) had the ermB, mefA and msrD, respectively. Tetracycline non-susceptibility genes tetO and tetM were prevalent in 55.4% (154/278) isolates and 42.8% (119/278), while 4 resistance genes (ant(6)-Ia, aph(3')-III, aph(2'')-Ia and aac(6')-aph(2'')) associated with aminoglycoside non-susceptibility were found in over 50% of isolates and majorly in CC17 or CC10 clones.

Conclusions. The findings from this largest whole genome sequence sample of GBS isolates establish important baseline data required for further surveillance and evaluating impact of future vaccine candidates.

Efficacy and safety evaluation of albumin-bound paclitaxel chemotherapy in East Asian patients with gynecological tumors based on the degree of paclitaxel binding to patient plasma

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Nab-PTX is a special dosage form of antitumor drug that is different from other injections. In order to explore the efficacy and safety of albumin-bound paclitaxel, we developed an analytical method with UPLC-MS/MS to quantify the total and free paclitaxel in plasma, and prospectively evaluate the impact of unbound fraction fu (%) on the prognosis and adverse reactions of patients with gynecological tumors. From 2020.10 to 2021.10, a total of 116 patients with gynecological tumors were included, application of albumin-bound paclitaxel

combined with platinum chemotherapy drugs, the blood collection time is 18–30h after nab-PTX intravenous infusion. The collection time and the start (end) time of intravenous drip are recorded correctly, and a high precision and sensitive UPLC-MS/MS method for the simultaneous

determination of total and free paclitaxel was established. With fu(%)=Cunbound/Ctotal as the evaluation index, the concentration of total paclitaxel and free paclitaxel were determined by UPLC-MS/MS. The value of fu (%) was closely related to clinical adverse reactions, neutropenia, thrombocytopenia, leukopenia and bone marrow suppression. Neurotoxicity was statistically remarkable ($P < 0.001$), and fu(%) has a significant correlation with clinical efficacy ($P < 0.001$). We have developed a highly precise, highly sensitive and specific UPLC-MS/MS method for the simultaneous determination of binding and free albumin-bound paclitaxel concentrations in patients' serum. In addition, we found that fu(%) could be used as the detection index. The higher the fu(%) was, the more taxol could be free, the more adverse reactions related to toxic events occurred in patients.

Universal health coverage in Egypt: The hospital pharmacy success stories

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Universal health coverage (UHC) refers to a system in which all individuals and communities have access to quality healthcare services without experiencing financial hardship. In Egypt, the government has taken steps to achieve UHC through a series of reforms aimed at improving the health system's efficiency and effectiveness.
The government has built new health facilities and trained community health workers to provide preventive and curative services.
Overall, the Egyptian government's efforts to achieve UHC are an important step towards ensuring that all citizens have access to quality healthcare services.

The presentation will discuss the role of the pharmacist to ensure quality of healthcare provided.
The presentation will discuss the reform in medication management system done and how the medication management is integrated with clinical governance and green pharmacy .

The presentation will share the success stories of achieving rational use of medication,antimicrobial stewardship program,Medication Reconciliation,Medication appropriateness Index and medication use evaluation programs.

The presentation will discuss the challenges and the Egyptian approaches to provide a stat of art hospital pharmacy care.

Finally the presentation will discuss how pharmacists in low and middle income countries can contribute to access to care and un8versl health coverage success.

HPS-155

Implementation and standardisation of unit dose dispensing system in Egypt healthcare authority hospitals

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Egypt Healthcare Authority is the authority responsible for the provision and organisation of healthcare services under Universal Helath coverage

We will present and discuss how we implemented and standardised the system of a unit-dose system at all 21 hospitals of Egypt Healthcare authority in 4 different governorates .

We will discuss how we planned a successful operation of a unit-dose drug distribution system.

A complete description of the system woll be presented.
In addition we will report data involving impact and outcomes of the system including the return on investment.
We will also discuss future projects to improve the system.

Do ink components show toxic effects? - photoinitiators induce breast tumor growth in mouse xenografts with MCF-7 breast cancer cells-

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background: Photoinitiators are utilized in the production of a wide range of commonly used products, including materials in the medical field. We previously detected photoinitiators, including 1-hydroxycyclohexyl phenyl ketone (1-HCHPK), methyl 2-benzoylbenzoate (MBB), and 2-methyl-4'-(methylthio)-2-morpholinopropiophenone (MTMP), in marketed injection solutions. Subsequently, we demonstrated that 1-HCHPK, MBB, and MTMP exhibited endocrine-disrupting activities and interacted with the estrogen receptor (ER) as agonists in the MCF-7 breast cancer cell line.

Purpose: The present study examined the estrogenic activities of 1-HCHPK, MBB, and MTMP using a mouse xenograft model with MCF-7 breast cancer cells.

Methods: The mouse xenograft model was established according to a previously described method. MCF-7 breast cancer cells were suspended in PBS and mixed with Matrigel Matrix at a ratio of 1:1 in 200 µl. Suspended cells were subcutaneously injected into 6-week-old female BALB/c-nu mice. When the estimated tumor volume was 100-300 m^3, mice were randomly separated into five mice/treatment

group and administered a photoinitiator (5–50 mg/kg), Tamoxifen (Tam) (0.5–50 mg/kg), or a combination of Tam (0.5–50 mg/kg) + the photoinitiator (50 mg/kg) via a subcutaneous injection once a day for 2 weeks. Tam (0.5–50 mg/kg) was administered 30 min before the challenge with each photoinitiator (50 mg/kg). Estimated tumor volumes were measured each week using a scale and Vernier caliper, respectively. The estimated tumor volume was calculated using the formula V = (W (2) × L) /2, where V is the volume of the tumor, W is the width of the tumor, and L is the length of the tumor. The observation period was 91 days after the start of drug administration. Experiments were performed in accordance with the Guidelines of the Ethics Review Committee for Animal Experimentation of Okayama University Medical School.

Results: The 1-HCHPK treatment markedly increased tumor volumes. No significant differences were observed between the 5 mg/kg group and control group. However, the 25 mg/kg group showed significant increases in tumor volumes. In the 50 mg/kg group, significant time-dependent increases were observed in tumor volumes. MBB-treated tumors grew in a time-dependent manner and significantly increased in the 50 mg/kg group. On the other hand, no significant differences were noted between the 5 and 25 mg/kg groups and the control group. The MTMP treatment also markedly increased tumor volumes. No significant differences were observed between the 5 mg/kg group and control group. Gradual increases in tumor volumes were noted in the 25 and 50 mg/kg groups. In 1-HCHPK, MBB or MTMP-treated mice, the pretreatment with the ER antagonist Tam reversed each photoinitiator-induced increases in tumor volumes.

Conclusion: We confirmed the estrogenic activities of photoinitiators in vivo. 1-HCHPK, MBB, and MTMP promoted tumor growth in a mouse xenograft model. In addition, a pretreatment with Tam blocked the increases induced in tumor volumes by each photoinitiator after tumor formation. In conclusion, we suggested that three photoinitiators containing injection solution showed ER agonist in vivo. In addition, we suggested that as a factor of breast tumor growth, the photoinitiators at least interfered with binding of ER in vivo.

Evaluation of the effectiveness of optimizing the computerized physician order entry to improve physician's prescription instructions and inappropriate usage

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background
Medication errors as a result of prescribing deficiencies are the leading cause of adverse drug events and most commonly occur in the prescribing stage. An incomplete prescription may result in either a delay in the initiation of treatment and interruption of healthcare professionals or a medication error because of the misunderstanding of the intended drug, dosage, or route or frequency of administration. Any incorrect prescribing or incomplete information given by the physician can cause suffering to patients and expenses to both patients and the community. Prescribing errors are the most common type of avoidable medication errors so it is considered an important target for the improvement. Therefore, recognizing the possible causes of such errors is the first step in preventing them.

Purpose
According to the data analysis of China Medical University Hospital Patient Safety Database (CMUH PSD) in 2020, the total number of medication order of physician prescription instructions and inappropriate usage was as high as 488, ranking first in the error ratio of physician prescriptions (23.3%, 488/2,097). Therefore, this improvement project intends to optimize the computerized physician order entry (CPOE) system to build common drug usage phrases, and use Plan-Do-Check-Act (PDCA) method to improve the project, in order to effectively improve the number of discrepancies between physician prescription instructions and usage.

Methods
We conducted a before-and-after in a 2,202-bed care academic medical center that was implementing the Optimized CPOE system to improve physician's prescription instructions and inappropriate usage. We assessed the rate of medication error in prescribing before and after implementation of the Optimized CPOE system, including all inpatient prescriptions from 1 January 2020 to 31 December 2022. From January 2021, the PDCA method was used to improve inappropriate physician prescription instructions and usage.

Results
The error rate of medication orders in prescribing was significantly reduced about 69.1% from 0.0013% (2,097/18,551,036) in 2020 to 0.0042% (853/20,190,907) in

2022 after implementing Optimized CPOE system in hospital from January 1 2020 throughout to December 31 2022. The number of medication orders in prescribing error was significantly reduced about 59.3% from 2,097 in 2020 to 853 in 2022. Physician prescribing instructions and inappropriate usage error percentage was decreased from 23.2% (488/2,097) in 2020 to 8.3% (75/906) in 2021 and 9.5% (81/853) in 2022. In 2022, due to the launch of the new version of the doctor's order system, doctors are not familiar with the interface of prescribing medicines, resulting in an increase in error rates, and the results will continue to be tracked.

Conclusion
The advantage of this PDCA improvement project is to reduce the time required for physicians to manually remark drug usage, and when physicians prescribe PRN drug orders, the system automatically provides commonly used phrases for selection. However, the disadvantage of this project is that it is still impossible to set common phrases according to medical disciplines, and it still takes time to find common phrases. Overall, our results suggest that the Optimized CPOE system can deserves strong consideration as a tool to improve patient safety.

Impact of tapentadol compared to oxycodone on clinical outcomes among surgical inpatients: A propensity score matched cohort study

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background
Opioid analgesics are routinely used for the management of moderate to severe acute pain after surgery. Oxycodone is one of the most commonly prescribed opioids for postoperative pain. However, there has been a marked increase in the use of tapentadol over the previous decade due to a perceived superior safety profile of tapentadol compared to oxycodone. There is limited real-world evidence on the safety of tapentadol compared to oxycodone after surgery.

Purpose
The primary objective of this study was to examine the impact of tapentadol compared to oxycodone use on the incidence of in-hospital opioid-related adverse drug events after surgery. Secondary outcomes included length of hospital stay and 28-day readmission rate.

Method
This was a multicentre retrospective propensity score matched cohort study. Data for adult surgical patients receiving tapentadol or oxycodone during hospitalisation between 1 January 2018 and 31 December 2021 were collected from electronic medical records of three tertiary metropolitan hospitals in Australia. The primary outcome was the incidence of opioid-related adverse events. Patients who received tapentadol were matched to those receiving oxycodone (1:2) using nearest-neighbour propensity score matching with patient demographics, surgical procedures, and comorbidity characteristics as covariates.

Results
In the matched cohorts, patients given tapentadol experienced a similar incidence of opioid-related events overall (14.4%, 220/1530 vs. 12.6%, 349/2775; p = 0.100; 95% CI -0.35% to 3.95%), but an increased risk of delirium (2.7%, 41/1,530 vs. 1.3%, 37/2,775; p = 0.003), cardiac arrhythmias (3.4%, 52/1,530 vs. 2.2%, 62/2,775; p = 0.029), and length of hospital stay (5 [range1-201] vs. 4 [range 1-226] days; p<0.001) compared to those receiving oxycodone.

Conclusion
Tapentadol use is associated with similar incidence of opioid-related adverse drug events overall, but is associated with an increased risk of delirium, cardiac arrhythmias and a longer length of hospital stay relative to patients given oxycodone. Further real-world studies are warranted to validate these findings and determine the impact of tapentadol use on a broad range of patient outcomes in clinical practice settings.

Integrating information technology and pharmacy: Precisely and effectively recruiting hospital pharmacists–Pioneer experience in Taiwan

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background
Taiwan will enter the post-covid era in 2023. During the epidemic, patients were reluctant to enter hospitals and turn to pharmacies, which indirectly made it difficult for hospitals to recruit pharmacists. For a regional hospital with

1,000 beds, it is necessary to quickly address emerging challenges, such as delivery of covid-19 patients' medicines to the home, and outpatient administration of methadone treatment. Multiple factors make the recruitment of pharmacists and medical workers more difficult. Taiwan will promote the specialization of pharmacists to encourage government health insurance to pay for pharmaceutical care. If pharmacists cannot be recruited promptly, such a transformation will be difficult to achieve. Therefore, it is necessary to change the traditional method of manually recruit-ing grassroots pharmacists into an information warfare approach to recruit high-end pharmacists more quickly and effectively.

Method

Recruit a pharmacist with programming expertise, write the recruitment website in two months, and recruit more pharmacists using precise marketing.

Result

Pharmacist: A Work from home (WFH) innovative model allows this project to focus on achieving our goals.

Website architecture: The frontend of the website uses HTML, CSS, Javascript, and jQuery to set up on the Vercel server; the backend uses Node.js to set up on the Google Cloud Platform cloud function; the mail server uses Sendgrid and cooperates with the Dynamic template function to customize the mail. Responsive Web Design is implemented to accommodate a mobile version for cell phones and tablets. A large number of photos were used to replace text descriptions. A Canon 6D2 camera with an EF 50mm F1.2 lens was used to take pictures of the pharmacist and Adobe Lightroom was used for post-production.

Poster: Created in Adobe Illustrator.

Marketing: Focused on the most frequently used social software in Taiwan, including Facebook, In-stagram, PTT, and Dcard for promotion.

Conclusion

In this case, the pharmacy department of a hospital in Taiwan, following a worldwide trend, pioneered the WFH system for pharmacists in Taiwan and set up an attractive website. It successfully recruited excellent pharmacists in a short period of time. This case is shared here to encourage pharmacists around the world to cultivate information processing skills so that we can lead the way among all medical professionals.

Implementation of commercial clinical decision support system to improve prescription errors in an academic medical center in Taiwan

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Background

Clinical Decision Support Systems (CDSSs) for prescribing are one of the innovations designed to improve physician practice performance and patient outcomes by reducing prescription errors. According to the results of a systematic review and meta-analysis literature research, the results of this study show positive effects on performance for all forms of CDSSs (Moghadam ST, et al., 2021). The positive effects of the CDSS can be due to factors such as user-friendliness, compliance with clinical guidelines, patient and physician cooperation, integration of electronic health records, CDSS, and pharmaceutical systems, consideration of the views of physicians in assessing the importance of CDSS alerts, and the real-time alerts in the prescription.

Purpose

Prescription errors of medications can cause serious adverse drug events. The use of computerized provider order entry (CPOE) and clinical decision support systems (CDSSs) are an effective means of reducing prescription errors. The objective of this study was to evaluate whether implementation of CPOE embedded in a commercial CDSS system reduced medication errors of prescribing in an academic medical center in Taiwan.

Methods

Our hospital has 190,000 outpatient visits, 12,000 emergency visits, 7,600 inpatient admissions, and 5,100 surgeries per month. We conducted a before-and-after in a 2,202-bed care academic medical center that was implementing the Commercial CPOE/CDSS (Medi-Span®) system to improve patient medication safety. We assessed the rate of medication error in prescribing before and after implementation of the Commercial CPOE/CDSS system, including all inpatient prescriptions from 1 January 2020 to 31 December 2022.

Results

The number of medication orders in prescribing error was significantly reduced about 59% from 2,097 in 2020 to 853 in 2022 after implementing commercial CDSS embedded in the CPOE system in hospital from January 1 2020 throughout to December 31 2022.

The number of infusion rate error in prescribing of intravenous medications was markedly decreasing about 93% from 226 in 2020 to 16 in 2022. The number of physician's prescription instructions do not match usage error was decreasing about 83% from 488 in 2020 to 81 in 2022. The number of wrong dose in prescribing was also reduced about 67% from 437 in 2020 to 145 in 2022. The

number of contraindicated drugs in prescribing was also reduced about 41% from 143 in 2020 to 85 in 2022.The number of wrong frequency in prescribing was also reduced about 23% from 123 in 2020 to 95 in 2022.

Conclusion
The commercial CPOE/CDSS system technology significantly reduced the prescribing error in our hospital. The top five types of prescription errors all showed significant improvements, including infusion rate error, inappropriate instructions, wrong dose, contraindicated drugs, and wrong frequency. Overall, our results suggest that the commercial CPOE/CDSS system can deserves strong consideration as a tool to improve patient safety.

Developing and deploying a mobile network information management system in hospital pharmaceutical services and management

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Background
Future Hospital Pharmacy-FIP Basel Statements stressed that hospital pharmacists should actively engage in research into new methods and systems to improve the use of medicines and of human resource needs in hospital pharmacy. Drug safety and the workplace environment of the pharmacists have increasingly become a concern in recent years due to the shortage of pharmacists professionals, the time pressure of the work and the scarcity of information technology which constitute to poor quality of the services. Arguably, information management system and mobile devices (e.g. equipment) can improve the quality of drug management, support drug utilization decisions and research, and improve pharmaceutical work and productivity.

Purpose:
This project was initiated to showcase the establishment – including the relevant planning, introduction and implementation – of a network information management system and a mobile device application management from a regional hospital in Taiwan.

Method:
The study used ODBC+Window IIS Server+Database (Oracle,MySQL,DB2) Server network information technology as a development tool. It also introduced related achievements and applications in the four aspects that have been completed

Results :
The current build functions are:

1.Inventory Management: Inventory、Validity management、Temperature/Humidity management、Drug flow.
2.Education Training:Class sign in、E-learning.
3.Drug Dispensing Dynamics:Pick up medicine、Make an appointment、Refill reminder.
4.Health Education:Drug currently in use、Health education video.

Conclusion:
This study successfully set up a network information management system and applied it to mobile devices. The mobile devices have the benefit of multi-users, multi-locations, multi-operating-systems, and multi-browsers. It reduced paper consumption. It also increased the data accessibility, the immediacy and effectiveness of management, and built functions such as reminders and error prevention. Therefore, it has the potential to be implemented more widely among pharmaceutical service institutions and businesses. Nonetheless, attention still need to be paid to improving the information security and privacy (e.g. firewalls, intranets, user permissions, and LOGs).

The investigation of multiple drugs use and potentially inappropriate medications use analysis in older inpatient adults

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Background: There is a lack of data on the prevalence of potentially inappropriate medications (PIMs) in inpatients of China.

Objective: Through retrospective investigation and evaluation of elderly inpatients' prescriptions in Beijing Tsinghua Changgung Hospital, Tsinghua University from January and July 2021, to find potentially inappropriate medication use (PIM), and provide the basis for the development of drug treatment management(MTM), promote the rational use of drugs in olderly patients.

Method: A retrospective review of prescriptions for older patients (aged ≥ 65 years) was performed using the 2017 Chinese Criteria and the 2019 American Geriatrics Society (AGS) Beers Criteria for Potentially Inappropriate Use in older adults. Each patient was classified as PIM-user or non-PIM-user, according to whether a patient took at least one potentially inappropriate medication.

Results: A total of 57432 medications among 1623 elderly patients were examined. The AGS Beers Criteria detected significantly more PIM-users than the Chinese Criteria (70.55% vs 57.49%, $P < 0.001$). Benzodiazepines(15.59%) and Insulin(sliding scale)(11.21%) were more frequently prescribed classes by both criteria. Proton-pump inhibitors

(48.92%) was the most frequently found inappropriate medicine based on the 2019 AGS Beers Criteria compared to Clopidogrel (17.01%) based on the Chinese Criteria.

Conclusion: The prevalence of the use of potentially inappropriate medication in Chinese inpatient older adults is high, and explicit criteria are a useful tool to evaluate the prescription of such medication in the elderly.

Costs avoided from pharmacist interventions to address drug-related problems identified in outpatient clinics

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Background: The pharmacist plays an essential role in identifying and managing therapeutic problems. The aim of this research was to assess the costs avoided by clinical pharmacist interventions to resolve treatment-related problems.

Methods: Clinical pharmacists identified treatment-related problems and interventions to address them in consecutive outpatients visiting internal medicine clinics at major teaching and public hospitals in Jordan from September 2012 to December 2013. The costs avoided by each intervention to address treatment-related problems were collected from the literature. The collected data were used to calculate the overall cost averted by the interventions implemented to address the identified treatment-related problems.

Results: A total of 2747 patients were enrolled in the study. In 68.3% of the 568 interventions implemented to address the treatment-related problem, "change dosage or frequency" was the most frequent approach for managing treatment-related problems. The total cost avoided over the research period was $142,500.09. Outpatient clinic attendance is estimated to save $114,000.072 over the course of a year. Treatment-related problems were associated with older age (>25 years old), the number of prescription medications (odds ratio = 1.105), prescribed gastrointestinal drugs (3,485), prescribed antimicrobials (3,326), and prescribed musculoskeletal drugs (1,385).

Conclusions: The projected expenditures saved by interventions to address treatment-related problems illustrate the effect of treatment-related problems on patients and the healthcare system. The high prevalence and cost of treatment-related problems offer a strong rationale for pharmacists to provide more vigilant interventions to improve patient outcomes while maintaining cost-effectiveness.

Prescription of nephrotoxic medicines among hospitalized patients with chronic kidney disease at state first central hospital of Mongolia: A retrospective study

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Introduction: The role of hospital pharmacies in Mongolia is primarily limited to the supply and dispensing of medicins. As a result, the development of pharmaceutical care services in hospitals has been limited. Moreover, there is a lack of research on the inappropriate use of drugs in patients with CKD and unsufficient understanding of the inappropriate use of drugs in this patient population, there is a risk of medication errors and adverse drug reactions, which can lead to patient harm and increased healthcare costs. Therefore, it is essential to conduct research on the inappropriate use of drugs in individuals with chronic kidney disease in Mongolia to improve the quality of care and optimize the health outcomes of this patient population.
This study aimed to investigate the prescription of inappropriate medications among hospitalized patients with CKD at State First Central Hospital of Mongolia.

Methods: We conducted a retrospective study by analyzing the medical records of 306 patients admitted to the Nephrology Department of the hospital between 2019 and 2021. Patients with KF stages 2-5, with a glomerular filtration rate (GFR) below 30 ml/min/1.73m², were included in the study. We assessed the use of nephrotoxic drugs and the prescription of drugs contraindicated for KF. The data were analyzed using ANOVA and Kruskal-Wallis tests.

Results: Of the 306 patients, 98% were taking nephrotoxic drugs, and the average number of drugs used was 11.6±4.1. The number of nephrotoxic drugs used was highest in CKF stage 5 (3.5±1.6), and lower in stage 4 (3.8±1.8) and stage 3 (3.2±1.5). The prescription of drugs contraindicated for CKD was higher in patients with end stage of kidney disease. The odds ratio for using drugs without dosage adjustment and with contraindications increased with the total number of drugs prescribed.

Conclusion: The use of multiple medications to manage co-morbidities in patients with CKD increases the risk of prescription of inappropriate medications. Physicians, pharmacists, and medical professionals should collaborate to improve the safety of medication use in patients with CKD, especially by reducing the prescription of nephrotoxic drugs and drugs contraindicated for CKD.

Use of ceftazidime-avibactam in the neonatal population: A systematic review of case reports

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Background
The emergence of carbapenem-resistant bacterial infections has become a severe issue in the neonatal intensive care units. Ceftazidime-avibactam (CAZ-AVI), a broad-spectrum antibiotic consisting of a third-generation cephalosporin and a beta-lactamase inhibitor, is one of the preferred agents for treating infections caused by carbapenem-resistant Enterobacterales. It has been approved for the treatment of complicated intra-abdominal infections, hospital-acquired and ventilator-associated pneumonia and complicated urinary tract infections in adults and pediatric patients aged three months or older. However, limited data are available for the use of CAZ-AVI in infants younger than three months.

Purpose
We aimed to evaluate the efficacy and safety of CAZ-AVI use in neonates with infections caused by carbapenem-resistant Enterobacterales through a systematic review of case reports.

Methods
We searched PubMed and Embase for relevant studies published from inception to March 2023 using the keywords "ceftazidime-avibactam" and "neonates". Studies were considered eligible if they investigated the use of CAZ-AVI against carbapenem-resistant Enterobacterales in the neonatal population. Efficacy was assessed as clinical and microbiological response, and adverse events were also evaluated as the secondary outcome.

Results
Four case reports with a total of ten cases were included in this review. The babies were born between gestational age 27 to 37 weeks. Nine cases were prescribed CAZ-AVI for late-onset sepsis, with one also having concomitant meningitis, and the remaining case was treated for urinary tract infection. Carbapenem-resistant Klebsiella pneumoniae (CRKP) was found in all eight cases who used CAZ-AVI as definitive treatment. CAZ-AVI was administered empirically in the remaining two cases due to previous colonization of CRKP, which were later de-escalated according to culture results. All cases underwent antibiotic sensitivity testing, and concomitant sensitivity to meropenem, fosfomycin, tigecycline, aminoglycosides and colistin were 0%, 12.5%, 25%, 37.5% and 75%, respectively. CAZ-AVI monotherapy as definitive treatment was used in two out of eight cases (25%), one of which was the case with urinary tract infection. Two cases (25%) used another antibiotic concomitantly, one was used with amikacin and the other with colistin. In the remaining four cases (50%), CAZ-AVI and meropenem were used in addition to two other antibiotics: fosfomycin, colistin, or amikacin. The most commonly used CAZ-AVI dosage was 62.5 mg/kg every 8 hours; definitive treatment duration ranged from 5 to 21 days. All cases except one achieved microbiological and clinical cure, who died a few days after the treatment, possibly due to complications of prematurity or sepsis. The adverse events observed included elevated creatinine level (10%), glycosuria (10%), elevated direct bilirubin level (10%) and hypomagnesemia (20%), of which glycosuria and elevated direct bilirubin level resolved a few days after the treatment without intervention.

Conclusion
Although CAZ-AVI has not been approved in pediatric patients younger than three months, the findings of this systematic review showed that CAZ-AVI was effective for the treatment of CRKP infection in premature neonates without significant adverse events. Nevertheless, further studies are needed to provide stronger evidence on the efficacy and safety of CAZ-AVI use in neonates.

The creation of job action sheet procedures for mock code grey incidents (severe unexpected electronic medical record failures) post code grey

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Background: Climate change, cybersecurity, political issues and increased dependence on software infrastructure has caused an increase in Code Greys - unexpected failure in electronic medical record systems in hospitals that last multiple hours and are classified as disasters. Existing procedures are not resilient or detailed enough to manage the above global influences.

Purpose: The purpose of this project was to develop procedures in anticipation of future Code Greys, as they are likely to increase due to climate and cybersecurity impacts.

Method: Following a code grey event, a review of multidisciplinary impact was undertaken and two grants were applied for (HIROC and CAPhO) in order to develop institutional pharmacy code grey procedures. A vulnerability assessment was completed via an ISMP report focused on Code Grey indicators. Job action sheets were created. In order to reduce the complexity, phases of Code Grey procedure implementation were indicated within the oncology setting to manage complexity of cases : i.e. low risk, moderate risk and high risk. A mock Code Grey exercise was conducted, during which the developed procedures were tested for low and moderate risk situations (where orders were either verified and bloodwork was checked already, or where orders were in place but dose changes had to occur.

Results: We noted that hospitals in general have not had to create extensive Code Grey procedures until recently, due to new climate and cybersecurity realities. The vulnerability assessment conducted using the ISMP report indicated key gaps.

During our mock code grey exercise we identified the need for joint multidisciplinary collaboration on procedures, interactive visual mapping along with detailing of practical steps with individual responsibilities, and the conducting of future code grey tests on a regular basis to streamline various processes and support team readiness..

Conclusion: We have concluded that more extensive work is needed nationally and internationally to focus on this issue, and that this pilot provided a starting framework for more pilots to consider; in addition, we are recommending the prioritization of emergency management consideration of Code Grey issues and other climate hazards.

A novel approach to cardiopulmonary resuscitation training for hospital pharmacists utilizing 360-degree video-based virtual reality and in-situ simulations

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Background

Hospital pharmacists in Japan have been involved in more diverse responsibilities, such as providing medication guidance, managing side effects, and participating in team-based healthcare other than medication dispensing. Although they have an increased potential to encounter patient emergencies, they have few opportunities for cardiopulmonary resuscitation (CPR) training. A major reason for such a problem is that conventional CPR training (Basic life support, BLS), consisting of chest compressions and automated external defibrillator (AED) use, has limited participants due to limited human and logistical resources.

Purpose

To provide pharmacists with more opportunities for improving their CPR abilities, we developed and implemented an effective CPR training program in more efficient ways for participants and instructors.

Method

Our project team comprised an emergency physician, anesthesiologist, dentist, nurses, clinical engineers, and pharmacists. We developed a short scenario where a pharmacist encounters a patient emergency; based on this scenario, we produced a five-minute, 360˚ video showing how to perform BLS and a one-hour face-to-face training session. The video was uploaded to YouTube for participants' access with their smartphones and inexpensive cardboard virtual reality (VR) goggles. The face-to-face training session consisted of BLS and in-situ simulation training using three mannequins in the hallway outside the pharmacy. Three members at least, including facilitators of pharmacists and instructors of physicians and nurses, provided the training sessions. They were held on business days between 4:00 and 7:00 pm with up to 20 participants per session. The training program consisted of three steps. First, the participants watched the 360˚ video individually with VR goggles (VR-BLS) for pre-training. Second, they underwent face-to-face training sessions as a group. Finally, they self-reviewed with the VR-BLS three months later. To evaluate the effectiveness of this program, we measured pharmacists' CPR self-efficacy before, immediately after, and 6 months after the training by filling out paper-based questionnaires on-site. The basic resuscitation skills self-efficacy scale, modified specifically for the program's content, was used to assess participants' self-efficacy in the total score of 21 items (minimum 21 to maximum 105).

Results

We conducted four sessions of the program in our hospital from July 2022 to April 2023. Of all 105 hospital pharmacists, 35 participated, all of whom completed the program. The average age of the participants was 29.3 years, and the average year of pharmacist experience was 5.6 years. Two pharmacists (5.7%) had undergone CPR training in the past two years. The self-efficacy scores (mean [SD]) significantly increased from before (57.1 [17.7]) to immediately after (87.7 [8.7]) training ($p<0.01$). After 6 months, they remained significantly higher (80.4 [7.9]) than scores before training ($p<0.01$). The item "Assess breathing in no more than 10 seconds " was less confident for many participants throughout training.

Conclusion

Our study suggested that the novel CPR training program combining the original 360˚ video-based VR for repeated self-learning and in-situ simulation can improve and maintain self-efficacy for CPR of hospital pharmacists, requiring fewer health care resources. We will measure the impact of this program on CPR technical skills in our further study.

Effect of electroconvulsive therapy (ECT) on polypharmacy of psychotropic drugs

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Background
Polypharmacy, high doses, and long-term use of psychotropic drugs, including benzodiazepine receptor agonists (BZRAs), are associated with an increased risk of adverse events. Electroconvulsive therapy (ECT) is one of the non-pharmacological treatments in psychiatry, and is used for the treatment of intractable or drug-resistant psychiatric disorders. The effect of ECT on polypharmacy of psychotropic drugs is unclear.

Purpose
This study aimed to clarify the effect of ECT on polypharmacy of psychotropic drugs, including BZRAs.

Method
This is a retrospective study evaluating the patients who underwent ECT therapy during hospitalization at Shimane University Hospital in Japan between April, 2016 and March, 2022. Patient information such as age, gender, and disease name, as well as the number of psychotropic drugs and the dose of BZRAs used on admission and 6 months after completion of ECT was investigated.

Results
Thirty-one cases were included in the study. The common primary diseases for which ECT was indicated were depression (13 cases) and schizophrenia (11 cases).
The use of BZRAs on admission was observed in 25 patients (80.6%). The number of prescribed psychotropic drugs and dosage of BZRAs decreased significantly 6 months after completion of ECT compared to the admission.

Conclusion
ECT has the potential to reduce the number and dose of drugs in polypharmacy of psychotropic medications, including BZRAs.

Evaluation of extemporaneously compounded ursodeoxycholic syrup for neonates use

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Background: Extemporaneous compounding is a pharmacy practice aimed to prepare suitable pharmaceutical dosage forms that are not commercially available and licensed. Compared to the use of authorized drugs, these preparations have significant risks such as toxicity and stability issues. There is a need to prepare liquid formulations from such adult tablets or active drug to treat paediatric medical health conditions without these risks . Until now, no oral compounded liquid formulation containing Ursodeoxycholic acid syrup has been evaluated in Nigeria.

Purpose: This study focused on the extemporaneous compounding and evaluation of Ursodeoxycholic acid syrup from the capsules to treat hyperbilirubinemia in neonates in Nigeria.

Methods: Ursodeoxycholic acid Syrup was prepared using commercial syrup base (Cherry).The syrup was evaluated for various physicochemical parameters such as physical examination, pH determination and viscosity measurement. Microbiology assay was also carried out on the syrup. Fifteen plastic bottles of syrup were stored in amber plastic prescription bottles at 29 oC. Stability study was carried out on the syrup for three months. Samples were collected on 0, 30, 60 and 90 days for carrying out above stated parameters.

Results: Physical examination showed a pink, pleasant odour and sweet syrup. pH value was 3.0 after freshly prepared. pH ranged from 2.63 – 3.51 for three month period. Viscosity of syrup was high (38.30) at month 0 and increased with time however, did not affect appropriate dose withdrawal. There was no presence of Eschericia coli, Salmonella, Total Coliform, Total aerobic bacteria, yeast and mold in the syrup for three months study.

Conclusions: Based on the findings from investigation carried out, prepared sweet Ursodeoxycholic syrup had no change in odour and taste during period of study. The acidic pH of syrup was stable with no microorganism growth for the three months study.

Stability study of extemporaneously compounded sildenafil citrate suspension in Nigeria hospital

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Background: One of the major challenges in paediatric treatment is the lack of suitable drug dosage forms specifically designed and marketed for children. Most of the FDA approved drug formulations for adults have not been licensed for use in paediatric patients. Shortage of suitable paediatric dosage formulation often leads pharmacists and other health professionals to use adult solid dosage formulations in an off-label manner. Stability of these off-label paediatric formulations is a challenge in paediatric treatment.

Purpose: The aim of this work is to study stability of compounded Sildenafil citrate suspensions over three months study period at room temperature(32oC).

Method: Suspension of Sildenafil citrate were prepared with cherry syrup, a commercial dispersing mediumusing convectional suspension preparation techniques. The suspension were evaluated immediately for various physico-chemical properties such as organoleptic properties, pH, viscosity, sedimentation volume, microbiology assay and drug content using thin layer chromatography (TLC) assay. The suspension were stored at room temperature (32oC) and analyzed for above parameters at 30, 60 and 90 days.
Results: Organoleptic properties showed pink colour, pleasant smell and sweet taste of the suspension. pH determination showed 3.25, while viscosity reading was 47 mPas. The initial drug content was 98.81%. There was no microbial contamination for organisms investigated namely Eschericia coli, Total coliform, Total aerobic count, Salmonella, Shigella, yeast and mold. Organoleptics properties remain unchanged under the study period. The pH ranged from 2.98 to 3.48 over three months period. The percentage drug content at month three was 93.27% which was still within British pharmacopeias specification (90 – 110%).

Conclusion: Based on the findings from investigation carried out, suspension Sildenafil citrate extemporaneous paediatric oral formulations was physically, chemically and microbiologically stable and retained 93.27% of the initial content after three months study period at 32oC.

pH Determination for quality assessment of infusions, injections and eye drops used in hospital in South-East Nigeria

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Background: Substandard drugs comprise an increasing percentage of the drug market in both developed and low income countries. The prevalence of substandard medicines ranged from 11-48%. pH is an important parameter for assessing quality of drugs because it reflects chemical condition of a solution thereby controlling the chemical behaviour, availability, biological functions and microbial activity of drugs. Infusions, eye drops and Injections especially liquid are stabilised at particular pH range.

Purpose. This study evaluates the quality of infusions, injections and eye drops using pH value determination for a period of two years in a hospital.
Methods: Samples of various infusions (191), injections (599) and eye drops (30) procured for the hospital were analyzed for a period of two years from January 2021 to December 2022. Physical examinations of all the infusions, injections and eye drops were carried out visually. Each infusion pack was firmly squeezed to check for minor leakage. pH values for the infusions, injections and eye drops were determined using calibrated pH meter.

Results: Physical examination showed that all the samples investigated were free from particles and infusions were free from minor leakage. Out of the 599 injections tested, 87 samples deviated from British Pharmacopeia (BP) pH specification range for each drug. In infusions, 54 samples out of 191 infusions failed pH tests. Three (3) out of 30 eye drops deviated from BP pH range.

Conclusion: Study revealed that 28.27%, 14.52% and 0.1 % of the infusions, injections and eye drops respectively did not conform to BP specifications for pH. Hence were substandard and not pushed into hospital drug distribution system. The substandard injections and infusions will pose a threat to the clinical therapeutic outcome when used on a patient. The deviation from BP range may depict poor production or deterioration from poor storage condition.
Keywords: pH, Quality, Substandard, Infusion, Injection, Eye drop

Taking IV safety software off the shelf: Developing drug libraries to improve medication safety

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Background: Incorrectly administered parenteral medicines represent a significant source of preventable patient harm. Intravenous Safety Software (IVSS) including a regularly updated drug library and use of medication infusion smart pumps is a critical strategy to mitigate this risk.

Purpose: To prevent dose-related medication harm through a major 10-year update of all IVSS drug libraries in a tertiary Australian hospital.

Methods: New IVSS drug libraries were developed across a 1000-bed hospital. Medication incident reports, dispensing records and imprest holdings were used to identify profiles for improvement. An iterative review was undertaken, where drug libraries continued to be refined through multidisciplinary feedback until being finalised. A pre- and post-update audit of compliance with IVSS and incident reports was performed.

Results: Compliance with intravenous medications administered in the correct profile improved from 81.2% pre-update to 93.9% post-update (p=0.003). Incident reports related to incorrect rate errors decreased from 46 incidents across a six-month period pre-implementation, compared to 33 incidents in the six months post-implementation. Wrong administration technique incidents (45 incidents decreased to 33 incidents) and incorrect strength or concentration incidents (10 decreased to 8 incidents) also improved post-update.

Conclusions: This project included multi-stakeholder involvement to implement evidence-based changes to IVSS. Review and implementation of IVSS drug libraries has reduced dose-related errors and improved compliance with intravenous administration safety systems to prevent medication-related harm.

Investigation of medication safety culture in hospital pharmacy

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Background: Understanding culture may help identify strategies to prevent medication-related harm. Regular surveys of staff culture are recommended by the National Safety and Quality Health Service Standards, but often neglect to include pharmacists.

Purpose: To explore and describe the medication safety culture amongst pharmacists and pharmacy technicians in a tertiary teaching hospital in Australia.

Methods: An abridged version of the previously validated Medication Safety Climate Questionnaire (or "mini-MSCQ") was disseminated to pharmacists and pharmacy technicians at a single hospital. Survey results were analysed and used to inform a discussion guide. A follow-up focus group was conducted with pharmacists. Focus group discussions were audio recorded and thematically analysed. Themes were mapped against the Theoretical Domains Framework (TDF).

Results: Thirty-two staff responded to the mini-MSCQ. Aspects related to Teamwork achieved the highest score (4.12 ± 0.74), whilst Feedback and Communication about Error attained the lowest score (3.87 ± 0.75). Four pharmacists participated in the focus group. In total, 34 themes across 10 TDF domains were identified. Social/professional role was a key facilitator to pharmacist involvement in medication safety. Key barriers included time, knowledge, and concerns around interprofessional tension.

Conclusion: Medication safety culture was perceived as integrated within the pharmacists' role, however further resources are required to support medication safety activities. Future work should evaluate the predictive accuracy of the mini-MSCQ, and incorporate medical and nursing perspectives.

Interactive pharmacist education to enhance safety of parenteral infusions

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background
Incorrectly administered parenteral medications represent a significant source of preventable patient harm. Hospital

pharmacists may intercept infusion errors by completing a comprehensive bedside check, however standards for pharmaceutical review of infusions are not well described.

Purpose
To determine whether an educational intervention improves documented pharmaceutical review of intravenous and subcutaneous infusion in an Australian hospital.

Methods
An educational intervention including a didactic lecture, decision support and one-on-one case-based learning on bedside review of intravenous and subcutaneous infusions was delivered to pharmacists. Rates of documented pharmaceutical review of infusions across relevant medical records was collected from a convenience sample of patients across Medical, Surgical, Palliative Care and Coronary Care wards pre- and post-education.

Results
Documentation of pharmaceutical review was assessed for 328 medication orders pre-education and 212 orders post-education. Improvements were observed for all medication forms and high-risk medication (APINCH) classes, with statistically significant improvements observed for review of intravenous potassium (17% pre-education, 81% post-education, p=0.0045) and intravenous fluid orders (10% pre-education, 78% post-education, p=0.003). Completion of subcutaneous infusion review was low pre-education (17%, n=7), however no post-education data was observed.

Conclusions
An improvement in documented pharmaceutical review of infused medications was observed following an educational intervention. Future work should promote pharmaceutical review standards for infusions including bedside checks.

Linking Aboriginal and/or Torres Strait Islander peoples with diabetes care in hospital using hospital pharmacists

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background: Diabetes is a common diagnosis for Aboriginal and/or Torres Strait Islander peoples, yet often undetected in hospital.

Purpose: To identify how urban hospital pharmacists can detect if Aboriginal and/or Torres Strait Islander patients have diabetes or a higher chance of getting diabetes.
Method: A multi-method design used complementary data collected from patients, and researcher field notes. Aboriginal and/or Torres Strait Islander peoples admitted to hospital over 12 weeks (July-October 2021) were prospectively identified from patient admissions lists. Patients were excluded if they were due for or already discharged. A hospital pharmacist visited eligible patients. Those who consented to participate, had their blood glucose and HbA1c checked. Participants with HbA1c > 6.5% (no known diabetes) or 7% (known diabetes) were referred for endocrinology review during their hospital stay. Test results and resultant diabetes plan were shared with their general practitioner (GP). Two days after discharge, the pharmacist telephoned participants to gauge their views on their hospital-based diabetes care. Barcode technology recorded pharmacist time. Voice recorded field notes were thematically analysed. Ethics approval was obtained.

Results: Seventy-two patients were eligible for inclusion, 67/72 (93%) consented to take part. Sixty-one (91%) patients returned a HbA1c < 6.5. Of these, 4/67 (6%) returned a HbA1c, 6-6.4. They were contacted and/or their GP to suggest a yarn about diabetes prevention. Six of the 67 (9%) qualified for endocrine review, 5 had known diabetes, one was newly diagnosed. None were previously known to endocrinology. All patients telephoned were satisfied with their hospital-based diabetes care. Pharmacist's time spent was 10-30 minutes, depending on HbA1c. Field notes guided understanding of service implementation.

Conclusion: We have developed, implemented and pilot tested a pharmacist-led screening service. Hospital pharmacists can help detect diabetes in Aboriginal and/or Torres Strait Islander peoples, ensuring linkage to endocrinology review and improved care during admission.
Topic area: Hospital pharmacy.

Improving medication safety in Southern Taiwan regional hospital pharmacy

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background
According to the law of Good Dispensing Practice (GDP), pharmacist in Taiwan must confirm the legality, completeness and validity of the prescription. If we review the data from Taiwan patient safety reporting system (TPR), we can easily found out that the top 3 medication error occur in prescribe stage (62%), drugs administration stage (22%) and dispensing stage (14%). Almost 50% of the errors in dispensing stage lead to drugs name confused, so lower the human error as much as possible may improve the medication safety in hospital pharmacy.

Purpose
Improving medication safety in hospital pharmacy by decrease the human error.

Method
We are using 3 ways to decrease the human error. First, we change the color of drugs part number and drugs name on

the medication bag and makes sure the color is easily observe by the pharmacists. Secondly, we host a near miss meeting every month to discuss and advocate every drug that occurs in dispensing error, the result may change the way of listing or the location of the drugs. Lastly, we adding a pop out sound to increase the pharmacists awareness when dispensing the medication that relatively easy to be mistaken.

Results
After we implemented the method, we are able to sustain the percentage of near miss around 0.35(Numbers of near miss/Total prescription per month) and only one cases of medication error occurred in 2022 and no cases happened until May of 2023.

Conclusion
Human error is the most important factor to cause medication error but it is hard to totally avoid it because everyone can make errors no matter how well trained and motivated they are. Luckily, we are working on the latest dispensing table that adding light guidance system, infrared (IR) inspection system and voice indicate system. Perhaps improving the hardware can help us achieving our goal.

Effectiveness of the use of electronic materials in drug counseling training of Taiwan teaching hospital

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background
Pharmaceutical education in Taiwan aims to develop professionals in the pharmaceutical sector. As a mandate in the developmental process, pharmacy internship training is implemented for developing professional skills and attitudes, and it also lays the foundation for training competent professional pharmacists. During drug consultations, pharmacists provide their professional knowledge to patients. Correct drug safety information is key in drug consultations, in order to guarantee the patient's quality of life. The development of certain technologies made possible to understand the feasibility of electronic training materials in teaching.

Methods
This study conducted a questionnaire on the use of electronic materials (Fliphtml5) and satisfaction, and analyzed reliability of cognitive problems (Cronbach's α = 0.87), using the Likert scale (total score = 5.0). The people interviewed (N = 21) worked in a hospital setting from January 2020 to March 2022. A total of 21 questionnaires completed, with an effective response rate of 70% (G*Power = 0.8). Descriptive statistics were performed with SPSS 21.0 statistical software.

Results
In our qualitative research interviews, we learned that pharmacists hoped to have electronic materials with exclusive characteristics, and which they would know how to use. According to the results of the cognitive questionnaire, pharmacists agree that electronic materials can improve learning effectiveness (4.4 ± 0.5). By analyzing the satisfaction questionnaire, both knowledge learning and layout design had an overall satisfactory acceptancy (4.7 ± 0.6). It can be seen that pharmacists agree with the application of electronic materials in drug counseling training.

Conclusion
The use of electronic supplementary materials can introduce unique drug consultation training materials, which would be used in clinical education and training, while expanding the audiovisual link and note-taking functions. These can also be used as an effective source for pharmacists to inquire about drug knowledge.

Diversified distance learning applications for pharmacy interns in Taiwan teaching hospitals under the epidemic

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Objective
In the face of the COVID-19 virus, we use a diversified distance teaching model to ensure course quality and a safe environment that can further meet the learning benefits of pharmacy practice. We hope to use this research to prove that distance learning is feasible.

Methods
That is a retrospective study. We have planned 640 hours of pharmacy practice, including 160 hours of virtual E-portfolio courses according to the Hospital Pharmacy Internship Regulations under the epidemic with Microsoft Teams video software for distance learning, E-Portfolio for self-directed learning, Google Cloud for a learning feedback cloud, and Line community software for live student connection. During the study period from July 2021 to February 2022, 35 pharmacy interns used the Likert scale to evaluate the differences between the actual and virtual programs. The data were statistically analyzed using IBM SPSS software in 2019.

Results and Discussion
The professional knowledge was assessed by a pharmacology test (250 questions), with an average score of 94 (out of 100) and a minimum score of 70. A questionnaire assessed for virtual course quality in clarity of topic (99.7% satisfied), completeness of the content (99.7% satisfied), clarity of presentation (99.5% satisfied), and the appropriate number of hours (99.5% satisfied). There was no significant difference between the live and virtual sessions ($p>0.05$). That means distance learning models can partially replace physical learning. All students have successfully passed the internship training program.

Conclusion
The distance learning model meets national licensing requirements and immunization standards; the small group teaching model reduces cluster concerns; three doses of vaccines reduce the risk of infection; and self-health management and notification create a safe and secure practice environment.
Key Words: Taiwan Teaching Hospital, Diversified Distance Learning, Pharmacy Internship.

Does personality affect lithium serum level? – A pilot cohort study in a public psychiatric center

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background
Lithium is widely used as a mood stabilizer with narrow therapeutic index. Though several dosage predicting formulas have been developed in past decades, it was concluded that these formulas had shortcomings and should be used cautiously. Therefore, several times of blood sampling and corresponding dosage adjustments are needed to confirm lithium serum levels (LSLs) within normal range. Many studies have indicated personality could affect insight toward illness and overall effects of therapy. It has been proved that patients with neurotic personality tended to have lower fasting blood glucose level, triglyceride level, and HbA1c in comparison to patients with conscientious personality. Currently, studies regarding the relationship between LSL and personality were not available. Hopefully, care givers are able to intervene in advance for patients whose personality traits easily present abnormal LSLs.

Purpose
In this study, we aimed to observe which personality has greater chance of abnormal LSLs. For those patients with abnormal LSLs, we further investigated whether age, gender and lithium daily dose were associated with abnormal LSLs.

Methods
Patients who have been taking lithium at least 6 months were included. Patients with compromised renal function (Clcr < 60 ml/min), without lithium sampling data, or taking other mood stabilizers simultaneously were excluded. LSL profile was separated into 2 categories, normal range (0.6 ~1.2 mEq/dL) and abnormal range (<0.6 or >1.2 mEq/dL). The 15-item Big Five personality scale was used to determine patient's personality. Dominant personalities in two groups were presented descriptively. Differences of means between 2 groups in term of age and lithium daily dose were demonstrated by two sample t-test. Gender difference was examined by Chi-Squared test.

Results
51 patients were included in this study. According to LSL sampling profile, 27 patients had their LSLs within normal range and 24 patients had their LSLs out of normal range. For those LSLs within normal range, neuroticism (15, 55.5%) was the major personality. For the counterpart, the dominant personality was agreeableness (18, 75%). Age, gender and lithium daily dose were not shown significant differences between two groups. ($p = 0.808$, $p=0.128$, and $p=0.276$, respectively)

Conclusion
In this study, we found that for patients with normal LSLs, half of them had neurotic personality trait. They tended to worry about their therapeutic effects and be vigilant to take lithium routinely, and this could explain why they had greater possibility of keeping LSLs within normal range. For the other hand, to those had high in agreeable personality, medical providers should enhance their insights toward the disease and assess medication compliance specifically to lithium taking.

Dose evaluation of NMTT cephalosporin and the risk of hypoprothrombinemia

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background
One of the beta-lactams, cephalosporin is commonly prescribed to treat infectious diseases. However, some of these which have N-methyl-thiotetrazol (NMTT) structure may cause prothrombin time (PT) prolongation through inhibition of vitamin K-epoxide reductase and vitamin K-dependent carboxylase. This may potentially prolong the hospitalization and the treatment.

Purpose:
To understanding the relationship between dosage and ADR occurrence.

Methods:
It is a nested-case-control study from the data of our hospital which is a dedicated infection hospital. Four antibiotics with NMTT structure were involved: cefoxitin, flomoxef, cefmetazole , cefoperazone/sulbactam(CPZ/SUB). Data were collected from 2019-2021 to understand if there were the events of PT prolongation or vitamin K supplement under antibiotic treatment. The data were matched 1:1 for

age (+/- 5 years), sex, and the cohort entry date (+/- 1 year). The result and associations between 4 cephlosporins are presented as Cumulative Defined Daily Dose (DDDs).

Results:
Total 298 cases were involved. The average age was 78.42±14.1 years old and 53% were male. We find significant between 4 cephalosporin between case and control. The Cumulative DDDs for daily and 14 days are 0.89±0.62 and 6.86±5.7 respectively. The average PT value of ADR cases was 12.24±6.86secs. When comparing DDDs using less than 1 as the standard, the odds ratio (OR) value was 0.62 (p=0.06). When comparing the 14-day cumulative DDDs using less than 5 as the standard, the OR value was 0.96 for 5-10, 1.44 for 10-15, and 1.94 for greater than 15 (p=0.348).

Conclusion:
This study indicated a significant difference in the occurrence of adverse ADR among antibiotics; which cephalosporins with NMTT structure do have a higher incidence. However, the relationship between the defined DDDs and ADR may not be significant, regardless of whether it is for a single day or a cumulative 14-day period. Although the sample size in this study is small, it still suggests that it should be caution about ADR when using antibiotics, regardless of the dosage.

Meperidine use evaluation and pharmacist intervention management

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background
The opioid class of narcotic painkillers includes meperidine. The study found that its analgesic effect is not superior to other opioid analgesics, and it is more likely to induce delirium and has a risk of serotonin syndrome. Taiwan has developed standards and encouraged appropriate clinical application, which has decreased utilization in hospitals.

Purpose
To ensure the clinical compliance of meperidine usage, we evaluation of its prescription patterns in a regional hospital in Taiwan.

Method
This study is a retrospective cohort study, which retrospectively analyzes the use of meperidine in outpatient, emergency, and inpatient settings in a certain hospital in a certain area from Jan 2023 to March 2023 using computer databases and medical records. The total daily dose of meperidine, duration of continuous use, and reasons for use were analyzed for all patients.

Results
A total of 323 patients were included, with a rate of 43 (13.3%) for meperidine continuous use exceeding 48 hours. Among patients who used meperidine continuously for more than 48 hours, 166 (51.4%) were elderly over 65 years old. There were 9 patients (2.8%) who were currently taking any MAO inhibitors (monoamine oxidase inhibitors) or had taken them within the past 14 days. No neonates or infants under six months old received meperidine, and the total intravenous or intramuscular injection dose within 24 hours was less than 600 milligrams.

Conclusion
To reduce inappropriate use of meperidine and ensure patient safety in our hospital, we're implementing improvement measures, including establish usage guidelines for medical staff, pharmacist promotion of appropriate use and clinical guidelines, and computerized control through the Controlled Substance Management Committee to minimize potential risks and inappropriate use.

The benefit of pharmaceutical home care for diabetic patients

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Objective:
To investigate the pharmacist interventions on the improvement of disease control under diabetes home care.

Methods:
The data was retrospective collected from the database of pharmacist home care project in a regional hospital from January 2022 to December 2022 for analyzing the benefits of pharmacist intervention. The primary outcome was the indicator for blood glucose and lipid control, and the secondary outcome was pharmacist intervention case analysis.

Results :
A total of 60 patients were included with an average age of 79.6 years.
The average numbers of drugs taken by patients were 9.2. For primary outcome, the
results showed pharmacist home care intervention improved HbA1C, AC glucose, Total cholesterol, Triglyceride and HDL control for diabetic patients. The secondary outcome showed the pharmaceutical home care identified 27 drug-related problems on intervention, and 35 education sessions on special formulations and 26 recommendations for safe family environment of drug usage were given.

Conclusion :
The combination of pharmaceutical care and home care visiting could improve the effectiveness of diabetes control .

Optimized the renal function lookup interface on pharmacists' assessment for the rationality of antibiotic use at a municipal hospital

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background: When pharmacists assess the appropriateness of antibiotics use, they need to consider not only the indication of the antibiotic but also the dose and frequency according to the patients' renal function. Therefore, an interface, that concomitantly calculates the Cockcroft-Gault (C-G) and the modification of diet in renal disease (MDRD) for estimating glomerular filtration rate, is necessary for pharmacists to assess the rationality of antibiotics and improve medication safety and health care.

Goal: This study aims to optimize the renal function searching interface of Hospital Information System (HIS) by automatically calculating the pharmacists' assessment through the C-G and MDRD formula and comparing the results.

Method: The optimization of the renal function searching interface was done on February, 2019. Selecting patients who admitted to the Internal Medicine Intensive Care Unit (MICU) more than 72 hours, had records of antibiotics usage, and were primarily diagnosed as J by the first code of ICD 10 from January, 2018 to December, 2019, the system analyze the differences between the creatinine clearances (CLcr) and estimated glomerular filtration rate (eGFR) results of each patients, calculated through C-G and MDRD formula. The study was conducted with approval from TCH Research Ethics Committee (TCHIRB-10805005-E).

Result: A total of 391 cases, 261 men and 130 women, were included in our study; 228 (58.3%) cases had the same renal function assessment results from the Cockcroft-Gault and MDRD formula, 157 (40.2%) cases had higher eGFR value and 6 (1.5%) cases had lower eGFR value.

Conclusion: Despite the rapid change of MICU patients' condition, the optimization of the renal function searching interface provide pharmacists with reasonable reference for antibiotics use, time-saving process, and reminder of the difference between eGFR by MDRD in renal diseases and Cockcroft-Gault formula in general population to carefully evaluate patients' renal function.

Clinical efficacy and safety of thrombopoietin in combination with herombopag for the treatment of chemotherapy-induced thrombocytopenia

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background: Chemotherapy-induced thrombocytopenia (CIT) is common and causes chemotherapy dose reductions or treatment delays, bleeding, and suboptimal oncological outcomes. Herombopag is a new thrombopoietin receptor agonist that has been shown efficacy and safety in chronic immune thrombocytopenia (ITP) and severe aplastic ane¬mia. With broad effi¬cacy in many causes of throm¬bo¬cy¬to¬pe¬nia, herombopag is a prom¬is¬ing treat¬ment in CIT. However, the treatment of CIT with herombopag has not been reported until now.

Objective: To evaluate the efficacy and safety of thrombopoietin (TPO) in combination with herombopag in the treatment of chemotherapy-induced thrombocytopenia (CIT).

Methods: From January to December 2022, patients who were treated by TPO in combination with herombopag in our hospital and met the inclusion criteria were included. Inclusion criteria were:18 years of age and older, diagnosis of solid malignancies, receipt of at least 1 cycle systemic chemotherapy, grade 3 or 4 thrombocytopenia. Outcomes evaluated were the time required for platelets to recover to ≥ 75×109/L, the platelet counts < 50×109/L lasting days and adverse reactions.

Results: The study enrolled 27 patients, with mean age of 53.0±4.9 years, 40.7% male, 59.3% female. Diagnoses included lung cancer (29.6%), breast cancer (22.2%) colorectal cancer (18.5%), cervical cancer (18.5%) and others (11.1%). Chemotherapeutic regimens included carboplatin, nedaplatin, paclitaxel, irinotecan, gemcitabine. After the treatment, the platelet counts of all patients were recovered to > 75×109/L. The time required for platelet levels recovered to ≥ 75×109/L were 10.1 ± 6.3 days, the platelet counts <50×109/L lasting days were 7.2 ± 4.9 days. The adverse reactions included elevated transaminase, fever, muscle aches. All ADRs were grade 1 or 2, no serious ADRs (grade 3 or more) were observed.

Investigate the influence factors of patients with chronic diseases for refilling prescription in a Taichung regional hospitals

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background
The aging society in Taiwan has led people with chronic disease to grow. In order to save medical resources and reduce the huge burden of medical expenses, the government encourages the patients with chronic diseases to ask doctor to prescribed refilled order if they were in stable condition. Patients can choose to refill chronic disease prescriptions in our hospital or in community pharmacies. According to the research, there are some factors may affect the patients to refill prescription back to the hospital, for example, the patient's age, gender and so on.

Purpose
This study aims to investigate the influence factors of patients returning to our hospital for refilling chronic diseases prescriptions.

Methods
This study used the chronic disease prescription database of a regional hospital from Jan. 1st, 2022 to Dec. 31st, 2022 .We compared the factors of demographic characteristics, distance of residence and medical departments between the patients refill chronic diseases prescriptions in our hospital or in community pharmacies.

Results
The database of 133,783 refillable chronic disease prescriptions were collected from our hospital. The rate of prescriptions refilled in our hospital was 37.1%. There was no significant difference in gender (female 36.9 % and male 37.2 %, respectively. p=0.19). The prescriptions refill rates in our hospital among patients 1~20 years old were significantly higher than 21~60 years old(41.4% vs 38.0%, p=0.00). The 21~60 age group also has a higher refill rates than ≧61 age group(38.0% vs 36.4%, p=0.00). The refill rates of patients who live within 5 kilometers were significantly higher than live within 5~15 kilometers and over 15 kilometers(53.5% vs 34.9% and 53.5% vs 18.0%, p=0.00). There was also significant difference between patients who live within 5~15 kilometers and over 15 kilometers(p=0.00). The patients of obstetrics and gynecology, ENT, internal medicine, pediatrics and surgery refill rates were 40.1%, 39.4%, 37.8%, 37.6% and 33.5%, respectively. There was significant difference only between surgery and other medical departments(p=0.00).

Conclusion
In our study, the prescription refill rate under 20 years old is higher than other age groups. After comparing the medical visits to the pediatric department, we can infer that this is because of the difficulty to obtain rare disease medication, specific medication and special dosage form (for example powder and so on) in general community pharmacies. Distance of residence in deed affects the willing of patient to refill chronic diseases prescriptions back to our hospital.

Analysis of the antibiotic usage in patients with novel coronavirus pneumonia in a tertiary hospital

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Posters Wednesday, September 27, 2023, 12:30 PM - 2:30 PM

Background: China has adjusted the management of novel coronavirus since December 2022. Our hospital has started to accept novel coronavirus patients since December. This study is to analyze whether the use of antibiotics during this period is different from that in the past.

Purpose: To analyze the use of antibiotics in patients with COVID-19 in a tertiary hospital

Methods: This is a retrospective study. The patients discharged from a tertiary hospital from December 2022 to March 2023 were investigated. Patients diagnosed with novel coronavirus pneumonia and other pneumonia were included in this study. To analyze the difference in the use of antibiotics between bacterial pneumonia patients with COVID-19 (group A) and bacterial pneumonia patients without COVID-19 (group B). The intensity of antimicrobial activity is evaluated using AUD (Antibiotics Use Density), where AUD=accumulated DDDs * 100/Total hospitalization days during the same period.

Results: 617 patients with novel coronavirus were diagnosed this period, 457 of whom (74.07%, 457/617) used antibiotics, and 129 of whom (20.91%, 129/617) used special grade antibiotics. Among patients who used antibiotics, 256 patients (56.02%, 256/457) were complicated with bacterial pneumonia. In terms of drug use intensity, the AUD from December 2022 to March 2023 was significantly higher than that of December 2021 to March 2022 (44.51 vs 39, p<0.05); The AUD of group A patients was significantly higher than that of group B patients (100.42 vs 89.52, p<0.05).The use rate of special grade antibiotics in group A was significantly higher than group B(40.63% vs 18.35%, p<0.05), as the length of hospital stay was significantly higher (25.33 vs 15.3, p<0.05). In terms of medication rationality, there was no significant difference in the rationality rate of antimicrobial drug use in this period compared to the same period in the previous year(97.72% vs 98.45%, p＞0.05）.

Conclusion: During the period of receiving patients with COVID-19 infection, the use intensity of antibiotics in the hospital increased significantly, and the hospitalization days of patients with COVID-19 also increased significantly, but the rational rate of drug use did not decline significantly. We

should pay attention to this phenomenon and continue to explore the differences in drug-resistant bacteria.

The prevalence and patient perception of medicine shortages in a state sector hospital in Sri Lanka

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RFTU-03 - Rapid Fire Session Tuesday, M1-M2, September 26, 2023, 2:30 PM - 4:00 PM

Background: Medicine shortages are a global issue and are underrepresented in developing countries such as Sri Lanka, where monitoring the prevalence of medicines shortages and their impact is difficult, due to the absence of medicine shortage reporting and notification systems. As the priority healthcare service provider, identification of the prevalence and patient perception of medicine shortages in the State sector is an essential initial step to be employed in managing medicine shortages in Sri Lanka.

Purpose: The purpose of this study was to identify the prevalence and patient perception of medicine shortages in a Sri Lankan State hospital.

Method: In the first quarter of the year 2023, a quantitative study with two parts was conducted at the outpatient pharmacy of the medical clinic in a tertiary care hospital in Sri Lanka. In Part 1, patients (n=392) with a minimum of two previous clinic visits were invited to participate after having their prescriptions dispensed. To determine the prevalence of medicines shortages in the hospital, participants' prescriptions were assessed, and the short supply of medicines to patients was noted e.g. medicines marked as out-of-stock on patient prescriptions by the pharmacists, and the substitution of prescribed brands or strengths in medicine shortages. Patients who experienced medicines shortages in Part 1 were invited to participate in a verbally administered structured survey (Part 2), which explored their knowledge, experiences (in the pre and post-COVID-19 pandemic era), and preferences regarding information on medicine shortages.

Results: The majority of the participants were aged above 60 years, females, with ischemic heart diseases, and a monthly income of less than 10,000 Sri Lankan Rupees. Medicines were short-supplied to most of the participants, namely because the medicine was out-of-stock, followed by limited quantities of the medicine being available in the hospital system. Some medicines were completely out-of-stock and unavailable e.g. furosemide tablets, losartan potassium tablets, enalapril maleate tablets, salbutamol metered-dose inhaler capsules and biphasic human insulin injections. Other medicines had to be substituted for a different strength e.g. atorvastatin tablets, metformin tablets and gliclazide tablets. In these instances, dosage instructions were amended e.g. patients were asked to break tablets, and take one-quarter or eight tablets of the available strength, to administer the equivalent of their usual dose.
Most of the participants completed the part 2 survey. Medicine shortages in the clinic visits impacted patients clinically, economically and ethically; and medicine shortages were experienced more frequently after the COVID-19 pandemic. Among respondents, the majority reported pharmacists to be their first source of information about medicines shortages. Despite the lack of understanding about medicine shortages, most of the participants were not interested in more information on medicine shortages.

Conclusion: Multiple essential medicines are in shortage in the Sri Lankan State Hospital system which impacts clinically, economically, and ethically to patients. Monitoring the prevalence of medicine shortages, risk assessment of medicine shortages and related substitutions and patient education on medicine shortages is required in managing medicine shortages in Sri Lanka.

Development of a medication safety dashboard aligned to national quality standards

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RFTU-03 - Rapid Fire Session Tuesday, M1-M2, September 26, 2023, 2:30 PM - 4:00 PM

Background: In Australia, the National Safety and Quality Health Service (NSQHS) Standards provide a consistent statement of the level of care consumers can expect from health service organisations. Independent accreditation agencies assess a health service against these standards. Historically, assessment of meeting standards was conducted on a 3-year cycle. Health services expended significant resources in the months leading up to a manual assessment. Australia is now moving to short notice assessments requiring organisations to be constantly assessment-ready with internal monitoring capacity to ensure readiness for external review at any time. For this reason, automated, near real-time performance monitoring processes are needed.

Purpose: The "Actionable Dashboards Project at Eastern Health" or ADaPt EH is a collaborative approach to address the challenges of both short notice assessments and near real time monitoring of standards internally. The objective was to generate near real time dashboards presenting relevant patient information from the Electronic Medical

Record (EMR) in an easily accessible and digestible format that can be used by hospitals for monitoring clinical care and performance aligned to accreditation standards.

Method: ADaPt EH used a co-design approach working with key stakeholders, in particular the health service and the accreditation agency, to identify accreditation related measures that could be generated from the EMR. Existing "scorecards" were utilised to prioritise measures of organisational importance. A secure data warehouse was created to house EMR data and the pre-computed accreditation measures, from which data processing and interactive data visualisation using PowerBI® was constructed. Health service Quality Managers, Clinical Risk Managers, and researchers conducted data validation. Qualitative feedback on dashboard content, design and functionality was gathered via focus groups and interviews with key hospital staff and accreditation agency assessors. The potential value of dashboards on quality-of-care outcomes, clinical governance and organisational performance monitoring was also explored.

Results: We developed, validated, and implemented two interactive Medication Safety dashboards, a performance dashboard with 16 measures and a live monitoring dashboard with 2 measures. Evaluation with accreditation agency assessors and health service staff indicated high levels of enthusiasm for integrating into regular use. Dashboards were visually appealing with features such as trend observation over time being identified as particularly useful. The ability to drill down to data of a specific unit/ward and individual patient was highly valued. Overall, acceptance of dashboards occurred rapidly, and stimulated suggestions for other areas of dashboard development.

Conclusion: This Medication Safety dashboard is part of a larger project to develop dashboards for each NSQHS standard. These dashboards will be used for longitudinal monitoring to assess measures of uptake and use, impacts on workloads, and use for short notice accreditation assessment. Health service staff indicate enthusiasm for the dashboards and a high level of willingness supporting their development and implementation.

ADaPt EH is supported through the Digital Health Collaborative Research Centre (DHCRC)in Australia (DHCRC-0108), and has multiple partners including Monash University, Eastern Health, the Australian Council on Healthcare Standards, and the Victorian Department of Health. DHCRC is funded under the Commonwealth of Australia's Cooperative Research Centres (CRC) Program.

There has to be a better way of doing this–Hospital pharmacists' perspectives on optimising medication management during hospital to home transitions of care

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RFTU-03 - Rapid Fire Session Tuesday, M1-M2, September 26, 2023, 2:30 PM - 4:00 PM

Background
The World Health Organization 'Medication Safety in Transitions of Care' 2019 report noted that "the most important challenge in the field of patient safety is how to prevent harm, particularly avoidable harm, to patients during their care". Medication-related harm associated with transitions of care is a major public health problem in Australia. The Pharmaceutical Society of Australia's 2019 'Medicine Safety: Take Care' report highlighted that over 90% of patients have at least one medication-related problem post-hospital discharge, and 250,000 hospital admissions annually are due to medication-related problems.

Purpose
This study undertook an in-depth exploration of factors contributing to medication-related problems arising from hospital to home transitions of care and opportunities for hospital pharmacist involvement.

Method
A case study approach was used to comprehensively examine a specific Australian tertiary care hospital environment that services a large metropolitan population at high risk of medication-related problems, chronic co-morbidities and low health literacy. A single focus group was used, directed by a semi-structured question guide and held via an online communication platform. A combination of convenience and purposive sampling was used to select participants. A thematic approach was used to develop meaningful themes arising from qualitative data in a systematic manner. The study was approved by the University Human Research Ethics Committee (HRE21-174).

Results
Six hospital pharmacists who worked at a large, tertiary care, metropolitan hospital and healthcare organisation participated in the focus group. Ineffective medication-related communication with the patient, among the hospital healthcare team, and between the hospital and community healthcare team were identified as the main contributing factors to medication-related problems arising from hospital to home transitions of care.
Participants identified that the patient may not receive comprehensive medication-related counselling in the hospital setting, prior to discharge, and information may be

incorrectly communicated to the carer, under the assumption that the patient doesn't manage their own medications (especially if the patient was living with dementia). Participants highlighted that cultural considerations (not speaking English as a primary language), (poor) health literacy, patient preferences (lack of translators available for all patient languages), and timing of counselling (during the busy discharge process) could impact how effectively medication-related information was received by the patient during hospital to home transitions of care.
Participants suggested that more regular and systematic incorporation of hospital pharmacists in discharge planning and medication management decision making (facilitated by attending ward rounds with the entire medical team) and pharmacists planning and preparing for discharge medication counselling well in advance of the discharge date (facilitated by prioritising workloads) could work towards addressing identified challenges.

Conclusion
One of the main factors contributing to medication-related problems arising from hospital to home transitions of care is ineffective communication between healthcare providers and the patient. While calls for hospital pharmacy leadership in transitional care are not new, this exploratory study indicates that there are still avenues where space should be made for hospital pharmacists to be involved in the transition of care processes – including in medication-related decision making and planning.

An audit of missed clozapine doses for patients admitted to a tertiary hospital in Queensland, Australia

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RFTU-03 - Rapid Fire Session Tuesday, M1-M2, September 26, 2023, 2:30 PM - 4:00 PM

Background: Clozapine, an antipsychotic for treatment-resistant schizophrenia, requires strict adherence and monitoring. Interruptions to clozapine therapy from missed doses may increase the risk of psychotic relapse, serious adverse effects, and requires readmission to hospital for re-titration. Strategies must be utilised to promote the safe use of clozapine and prevent unnecessary breaks in therapy. Evaluating the administration of clozapine, a high-risk medicine, in hospitals is crucial to ensure and promote the safe and quality use of medicines.

Purpose: We aimed to investigate the frequency and reason(s) for missed clozapine doses for patients admitted to hospital, the impact of psychiatry and pharmacy reviews on missed clozapine doses, and the impact of missed clozapine doses on length of stay (LOS) in hospital. We hypothesised that missed clozapine doses would occur less frequently when patients have earlier psychiatrist and pharmacist reviews, and missed clozapine doses may increase LOS.

Method: A 6-month, single-site, retrospective audit was completed for patients on clozapine admitted to a tertiary hospital in Queensland, Australia. Patients prescribed clozapine during an inpatient and/or emergency department (ED) admission between 01/12/2021–31/05/2022 were included in this audit. Electronic medical record reports were used to identify eligible patients. Data collected was patient demographics; frequency and reason/s for missed doses; admitting ward; re-titration status; length of stay; time of psychiatrist and/or pharmacist review. A "missed clozapine dose" was defined as a dose not administered OR a dose ≥8 hours late. A missed clozapine dose was determined to be "accidentally missed" or "intentionally withheld" based on reason(s) for the missed dose. The audit was undertaken by one pharmacy student and four clinical pharmacists. Identifiable patient information was securely stored and accessible only by project staff. All data collected were de-identified.

Results: Overall, 77 missed clozapine doses were identified (125 patient admissions); 32 patients accidentally missed a dose (n=34 doses) and 15 patients (n=43 doses) intentionally had a dose(s) withheld. Patients admitted to ED were more likely to miss a clozapine dose compared to medical/surgical or mental health wards (ED=12/30[40%]; MedSurg=11/38[29%]; MH=9/57[16%]). 82 (66%) patients had a psychiatrist review during their admission; 7 of 38 (18%) patients reviewed within 6 hours accidentally missed a dose, despite an early review by a psychiatrist. 80 (64%) patients were reviewed by a pharmacist during admission, with zero patients missing a dose thereafter. Patients re-titrating clozapine, due to missed doses, stayed in hospital for 11 days longer than patients not re-titrating (ANOVA 95% CI, 6-to-16; p<0.001; NB:analysis excluded patients initiating clozapine).

Conclusion: In conclusion, we found that patients are at risk of missing clozapine doses when admitted to hospital. Our results showed that pharmacist reviews may prevent missed clozapine doses, especially when conducted early during the admission; and patients requiring re-titration due to missed doses had a significantly longer LOS. Future projects would benefit from investigating the implementation of strategies to prevent missed clozapine doses. Strategies may include providing education for junior doctors on charting stable clozapine doses on admission, implementing extended pharmacist hours in the ED, and use of clozapine alerts in a patient's electronic medical record.

Another form? Evaluating the intravitreal administration chart (IVAC) and whether it improved documented treatment plans

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RFTU-03 - Rapid Fire Session Tuesday, M1-M2, September 26, 2023, 2:30 PM - 4:00 PM

Background:
In our metropolitan ophthalmology clinic, intravitreal injection (IVI) plans were documented in the outpatient progress notes (OPN). To ensure the correct drug, frequency, and eye(s) were injected, a second source of documentation on a booking form (BF) was required to clarify the plan. However, both the OPN and BF often contained incomplete or missing information about IVI plans which was a risk to patient safety. It was identified that a new more structured documentation process and form was required.

Objective(s):
To develop an Intravitreal Injection Administration Chart (IVAC) to replace the BF and evaluate
whether it improved the clarity and documentation of IVI treatment plans.

Action (Method):
In consultation with the multidisciplinary ophthalmology team, a local medicines advisory group, and local forms committee, a new IVAC form was developed in July 2021 to replace the BF. OPN were still required to be used in addition to the new IVAC.
To evaluate, a retrospective audit of patients who received an IVI before (1/1/2021-9/7/2021) and after (10/7/2021-1/1/2022) the implementation of the IVAC was conducted. Additionally, ophthalmology clinical staff completed a survey to determine the acceptability of the IVAC.

Evaluation:
351 OPNs were extracted during the study period, with 83% (291/351) of these having incomplete IVI orders (134 pre- and 157 post-implementation). Of the 134 OPNs pre-, only 58 (43%) had an accompanying BF. Of the 157 OPNs post-, 151 (96%) had an accompanying IVAC. From the survey, 90% (18/20) of clinical staff stated they preferred the IVAC over the BF.

Discussion:
The form had great uptake by ophthalmologists, with almost all OPNs in the post period had accompanying IVACs. This represents a reduction in the likelihood of the incorrect IVI being ordered or administered, ultimately improving patient safety. As well as being safer, the form was well accepted by staff.

Investigating the research behaviours of hospital pharmacy staff: Capabilities, opportunities and motivations underpinning engagement

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RFTU-03 - Rapid Fire Session Tuesday, M1-M2, September 26, 2023, 2:30 PM - 4:00 PM

Background: The International Pharmaceutical Federation's Basel Statement 13 recognises that research into new methods and systems is an integral component of evidence-based clinical practice in hospital pharmacy. However, barriers to research engagement and conduct exist amongst hospital pharmacists and are unknown amongst hospital pharmacy technicians.

Purpose: To investigate the reasons underpinning the research behaviours of hospital pharmacy staff across Australia, with the view to developing behaviour change interventions to increase research capacity in the workforce.

Method: Purposive and convenience sampling was undertaken to identify five hospital sites (three metropolitan, one regional and one large rural according to the Modified Monash Model), and participants. Each hospital site lead was responsible for championing recruitment of at least five participants for a 30-45 minutes semi-structured qualitative interview. The interview guide was developed using the COM-B model for behaviour change that cites capability (C), opportunity (O) and motivation (M) as key factors capable of changing behaviour (B). Following e-consent via REDCap, virtual interviews were conducted (J.R.), audio recorded and transcribed using

Otter.ai., and video recorded in Microsoft Teams. Reflexive thematic analysis was used to conduct a preliminary analysis of the first 10 consented interviews (S.H.), which involved reading transcripts, annotating them in NVivo, watching video recordings to observe and interpret body language for further nuance and meaning, and grouping notes into common topics that produced semantic (descriptive) and latent (deeper meaning) codes.

Results: Thirteen codes have so far been identified in the interview data from six pharmacists and four technicians, majority working full time and in early to mid-career positions. The codes were assembled into initial candidate themes. In order of most common to least, they are: protected time; interest in research and collaboration (equally cited); knowledge and training; impact on quadruple health aims; leadership; value of improvement work; research success and technician scope of practice (equally cited); funding; pharmacists' changing roles and physical space (equally cited); and recognition. Collaboration and technician scope of practice were discussed more by technicians, compared to quadruple health aims and leadership by pharmacists. The themes appear equally aligned to the three factors of the COM-B model, with some cutting across all three factors, such as collaboration and leadership. To address these, participants suggested several locally appropriate interventions for implementation, the majority of which fall under interest in research, protected time, leadership and technician scope of practice.

Conclusion: The COM-B model of behaviour change uncovered key factors related to capabilities, opportunities and motivation that underpin research behaviours in hospital pharmacy staff. These will be validated and finalised on analysis of the remaining 16 consented interviews. A draft set of interventions will be developed and distributed via survey to participants to determine feasibility and acceptability. The final set will form a list of national recommendations to increase the research capacity of the hospital pharmacy workforce.

Factors influencing participation of clinical pharmacists in ward rounds in hospitals

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RFTU-03 - Rapid Fire Session Tuesday, M1-M2, September 26, 2023, 2:30 PM - 4:00 PM

Background: Ward rounds (WRs) are important for communication and decision-making regarding the management of patients in hospitals and provide an opportunity for pharmacists to be involved in the care of patients. Pharmacists' participation in WRs has also shown to reduce adverse drug events and improve medication appropriateness and communication. Available evidence suggests that WR participation by clinical pharmacists is currently limited.

Purpose: To explore the factors that impact WR participation by clinical pharmacists in Australian hospitals.

Method: A self-administered, anonymous survey of clinical pharmacists in Australia was conducted. The survey collected demographic information, and free text responses to questions relating to enablers and barriers to WR participation. The questions asked the respondents to describe past or current workplace experiences that facilitate or hinder WR participation, and what can be improved at an individual level, team level or organizational level to enable WR participation. Free-text responses were analysed thematically in Nvivo-2020. A reflexive thematic analysis was undertaken with an inductive approach utilizing semantic coding according to Braun and Clarke's technique.

Results: Ninety-nine responses were included in the analysis. Thematic analysis identified five themes that impact pharmacists' participation in WR: 'Clinical pharmacy service structure', 'Ward round structure', 'Pharmacist's capabilities', 'Culture' and 'Value'. 'Clinical pharmacy service structure' and 'Ward round structure' which encompassed organisational features (such as prioritisation of medication histories and reconciliation of medicines on admission) and WR features (such as the duration), determined whether there were opportunities for the clinical pharmacists' to be physically present with the broader health care team, expanding the professional relationship. A culture supportive of pharmacist's contribution to WRs and supported by a consistent WR structure with flexible delivery of the clinical pharmacy service enabled pharmacists' participation in WRs. Pharmacists using WRs as a platform to undertake clinical pharmacy activities and recognizing the value of being present at the time of decision-making, enabled them to see value in their participation in WRs. The responses of clinical pharmacists were also reflective of a unidirectional interprofessional relationship from the pharmacist to the clinical team. The clinical pharmacists that responded to our survey placed their focus on what they can provide to the team and ensuring that the team is aware of the role of the clinical pharmacist in a WR.

Conclusion: Being physically 'absent' from the ward round due to workload, workflow and self-perception of the need for extensive clinical knowledge can limit opportunities for pharmacists to proactively contribute to medicines decision making with physicians to improve patient care outcomes. Bidirectional communication between the interprofessional team and the pharmacist, where there is a co-construction of each individual's role in the ward round facilitates consistent and inter-dependent collaboration for effective medication management.

Safeguarding patient safety via Pakistan's first home grown bar-coded medication administration system developed and implemented at a private tertiary care hospital

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RFWE-02 - Rapid Fire Session Wednesday, P3-P4, September 27, 2023, 11:00 AM - 12:30 PM

Background: Preventable medication related errors continue to occur in different health care setups compromising the patient safety. Medication errors pose significant patient Safety risks related to transcribing, dispensing and administration of Medication orders. These include wrong drug, wrong route of administration, wrong dose, and wrong patient etc.
28% of all adverse drug events are due to Medication errors (Preventable errors) and 25% of the are due to LASA drugs1
The burden of medication errors can be estimated by the fact that the extra medical costs of treating drug-related injuries occurring in hospitals alone are at least to $3.5 billion a year, and this estimate does not consider lost wages and productivity or additional health care costs, the report says2
In terms of Government regulations governing Barcoding and traceability of medication there is no compliance from the manufacturers.
Furthermore, automation in hospital pharmacy setup is nonexistent there are not pharmacies in Pakistan where automated unit dose dispensing systems, automated dispensing cabinets or medication carousels dispensers are operational. There are no government subsidies on important of such equipment's.

Purpose: The aim of the implementation of BCMA is to aid physicians, pharmacist and nurses in the process of medication management and use to prevent medication errors / adverse events to enhance patient safety and quality of care.

Methods: The aim of the implementation of BCMA is to aid Physicians, Pharmacist and nurses in the process of medication management and use to prevent medication errors / adverse events to enhance patient safety and quality of care.
Medication management process is comprised of 8 steps starting with i) medication receiving, ii) medication labeling and storage, iii) transfer of medication from warehouse to pharmacy satellites, iv) ordering through CPOE, v) dispensing of medication, vi) medication review, vii) verification patient verification at bedside, and viii) mark administration in EMR.
Because of lack of automation technologies unique solutions were developed where Data Matrix and QR code labels are used and pasted manually on all medication dispensing units inclusive of unit dose and commercial primary or secondary packaging.

Barcode equipment were installed in satellites along with scanners and medication trolleys. In house Data Matrix and QR Barcode labels were initiated / generated for stored medication before transferring to any of the satellite in hospitals.
BCMA was installed and implemented from prescribing of medication orders till administration of medications.

Results: After implementation of BCMA analysis / examination showed a significant decreased in 50% decrease in annually reported medication related to medication administration and 74% decrease in annually reported medication errors. More than 1900 medications errors were prevented in 4 years since 2019.

Conclusion: BCMA technology played a vital role in safeguarding patient's safety in the hospital by preventing the medication errors from dispensing till administration.

Documenting for safety: How real-time documentation of medication changes improve physician–Pharmacist communication and prevent medication errors at discharge

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RFWE-02 - Rapid Fire Session Wednesday, P3-P4, September 27, 2023, 11:00 AM - 12:30 PM

Background: During the transition of care, timely and properly documenting medication changes is vital for ensuring medication safety. If a physician's intention to change a medication is not appropriately communicated to the nurse and pharmacist, breakdowns in communication can occur during medication preparation or administration, and the physician may also fail to record the change in the discharge summary.

Purpose: We aimed to investigate the impact of real-time documenting in-hospital medication changes on documentation errors at discharge.

Methods: We conducted a retrospective, observational cohort study in a tertiary hospital from April to June 2020. In-hospital medication discrepancies were determined by comparing preadmission and hospitalization medication lists and it was verified whether the physician's intent of medication changes was clarified by free-text documentation in the electronic order entry system. We also

conducted a pharmacists' survey for understanding the physician's intent, communication and saving times of pharmacist's work. By a documentation rate of medication changes of 100% and <100%, respectively, appropriately documented (AD) and inappropriately documented (ID) groups were defined. Any undocumented medication change at discharge was considered a 'documentation error at discharge'. The factors associated with documentation errors at discharge were analyzed using multivariate logistic regression.

Results: After reviewing 400 medication records with 1,201 episodes of medication discrepancies with or without free-text documentation in the electronic order entry, patients were categorized into AD (n=245, 61.3%) and ID (n=155, 38.8%) group. Documentation errors at discharge were significantly higher in the ID group than in the AD group (65.8% vs. 33.9%, p <0.001). Factors associated with documentation errors at discharge included belonging to the ID group, discharge from a non-hospitalist-managed ward rather than a hospitalist-managed ward, and having three or more intentional discrepancies. Favorable attitudes of pharmacist's were observed toward physician's real-time documenting of medication changes.

Conclusion: Appropriate documentation of in-hospital medication changes facilitated by free-text communication significantly decreased documentation errors at discharge. This analysis underlines the importance of initiating medication reconciliation at the physician level when writing orders and highlights the role of communication between pharmacists and hospitalists in improving patient safety during the transition of care.

Keywords: Human error, Medication reconciliation, Medication safety, Patient safety, Transitions in care, Hospital information systems, Hospital discharge, Quality audit.

Measuring equity of clinical pharmacy service provision at the regional and rural hospitals in Australia

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RFWE-02 - Rapid Fire Session Wednesday, P3-P4, September 27, 2023, 11:00 AM - 12:30 PM

Background:Provision of medication action plan (MAP) on admission and discharge medication record (DMR) are associated with reduced medication-related harm.

Purpose To develop clinical pharmacy key performance indicators dashboard and evaluate coverage and equity of service provision at the regional and rural hospitals.

Method 12-month retrospective period-prevalence study. The proportion of patients who received MAP and DMR were stratified by age, gender, Indigeneity and hospital type. Statistical analysis was performed using Chi-Squared tests and logistic regression in R. Ethics exemption EX/2023/QCH/94383-1684QA.

Results 13,818 patients (37.9% of admissions) received MAP and 11,631 patients (32.7% of discharges) received DMR. The proportion of MAP and DMR was significantly higher at the rural hospitals compared to the regional hospital (MAP 50.6% vs 34.6%; DMR 33.1% vs 31.3%) and for male patients compared to female (MAP 42.2% vs 33.7%; DMR 36.4% vs 29.2%). When stratified by age groups, First Nations patients received higher proportion of MAP and DMR in each age group except for age 85 and over. The proportion of First Nations patients 50 and over who received MAP was significantly lower compared to non-Indigenous patients 65 and over (56.3% vs 59.8%), whilst the proportion of DMR was similar. The proportion of female patients 50 and over of the First Nations origin who received a MAP was significantly lower compared to the proportion of female patients 65 and over of non-Indigenous origin (56.1% vs 61.2%) and the proportion of DMR was similar.

Conclusion The study defined clinical pharmacy key performance indicators for measuring equity of clinical pharmacy service provision in Australia. When adjusted for a difference in life expectancy, the proportion of First Nations patients who received MAP on admission was lower compared to non-Indigenous patients. Further improvements are required to establish prioritisation criteria to achieve equity of service provision for First Nations and female patients.

Development of pharmaceutical care competency framework in China: A qualitative study in hospital pharmacy

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RFWE-02 - Rapid Fire Session Wednesday, P3-P4, September 27, 2023, 11:00 AM - 12:30 PM

Objective: With the currently accelerating changes in pharmacists' roles and pharmacy service needs in China, evidence-based developmental tools are required to guide initial pharmacy education and define competencies for hospital pharmacists' progression and provide pharmaceutical care for patients. This study aimed to develop a competency framework of pharmaceutical care for hospital pharmacists in China.

Methods: A behavior event interview (BEI) method was used to gain understanding of the pharmaceutical care competency needs for the hospital pharmacists. A semi-structured interview schedule was developed and reviewed by experts in hospital pharmacy. A total of 22 eligible hospital pharmacists from large tertiary medical institutions from seven regions of China were interviewed. The interview

process was audio recorded and transcribed verbatim by an independent experienced transcriber. The competency themes and sub-themes were then extracted from the interview contents by the researcher who conducted the interview to develop the framework.

Results: Twenty-two pharmacists meeting the inclusion criteria were interviewed between January and April 2023. The results are coded into four major themes: professional competency, innovation capacity, interpersonal skills, management and leadership. The four major themes then included 15 sub-themes: (1) professional competency (expertise, professional skills, continuous learning, information retrieval); (2) innovation capacity (latest technology adoption, academic article writing, process optimization); (3) interpersonal skills (service mindset, accoutability, teamwork, empathy); (4) management and leadership (crisis management, inter-departmental coordination, strategic planning, execution).

Conclusion: This study proposes the first competency framework of pharmaceutical care for hospital pharmacists in China. The developed framework serves as a guidance for the pharmacists to shift from “medication-focused” to “patient-focused” paradigm. The framework can be used as a reference for further improvement of initial pharmacy education and support excellence in pharmacists’ performance to address the country’s needs from pharmaceutical services, to provide higher quality pharmaceutical services to ensure patients’ rational medication use.