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CONFERENCE ABSTRACTS

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Hospital pharmacy

Retrospective analysis of infusion-related reactions following parenteral administration of cytostatic drugs in a tertiary cancer center

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Introduction: Several anticancer therapies administered by the parenteral route carry a risk for infusion-related reactions (IRRs) in the form of adverse events that typically occur within minutes to hours after drug infusion. They are not only a very unpleasant complication of treatment for the patient, but their management prolongs hospitalizations, increases costs and burdens staff. Pharmacists being the drug experts have the central role in ensuring drug safety by detecting, reporting, monitoring and preventing adverse drug events, including IRRs.

Aim and Method: With the aim of potentially optimizing the procedures for managing and documenting of IRRs during parenteral administration of anticancer drugs, we at the Institute of Oncology Ljubljana decided to analyze the incidence of IR and their management. The purpose of this retrospective study is to analyze the incidence and characteristics of reported IRRs recorded in patients treated with chemotherapy between 2019 and 2023. The study included all patients who experienced an IRRs during parenteral administration of chemotherapy during this period. We determined during which cycle of therapy IRs occurred, how often patients continued with the administration of the drug on the same day after symptom resolution, and the frequency and success of desensitization.

Results: Our study revealed that In patients who received a total of 160,759 administrations of 14 cytostatic drugs, IRRs were reported in 403 cases. The highest incidence of IRRs was recorded for pegylated liposomal doxorubicin (7,42 %), followed by oxaliplatin (6,91 %) and paclitaxel (3,10 %), with a slightly lower incidence for carboplatin (1,95 %). Other agents had significantly lower IRRs incidence (below 1 %). Anthracyclines and taxanes caused IRRs during the first or second therapy cycle, whereas IRRs to platinum compounds appeared later, with a median around the 7th therapy cycle. After an IRR, patients continued the drug administration on the same day after symptoms subsided for pegylated liposomal doxorubicin (95 %), docetaxel (93 %), and paclitaxel (73 %). For other agents, the percentage was significantly lower, with the lowest being for carboplatin and oxaliplatin, where only 6 % and 7 % of patients, respectively, continued therapy on the same day. The trend was similar in subsequent therapy cycles, with the highest continuation rates for docetaxel (86 %), pegylated liposomal doxorubicin (84 %), and paclitaxel (81 %). The lowest continuation rates were again observed with platinum compounds (around 25 %). Upon re-exposure to the drug that initially caused an IRR, the recurrence of IRR was low, occurring in approximately 20 % of patients. When desensitization was used, the recurrence of IRR was further reduced by at least 50 %.

Conclusion: The data collected in this study will contribute to a better understanding of IRRs, which is crucial given the increasing incidence of cancer and the consequent greater use of cytotoxic agents.

Analysis and management of drug shortages in a regional Hospital (2021-2024)

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Background and Objectives: Recent events, such as global pandemics and warfare, have intensified the problem of drug shortages. This research examines the scale and impacts of these shortages in a regional hospital in Taiwan from 2021 to 2024, while also discussing potential countermeasures.

Methods: We collected and analyzed data on various drugs that were in shortage between 2021 and 2024. The study assessed the forms and pharmacological classifications of the affected drugs, the reasons behind the shortages, the average duration of the shortages, and alternative solutions.

Results and Discussion: A total of 417 drug shortage incidents were recorded, with the highest number of shortages in 2022 (35%). The most commonly affected dosage form was oral medications (55.64%), followed by injectables (33.57%). The main cause of shortages was manufacturer production capacity limitations (44.6%), followed by raw material shortages (21.8%). Based on pharmacological classification (using the first four characters of the ATC code), the most affected category was J01C (4.8%), followed by A10B (3.36%) and N05A (3.12%). In addition, generic drugs accounted for 45.2% of the total shortages. The most common alternative solutions for shortages included using drugs with the same pharmacological class or active ingredient (41.5%), followed by using drugs with the same active ingredient and specifications (49.4%), with 9.1% relying on existing stock to cope with the situation.

Conclusion: This study revealed the drug shortage issue in a regional hospital from 2021 to 2024, with the highest frequency occurring in 2022 -possibly related to the COVID-19 pandemic. The main cause of the shortages was insufficient manufacturing capacity. The finding emphasized the importance of strategic planning and reliable alternatives to minimize the impact on patient care. Future efforts should focus on strengthening supply chain stability and implementing predictive measures.

Gastroesophageal Reflux Disease (GERD): An ayurvedic overview of Indian system of medicine & role of hospital pharmacist

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Introduction: Gastroesophageal Reflux Disease (GERD) is a chronic digestive disorder characterized by the backflow of stomach acid into the esophagus, leading to symptoms such as heartburn, regurgitation, and chest pain. Modern treatments often focus on symptom management but can have side effects and may not address the underlying causes. Ayurveda offers a holistic approach by considering GERD as Amlapitta, which results from an imbalance of the Pitta Dosha. This perspective fills a gap in current research by providing a natural and personalized treatment strategy that complements modern medicine. Purpose: The objective of this study is to explore the Ayurvedic management of GERD, focusing on herbal remedies, dietary modifications, detoxification therapies, and yoga practices. We hypothesize that Ayurvedic treatments can effectively manage GERD symptoms by balancing the Pitta Dosha and enhancing digestive health, thereby improving quality of life and preventing complications.

Method: This study involves a comprehensive review of Ayurvedic literature and clinical practices related to GERD management. It examines the use of herbal remedies like Amla, Licorice, and Triphala, as well as Panchakarma therapies such as Virechana and Shirodhara. The study also considers dietary adjustments and yoga practices recommended in Ayurveda for GERD treatment. Data collection involves analyzing existing research on Ayurvedic treatments for GERD and evaluating their efficacy in clinical settings.

Results: The findings indicate that Ayurvedic treatments can significantly reduce GERD symptoms by addressing the root cause of the disorder—Pitta Dosha imbalance. Herbal remedies such as Amla and Licorice have been shown to neutralize acidity and soothe the esophagus lining, respectively. Triphala aids digestion and prevents acid build-up, while Shatavari promotes gut healing by balancing Pitta Dosha. Detoxification therapies like Virechana help remove excess Pitta from the body, and Shirodhara relieves stress, a major GERD trigger. Yoga practices, including Vajrasana and Bhujangasana, strengthen digestion and reduce acid reflux. Additionally, dietary modifications such as consuming cooling foods like coconut water and buttermilk have been effective in managing GERD symptoms.

In a sample of 500 individuals, the prevalence of GERD was observed to be highest among the younger generation, with

30% of those aged 25-35 years experiencing symptoms, followed by 25% in both the 35-45 and 55-65 age groups, and 20% in the 45-55 age group. This distribution highlights the importance of early intervention and lifestyle adjustments in preventing and managing GERD across different age groups. For instance, a case study involving 50 GERD patients showed a significant reduction in symptoms after adopting a Pitta-pacifying diet and practicing stress-reducing yoga asanas.

Conclusion: This study demonstrates the effectiveness of Ayurvedic treatments in managing GERD by providing a holistic approach that complements modern medical practices. The Ayurvedic perspective offers personalized care with minimal side effects, improving patient outcomes and quality of life. Future research should focus on integrating Ayurvedic methods with conventional treatments to enhance the management of GERD and other digestive disorders. Suggestions for future work include conducting clinical trials to validate the efficacy of Ayurvedic treatments for GERD and exploring their potential in preventing complications associated with the disease.

Development and implementation of an emergency department migrant prescription program

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Background: The city of Chicago (USA) has been a sanctuary city for 38 years. During the peak of the migrant crises, various states took advantage of this by bussing their migrants to Chicago. Since one of the migrant housing facilities was near the University of Illinois Hospital, many migrants were presenting to our emergency department (ED) for care, needing medications at discharge. They did not have money for their prescriptions or the means for transportation to go elsewhere to get them. During the day, they were directed to the pharmacy department's medication assistance program (MAP) located in our Specialty Care Building (SCB) outpatient pharmacy. When migrant patients presented to the ED after hours, they either spent the night in the ED waiting room until the MAP opened the next day or left without getting their medications. The C-Suite asked the Executive Director of Pharmacy to develop and implement a program to meet the migrants' prescription needs when the SCB pharmacy was closed. Purpose: To implement a program that would allow migrant patients to have their prescriptions filled when being discharged from the ED when the MAP is closed, thereby ensuring that they would always receive their medications and counseling regardless of discharge timing.

Methods: A multidisciplinary committee was developed and chaired by the Executive Director of Pharmacy. Membership included ED clinical pharmacists, an ED attending physician, C-Suite leadership, senior pharmacy leadership, and the program director of the PGY1 pharmacy residency. Since the goal was to implement this program quickly, it was patterned after the sexual assault patient program where their prescriptions are filled by our central pharmacy staff when our outpatient pharmacies are closed. Key to the ED migrant program was the use of our PGY1 pharmacy residents as they are on call evenings and weekends. They were involved in the majority of the steps required to provide prescriptions and counseling to the migrant patients. A formulary was developed for this program by the committee. The program did allow medications not on the formulary to be prescribed if deemed medically necessary by the physician. Hospital leadership agreed to underwrite the cost of the medications which was expected to be minimal. Prior to program rollout, all involved were appropriately trained.

Results: In the first nine months, 57 migrant patients seen in the ED had a total of 112 prescriptions filled by this program. Approximately 60% of the prescriptions written were for ibuprofen, acetaminophen, and ondansetron. The top three anti-infective agents were amoxicillin, followed by cephalexin and amoxicillin/clavulanate. Importantly, all migrant patients presenting to the ED after hours needing medications received them with counseling by the pharmacy resident. The total drug spend was estimated to be less than $500.

Conclusion: A robust multidisciplinary ED migrant prescription program run out of the central pharmacy met the needs of this patient population when our outpatient pharmacy was closed. We believe that this program is reproducible at other hospital pharmacies, especially those in academic medical centers.

Assessing the effect of pharmacist counselling on adherence to antihypertensive medication therapy at a quaternary hospital in Ghana

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Background: Hypertension is a significant public health challenge, particularly in developing countries like Ghana, where obstacles such as cultural beliefs, financial constraints, and inadequate healthcare access hinder effective management. Medication adherence is crucial for controlling hypertension and reducing complications. Purpose: This

study evaluated the impact of pharmacist counselling on patients' adherence to antihypertensive medication therapy at the University of Ghana Medical Center.

Methods: A cross-sectional study was conducted at the outpatient department of the University of Ghana Medical Centre from 1st June to 30th July 2024, involving patients who had received pharmacist counselling on any of the following; "medication side effects, dosage instructions, lifestyle changes, reason for use of the medication, and length of therapy" regarding their antihypertensive medications. Data on patient demographics, adherence levels, and pharmacist counselling outcomes were collected through structured questionnaires and exit interviews. The data were analyzed using descriptive and inferential statistics, and presented in frequencies and percentages.

Results: A total of 332 patients participated in the study. 168 (50.60%) were females and 164 (49.40%) were males. 57.83% were 60 years old and above, while 42.17% were less than 60 years old. Prior to receiving pharmacist counselling, 21.08% of the participants stated that they consistently adhered to their antihypertensive medications (never missing medication doses), while 40.06% reported sometimes missing doses. After counselling, 23.49% of patients communicated never missing medication doses and 30.42% mentioned rare misses. Critical adherence challenges reported by participants included forgetfulness (41.6%), side effects of medication (6.90%) and cost of medication (13.30%).

Conclusion: The study highlighted the critical role of pharmacist counselling in enhancing patient adherence to antihypertensive medication therapy; emphasizing the importance of integrating pharmacist counselling into the healthcare framework, focusing on patient education, and collaborative care. Addressing the identified barriers to adherence and leveraging the strengths of pharmacists could significantly improve health outcomes for patients with hypertension in Ghana and similar settings.

The evolving role of pharmacists in patient care: A retrospective review at a quaternary teaching hospital in Ghana

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Background: Pharmacists play a vital role in modern healthcare, transcending traditional medication dispensing to encompass clinical interventions, pharmacovigilance, patient counselling, medication information services, and interprofessional collaboration. In hospital settings, pharmacists significantly contribute to optimizing patient outcomes, minimizing medication errors, and enhancing healthcare efficiency. Globally, the role of hospital pharmacists has shifted from a product-centered to a patient-centered approach. Purpose: This study aimed to evaluate the role of pharmacists in patient care at the University of Ghana Medical Centre, Ghana.

Methods: This retrospective observational study was conducted at the University of Ghana Medical Centre, a quaternary teaching hospital in Ghana, from January 1, 2024, to December 31, 2024. Data documented by Pharmacists on the electronic medical records as well as KoboCollect tool was extracted onto Microsoft excel Version 16 for cleaning and analyzed using SPSS version 27. Descriptive and inferential statistics were used. Results are presented in frequencies and percentages.

Results: A total of 632 medication related problems for which interventions were offered were documented from 25 wards in the hospital. The highest documented pharmaceutical care issue was "dosing problem" (43.8%), followed by "drug choice problem" (26.1%). Of the interventions offered by Pharmacists, 94.3% were fully accepted, 4.1% were partially accepted, and 1.6% were not accepted by the clinical team. 48.6% of the interventions were made at a point where the error had not reached the patient, 15.2% at a point where the error had reached the patient with no harm caused, and 2.8% of the interventions had error reaching patient requiring monitoring or an intervention to preclude harm. 24.7% of pharmaceutical care issues were detected during pharmacist reviews, while 26.3% were detected during the discharge process. A total of 186 queries were received by Pharmacists and responded to. 98.4% were made within the hospital. Medical doctors were the highest number of professionals making enquiries representing 55.90%, followed by nurses 40.9%. A total of 397 ward rounds were documented to have been attended by pharmacists in the hospital with multidisciplinary team ward rounds accounting for 67.8% while pharmacist only ward rounds accounted for 32.20%. A total of 95 adverse drug reaction reports were documented by staff of the hospital, with Pharmacists being the cadre of staff documenting the highest (90%). A total of 92.63% of adverse drug reaction reports were on medications prescribed, with 69.47% of patients recovering from the adverse drug reactions.

Conclusion: This study provides valuable insights into the impact of pharmacists on patient care, highlighting their critical role in optimizing patient outcomes. The findings support recommendations for strengthening hospital pharmacy services in Ghana

Pharmacy workforce sustainability in the United States: Assessing hospital pharmacists' well-being and work environments using the NIOSH WellBQ

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Background: The National Pharmacist Workforce Study (NPWS) is a systematic, nationwide survey of licensed pharmacists in the United States that is conducted every five years. The NPWS describes and trends over time pharmacists' demographics, employment characteristics, and work perceptions. Recent reports and news stories in the U.S. have illustrated how organizational policies, practices, and poor working conditions are negatively affecting the health and well-being of pharmacists. The 2024 NPWS incorporated NIOSH WellBQ survey items to more holistically assess pharmacists' well-being across five domains: (1) Work Evaluation and Experience; (2) Workplace Policies and Culture; (3) Workplace Physical Environment and Safety Climate; (4) Health Status; and (5) Home, Community, and Society. The 2024 NPWS is the first study to use the NIOSH WellBQ to assess pharmacists. Purpose: Using data from the 2024 NPWS, the purpose of this study was to: (1) characterize United States hospital pharmacists' well-being and work environments using the NIOSH WellBQ, and (2) explore differences in hospital/health-system pharmacists' well-being and work environments based on demographics and employment characteristics, such as gender, race, age, and hospital type/size.

Methods: The 2024 NPWS utilized an online, cross-sectional, descriptive survey design. An online Qualtrics survey was sent using a 3-contact approach to a random sample of 198,000 licensed pharmacists drawn by the National Association of Boards of Pharmacy Foundation. Data analyses were conducted using SPSS Statistical Software and consisted primarily of descriptive statistics.

Results: The 2024 NPWS had a usable response rate of 89.7% (5,110/5,697) based on those who clicked the survey link. A subset of pharmacist responses was used for this analysis, which included 816 actively practicing pharmacists in hospital/health-system settings. Hospital pharmacists' reported satisfaction with aspects of their current employment included 79.5% that were satisfied (somewhat/very) with their job overall and 78.5% that were satisfied with their compensation, however, only 55.7% were satisfied with their chances for advancement or promotion. When evaluating their work environments and culture, 59.4% agreed (somewhat/strongly) their organization cares about their general satisfaction at work. Only 54.2% of hospital pharmacists reported they trust the management/leadership in their organization and only 53.1% believe their organization is willing to extend resources to help them perform to the best of their ability. The majority of hospital pharmacists reported their health was very good (38.7%) or good (34.7%). In the past 30 days, the average poor physical health days reported was 3.4 and the average poor mental health days was 7.2. The average poor mental health days for hospital pharmacists ages 24-30 years was 9.7 (one every 3 days).

Conclusion: Employers implementing changes to their policies, programs, and practices that improve work environments and promote pharmacists' well-being is critical for retaining pharmacists in the health care workforce and pharmacy profession. Opportunities for improving hospital pharmacists' well-being include creating more opportunities for promotion and advancement, providing adequate resources, facilitating caring and trusting relationships between pharmacy leaders and frontline pharmacists, as well as processes for navigating mental health concerns and poor mental health days, especially among younger pharmacists.

Pharmaceutical care for a tumor patient with interstitial lung disease due to EGFR-TKI and AIDS opportunistic infection

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Introduction: AIDS patients with tumors face significant challenges when treated with EGFR-TKIs, with interstitial lung disease occurring in up to 5.3% of cases, potentially higher in Asian populations. The presence of AIDS increases the risk of opportunistic infections, complicating the differentiation from EGFR-TKI-induced lung disease. Additionally, drug-drug interactions and necessary dose adjustments raise mortality risks. Despite these complexities, evidence-based guidelines for managing drug therapy in this population remain scarce. This study aims to provide guidance on pharmaceutical care for AIDS patients with tumors, emphasizing the importance of careful management of therapeutic agents.

Method: We report a case of an AIDS patient with pulmonary adenocarcinoma who experienced recurrent interstitial lung disease during targeted therapy. Bacterial and fungal infections were also considered. Clinical pharmacists delivered pharmaceutical care, which included medication monitoring, drug reconciliation, and adverse reaction assessment.

Results: The patient's use of Amivantamab was highly likely related to the adverse reactions, particularly interstitial lung disease. The clinical pharmacist recommended suspending targeted therapy drugs and implementing a hormone medication monitoring plan. For the potential pathogens associated with AIDS opportunistic infections, it was advised to discontinue ertapenem and foscarnet sodium. Monitoring of voriconazole levels was conducted, and the antifungal treatment regimen was adjusted accordingly. Due to drug-drug interactions and the patient's overall condition, the anti-AIDS regimen was modified to include bictegravir sodium, emtricitabine, and tenofovir alafenamide. Preventive medications, including compound sulfamethoxazole, nadroparin calcium, and esomeprazole, were also recommended to address the risk of Pneumocystis carinii pneumonia, thrombosis, and gastric mucosal injury. The physicians followed the clinical pharmacists' recommendations, resulting in a positive outcome for the patient, who experienced no significant adverse reactions or drug interactions and was discharged smoothly.

Conclusion: AIDS patients with tumors present complex clinical challenges due to their coexisting conditions and the multitude of therapeutic agents used. It is crucial for clinical pharmacists to perform thorough drug treatment management, including drug reconciliation and medication monitoring, while providing tailored pharmaceutical care to ensure medication safety and efficacy for these patients.

Reducing the incidence of multidrug-resistant pneumonia in neurosurgical patients: Pharmaceutical prevention and control based on rational use of antibacterial drugs requires more attention

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Objective: Among the many challenges faced in the field of neurosurgery, multidrug-resistant (MDR) pneumonia is an important and potentially reversible risk factor that severely affects patient prognosis. This study aimed to identify risk factors for MDR pneumonia in neurosurgical patients, construct a predictive model, and provide a clinical tool for early identification of high-risk populations, ultimately improving patient outcomes.

Method: We retrospectively collected 35 variables encompassing clinical data, early laboratory test results, and antimicrobial prescriptions from neurosurgical patients. Univariate and stepwise regression analyses were used to screen variables to determine predictive factors, and a nomogram was constructed in the training group based on the results of the logistic regression model. Using the validation group, discrimination, calibration, and clinical applicability were assessed based on the receiver operating characteristic curve, calibration curve, and decision curve analysis (DCA).

Results: Among 3,397 patients admitted to the neurosurgery department of the First Affiliated Hospital of University of Science and Technology of China between January 1, 2021, and September 30, 2024, 438 patients had pulmonary infections, including 208 patients with MDR pneumonia and 230 patients with non-MDR pneumonia. We randomly divided these patients into a training group (70%, N = 307) and a validation group (30%, N = 131). The nomogram consisted of only six predictive factors: augmented renal clearance (ARC) (OR=2.87; 95% CI=1.603–5.319), hypoproteinemia (OR=2.568; 95% CI=1.347–4.896), combination of antibacterial drugs (OR=3.68; 95% CI=1.877–7.216), the Day 1 neutrophil-to-lymphocyte ratio (OR=0.956; 95% CI=0.927–0.985), reduced hemoglobin (OR=0.972; 95% CI=0.96–0.985), and tracheostomy (OR=2.292; 95% CI=1.162–4.521), which demonstrated significantly higher sensitivity and specificity in the early identification of MDR pneumonia (AUC of the training group = 0.816, AUC of the validation group = 0.797) and good calibration. DCA confirmed the clinical applicability of this nomogram.

Conclusion: This study was the first to identify ARC as an independent risk factor for MDR pneumonia in neurosurgical patients and innovatively established a practical predictive model incorporating six variables. Notably, three key predictors-ARC, hypoproteinemia, and combination of antibacterial drugs - were closely associated with rational use of antibacterial drugs. Therefore, for MDR pneumonia in neurosurgical patients, pharmaceutical prevention and control measures based on the rational use of antimicrobial agents should receive more attention. With the help of this model, pharmacists can implement pharmaceutical intervention measures such as rational selection of antimicrobial agents, therapeutic drug monitoring, optimization of combination regimens, and timely de-escalation. These efforts can contribute to enhancing the rational use of antimicrobial agents and reducing the incidence of MDR pneumonia in neurosurgical patients.

Risk factors associated with inequalities in antibiotic-resistant bloodstream infections: A rapid umbrella review with considerations of opportunities for pharmacy professionals

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Introduction: National surveillance data published in high-income countries, including England, USA and Germany, have reported disparities in rates of resistant infections in the most deprived compared to the least deprived groups, and in minority ethnic groups. Pharmacists play a key role in combating antimicrobial resistance, as highlighted in the FIP policy on antimicrobial stewardship (AMS) and FIP Development Goals 16 and 17. Pharmacists are also integral to tackling health inequalities as highlighted in a 2024 update to the definition of Pharmaceutical Public Health (PPH) as "the application of pharmaceutical knowledge, skills and resources to the science and art of preventing disease, prolonging life, promoting, protecting, improving health and reducing health inequalities for all through organized efforts of society". This rapid umbrella review aimed to synthesize evidence from systematic reviews and meta-analyses to identify risk factors associated with disparities in the incidence and outcomes of antibiotic-resistant bloodstream infections (AR-BSIs) and to consider reported interventions.

Methods: Two databases (Embase, Cochrane Library) were searched in November 2024, for papers published from 01/01/1990, combining MeSH and free-text terms for antibiotic resistance, BSI risk factors, health equity, systematic review. No geographical or language restrictions were applied. Eligible reviews included assessment of AR-BSIs. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses Equity extension (PRISMA-E) abstract guidance was followed, and protocol registered on PROSPERO, CRD42024615358.

Results: Of the 148 eligible systematic review studies from Embase, 34 were independently selected by two researchers following title and abstract screening. One review was identified from Cochrane Library. The number of studies in the reviews ranged from 10 to 271 and involved 74 countries (Italy (6), USA, Turkey, China, Greece, India (5 each), Brazil, Taiwan, Korea, Germany, Australia, United Kingdom (4 each). Disparities in resistant infections were reported for age, gender, geographical regions or countries. Examples of risk factors reported were comorbidities (oncology, transplant, renal disease), invasive devices/procedures, ICU admission, exposure to antibiotics, malnutrition, hospital environment and prior bacterial colonisation. One example of reported intervention to mitigate risk factors on the burden of AR-BSIs was intrapartum antibiotic prophylaxis (IAP) strategy which was associated with reduced risk of Early-onset Group B Streptococcus (EOGBS) infections in low and lower-middle income countries. Many reviews reported limitations of heterogeneity, publication bias, and low-quality studies.

Conclusions: Despite evidence from national surveillance reports, published evidence in the literature on risk factors causing disparities in AR-BSIs beyond socioeconomic status is sparse. This is partly due to variability in recording and reporting across and within manuscript sections, impeding comparability and utility of available data. The risk factors identified from this review can be used to investigate linked electronic health record databases to model disease burden and ascertain potential interventions. Although very few interventions were identified from the literature, the identified intervention an antibiotic prophylaxis is an important antimicrobial stewardship measure for which pharmacists have a key role. Further work is required to identify how pharmacists can proactively contribute to reducing inequalities in the incidence of resistant infections and antibiotic use/exposure

TOP Hospital Pharmacy - The excellence of hospitals: Applying key performance indicators to assess hospital pharmacies performance in Portugal

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Introduction: Although most hospital pharmacies collect information and indicators for certification, accreditation and internal reporting purposes, there is currently no standardised system at national level that allows them to measure and compare their performance in a quantitative and objective way. The "TOP Hospital Pharmacy", led by the Portuguese Pharmaceutical Society in partnership with IQVIA Portugal, was designed to assess the performance of hospital pharmacies using a set of standard key performance

indicators (KPI), with the aim of identifying areas of excellence and opportunities for improvement.

Method: After defining a set of 85 KPI for a more holistic evaluation of hospital pharmacies, a sub-group of 13 KPI, divided into three performance dimensions, were selected to assess hospital pharmacies performance: Consumption and preparation of drugs, Clinical activities and Patient safety. The second phase of the study had as its main objective the evaluation of the performance of hospital pharmacies, having been divided into seven stages: I) invitation to all 44 public hospitals, excluding oncology hospitals due to their particularities; II) creation of four clusters of hospitals that share similar characteristics such as the number of beds or level of differentiation, allowing comparison of intra and inter cluster results; III) creation of surveys; IV) creation of the technical sheet for each indicator; V) creation of the individualized performance profile for each pharmacy; VI) collection and analysis of data regarding pharmacy performance in 2023; and VII) organisation of a public event to present and discuss the results.

Results: 77% (n=34) of the hospitals participated in the study. There were 712 Full-Time Equivalent (FTE) Pharmacists in the participating hospitals, with the number per hospital varying between 7.8 and 50.7 across different clusters. In these hospitals, there were 17,470 patients being treated with Biosimilar medicines and 8,260 with Biological medicines, corresponding to a ratio of 2.1 patients treated with Biosimilars.
A total of 658,684 sterile preparations were recorded (445,901 non-sterile) and a ratio per 1,000 patients discharged that varied between 316 (46) and 1,597 (1,575) between the hospital clusters.
Although 68% of hospitals report the participation of hospital pharmacists in medical visits and multidisciplinary meetings, the average annual number per FTE pharmacist was 5.9 visits and 4.6 meetings.
Of the 62% of hospitals that perform outpatient pharmaceutical consultations, only 11,825 consultations were recorded, corresponding to a ratio per FTE pharmacist of 16.6 per year. Hospitals in the university cluster record a ratio of 8 consultations/year.
Only 41% of hospital pharmacies have implemented therapeutic reconciliation protocols during the patient admission process, founding that therapeutic reconciliations were performed in only 4.1% of discharges, with this value varying between 0.5% and 7.5% between hospital clusters.
542 adverse drug reactions were reported by pharmacists, which corresponds to a ratio per 1,000 patients of 0.8 notifications, varying between 0.3 and 1.6 between clusters.

Conclusion: Despite challenges in implementing performance evaluation and comparison between hospital pharmacies, it is important to highlight the motto of this initiative: the creation, definition and implementation of these KPIs was developed "from pharmacists, by pharmacists, for pharmacists".

Reasons for hospitalization among patients with type 2 Diabetes mellitus in a primary care hospital in Ghana

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Background: Diabetes mellitus is one of the fastest growing public health problems worldwide. People with type 2 diabetes have higher rates of diabetes-related hospital admission than the general population and they require longer periods of hospitalization. Understanding the reasons for admissions among patients with diabetes can provide valuable insights into the burden of diabetes and its complications. The study will also help direct policy makers in implementing prevention and education strategies and economic changes as needed.
General Aim: To assess the characteristics and reasons for hospitalization of patients living with type 2 diabetes mellitus admitted to a primary care hospital in Ghana.

Methodology: A retrospective study was conducted with data from the electronic medical records (EMR) of the Korle Bu Polyclinic /Family Medicine Department (KBPFMD). A total enumeration of all patients with type 2 diabetes mellitus, admitted from January 2023 to December 2023 was processed and filtered using Microsoft Excel format. The extracted data included patient age, sex, admission date, NHIS status, occupation, provisional diagnosis, final diagnosis, medications prescribed and outcome of admission. The retrieved data was cleaned and imported into jamovi 2.3.28 for descriptive analysis.

Results: One hundred and thirteen (113) patient's data were retrieved. Sixty-five (57.5%) were females and forty-eight (42.5%.) were males. Fourty-three patients (42.5%) were aged above 60 years, constituting 38.1% of the total. The mean age was 57 years with a standard deviation of 15.8. A total of 100 (75.2%) subjects were on admissions because of metabolic and endocrine issues related to diabetes. Cardiac-related ailments followed, representing 9.0% of admissions. kidney-related conditions accounted for 8.2% of admissions whiles infection-related admissions comprised 6.0% of cases. Furthermore, a small proportion of admissions were attributed to ophthalmologic conditions and medication-related problems each accounting for 0.8% of cases, indicating specific eye-related concerns and medication-related complications, respectively. Majority of the patients

were discharged while the minority were either referred to other facilities or died.

Conclusion: In study, the main reason for hospitalization among the adult type 2 patients at the KBPFMD was metabolic and endocrine conditions related to diabetes. This study suggests the need to implement facility tailored and practitioner level strategies to improve education on the prevention and management of Type 2 diabetes mellitus. These strategies can help reduce avoidable diabetes related complications and hospitalization. This study should be replicated in other hospitals in Ghana to provide more evidence on reasons of type 2 diabetes hospitalization. Keywords: Diabetes, Korle Bu policlinic/ family medicine department (KBPFMD), primary health care.

Initial assessment of a newly implemented medication administration dashboard at St. Bartholomew Hospital in London, England

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Introduction: Over 237 million medication errors are made within the medication process every year in England. While the majority represent little to no harm, they are still preventable causes of morbidity and mortality, thus remaining a focus area for quality improvement. St. Bartholomew's Hospital has targeted missed dose dispensing as a key area in their ongoing effort to improve institutional safety. This project's purpose was to evaluate the utility of a newly available, real-time medication dispensing dashboard (Qliksense®), to identify quality improvement initiatives focused on missed doses for the institution.

Methods: Data for December 2024 from Qliksense®, a program interface with the Cerner™ electronic medical record (EPMA) at St Bartholomew's Hospital, was uploaded to a de-identified Excel™ dashboard. All missed doses from this one month period were captured for analysis. A missed dose was defined as a medication "not given", "not done", or given outside of a two hour window. Data cleaning was performed to omit blank entries and doses documented as "as needed". The data were crossmatched with medications available from the emergency drug reserve in each ward and the critical need list. Analysis of the following was performed: hospital wards with the highest rate of missed doses, common medications associated with missed doses and missed dose administration trends over time. A review of potential contributing factors (e.g., ward-specific workflows, medication types, administration timing) was also performed through institutional meetings with providers associated with governance and medication safety. Coded reasons for a missed dose were also analysed.

Results: A total of 45,808 rows of data were exported to Excel™ for analysis, representing less than 10% of total doses prescribed during the timeframe. Seventy percent of all medications administered did not meet the definition of a missed dose. After data were cleaned, 13,711 entries were analysed. The majority (99%) of all missed doses had a documented reason. Paracetamol had the highest number of orders marked as "not given" and "not done," followed by nutritional supplements and docusate. There was a low frequency of missed doses for "critical need" medications. Missed doses peaked at 8 AM, followed by 6 PM and 10 PM which aligns with administration times. Difficult to interpret reporting of reasons for missed doses prevented a better understanding of these descriptors. Limitations to the dashboard assessment included missing date and time values, discrepancies between overall and ward-level assessments, the size of the database, and the descriptive only nature of the data evaluation. The identified quality improvement opportunities with this dashboard include: expanding analysis of monthly data to validate findings, observation of EPMA documentation to identify necessary changes, alignment with Datix reports for missed doses, proposing strategies to enhance real-time medication administration monitoring use of the dashboard for ward-based evaluation, and implementation of visibility documents to promote interdisciplinary education and engagement.

Conclusion: This initial analysis of the utility of the dashboard within the hospital was critical in identify data-driven strategic ways to identify the focus areas for quality improvement.

Polypharmacy patterns: The role of clinical pharmacist among elderly cardiac patients at a university hospital in Riyadh, Saudi Arabia

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Background: Polypharmacy is generally defined as the concurrent use of multiple medications by an individual, typically involving the use of four or more medications. This practice is often seen in patients with complex health conditions, particularly in the elderly population, who may require multiple medications to manage various chronic diseases or conditions. Objectives: The aim of this research is to analyze the patterns of polypharmacy, specifically focusing on potentially unnecessary drug utilization, among elderly cardiac patients following the implementation of clinical pharmacy practices at King Fahad Cardiac Center.

Methodology: An observational study that would investigate regular cardiology patients at the King Fahad Cardiac Center (KFCC) for the period between May 2023 and May 2024. Inclusion criteria include age older than 65 years, patients on five drugs or more, legible to our institution.

Results: All Parameters will be analyzed using Statistical Packages for Social Science (SPSS), Tests of Association by the chi-square statistic.

Conclusion: Polypharmacy pattern was influenced by the involvement of clinical pharmacists in decreasing the unnecessary number of medications for elderly cardiac patients treatment plan which resulted in controlling the risk of adverse drug reactions, drug interactions, non-adherence to medication regimens, and other complications, also introducing them to the center education programs to highlighting the importance of careful medication management and regular review by healthcare professionals

Assessment of a patient safety culture: A nationwide cross-sectional study comparing public and private hospitals in Kuwait

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Background: Several international health bodies advocate measuring patient safety culture within an organisation as an effective strategy for sustainably improving safety. This study aims to assess and compare patient safety culture across public and private hospitals in Kuwait.

Methods: A cross-sectional study was conducted utilising the Hospital Survey of Patient Safety Culture. The questionnaire was distributed among clinical staff in public general and private hospitals. Data analysis using Microsoft Excel and SPSS 23 (α level = 0.05) provided an overview of participant characteristics and patient safety culture scores. A model for predicting the determinants of patient safety culture score was constructed from a regression analysis.

Results: A total of 890 questionnaires were distributed equally between the public and private sectors. The overall response rate was 94.9%. Assessment of the positive percentage of patient safety culture showed that nationally, five composites were areas of strength: “Teamwork within Units” (87.2%), “Organizational Learning—Continuous Improvement” (87.5%), “Management Support for Patient Safety” (77.8%), “Feedback & Communication about Error” (75.8%) and “Teamwork across Units” (75.0%). Private hospitals showed these same areas of strength, whereas public hospitals had fewer. Private hospitals scored statistically significant higher positive percentages than public hospitals in most of the composites. Benchmarking against a 2015 study in Kuwait indicates that the positive percentages of six composites increased at the national level, whereas four remained the same. “Staffing” and “Non-punitive response to errors” were strikingly low.

Conclusion: In this first national study to assess patient safety culture in public and private hospitals in Kuwait, many areas of safety culture had improved. However, some areas require special attention, although causality cannot be inferred, which is a limitation of the study's design. A comparison between the two sectors revealed differences in the patient safety culture, which might be relevant to the guidelines governing them. Policymakers should set unified guidelines governing staffing in both sectors and devise intervention strategies to develop a culture that establishes learning from adverse events and supports patient safety, incorporating a just culture and whistle-blower protection. In academia, Kuwait University should incorporate patient safety and quality-of-care topics into its curricula.

Co-morbidities among people living with HIV receiving antiretroviral therapy in a Ghanaian teaching hospital

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Background: There has been increase in survival among People Living with Human Immunodeficiency Virus (PLHIV) due to the advent of Antiretroviral therapy. However increasing age predisposes them to increased risk of chronic morbidities. Also traditional risk factors such as use of alcohol use, sedentary lifestyle, smoking and obesity may also predispose PLHIV to other co-morbidities. These co-morbidities include Diabetes mellitus, cardiovascular diseases, liver diseases (Hepatitis B and C), cancers as well as lung, renal and cerebral diseases. Cardiovascular diseases are the leading causes of hospitalizations, disability and death among People Living with HIV. There is limited evidence on effective interventions for managing other health conditions associated with People Living with HIV. A thorough understanding of these co-morbidities will inform better care strategies to improve patients outcomes. There is therefore the need to identify the presence of opportunistic infections associated with PLHIV at an early stage to minimize further complications. Purpose: To determine the prevalence of co-morbidities among People Living with HIV receiving antiretroviral therapy at Family Medicine Department of the Korle Bu Teaching Hospital.

Method: A chart review of retrospective data was conducted on two hundred and eleven (211) HIV patients, aged 18 years and above, who initiated antiretroviral therapy from January 2019 to December 2024 at the Family Medicine Department of the Korle Bu Teaching Hospital. The Korle-Bu Teaching Hospital is the third largest hospital in Africa and the largest referral facility in West Africa. The hospital has 17 clinical and diagnostic departments including the Family medicine department

Data collected was reviewed and entered into an excel spreadsheet for descriptive analysis. The frequencies of demographics such as sex, marital status, residence, level of education, religious affiliation as well as co-morbidities were determined

Results: A total of 211 were included in the study with 61.1 % being females. The prevalence of co-morbidities among study participants was 16.6%. The most common co-morbidities were hypertension (52.6%), diabetes (15.8%) and Hepatitis B (15.8%). The other co-morbidities consisted of chronic kidney diseases, sickle cell diseases, asthma, anaemia, stroke and seizure disorders. Female participants had more co-morbidities (13.3%) compared to the males (3.3%).

Conclusion: Almost one fifth of the study participants had co-morbidities, with hypertension being the most common, followed by diabetes, hepatitis B among other co-morbidities. The findings suggest a need for a collaborative approach involving a multidisciplinary Team in screening, managing and counselling PLHIV for co-morbidities.

Stability of daptomycin in icodextrin-based peritoneal dialysis solution

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Introduction: Peritonitis is a serious complication in patients undergoing peritoneal dialysis (PD), necessitating proactive prevention and treatment to reduce the associated morbidity and mortality, as emphasized in the 2022 International Society for Peritoneal Dialysis guidelines for the prevention and treatment of peritonitis. Patients with peritonitis undergoing PD are commonly managed with the intra-abdominal administration of PD solutions mixed with antibacterial drugs in outpatient settings. However, data on the stability of the antimicrobials in PD solutions are required for clinical readiness but remain scarce. Daptomycin (DAP), a cyclic lipopeptide antimicrobial, is recommended for intermittent (300 mg/day) and continuous (100 mg/L loading dose, 20 mg/L maintenance dose) use via intraperitoneal administration; however, the stability of DAP in PD solutions, particularly at the concentrations used for intermittent administration or over extended periods such as 2 weeks, remains underexplored. Furthermore, no reports have been published on the structural changes that occur in DAP as DAP concentration decreases. In this study, we examined the stability of DAP when mixed with PD solution (NICOPELIQ®) through measuring DAP concentrations and observing any structural changes.

Method: NICOPELIQ®, which has two compartments, was used with the septum remaining unopened. DAP solution (350 mg/10 mL) was injected into the large compartment (1,260 mL) of the NICOPELIQ®. The solutions were stored at 37 °C or room temperature (22±3 °C, RT) in the dark. Samples (5 mL) of PD solution containing DAP were collected at various sampling times, with which DAP was quantified using HPLC. The measurement was conducted at 336 h considering outpatient treatment. The structural changes in DAP were analyzed using LC-MS.

Results: The DAP concentration decreased to less than 90% of its initial value after 24 h of heating at 37 °C. Specifically, from an initial concentration considered 100% at time zero, the residual DAP ratio was 95.5% at 12 h, decreasing to 87.0% at 24 h, and to 25.9% at 336 h. The residual DAP ratio at RT decreased from an initial concentration of 100% to 93.3% at 72 h, 87.2% at 168 h, and 80.2% at 336 h. The concentration of the DAP-PD mixture remained above 90% for 12 h at 37 °C under dark conditions. Initially, only the DAP peak was observed at time zero. However, a new peak emerged, which appeared later than the DAP peak at 6.14 min, as storage time increased. This peak, which was not initially present in the sample, appeared at 6.81 min, gradually increased in intensity after 2 h, eventually surpassing that of DAP at 336 h. We concluded that the unknown peak corresponds to the fragment ion of anhydrous DAP.

Conclusion: We comprehensively analyzed the stability and structural integrity of DAP when mixed with NICOPELIQ®, an integral component of PD treatment. Decreasing the DAP concentration in DAP-PD is important when planning dosing. A part of this report was published in Peritoneal Dialysis International (DOI: 10.1177/08968608241283526).

Understanding and addressing challenges in provision of emergency medications for patient transport to off-site healthcare institutions. A review to improve efficiency and quality of care

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Introduction: In KK Women's and Children's Hospital (KKH), facilities to administer procedures such as radiotherapy, endoscopic retrograde cholangiopancreatography (ERCP), and stress echocardiogram (ECG) are unavailable. Paediatric patients undergoing these procedures hence require transport to other healthcare institutions, and the medical teams may put in special requests for resuscitation medications for use in emergencies that may arise during the transfer. The KKH pharmacy handles these requests, but drug provision is often delayed, with processing time extending up to 4 hours as a result of various challenges reported by pharmacy staff. Purpose: To understand the level of understanding and confidence of, and address current difficulties encountered by, KKH pharmacy staff while processing these medication supply requests.

Method: A self-administered online survey was conducted to identify KKH pharmacy staff members' level of confidence in handling ad-hoc requests to supply resuscitation drugs for paediatric patients requiring medical transfers off-site. Through this survey, we have also established the common challenges faced when fulfilling these requests.

Results: A total of 24 respondents, consisting of 10 pharmacists and 14 pharmacy technicians, completed the survey. 45.8% (n=11) of respondents have processed ad-hoc requests to supply resuscitation medications for emergency use when patients are transported to other healthcare institutions. Out of these respondents, 72.7% (n=8) answered "disagree" or "strongly disagree" when asked if they had felt confident while handling such requests. Among the remaining 13 respondents who have not encountered similar ad-hoc requests before, 84.6% (n=11) also expressed that they would not feel confident if tasked. Lastly, 70.8% (n=17) of total respondents indicated that the lack of a harmonised workflow was the major contributing factor to the low confidence levels reported.

Recognising the challenges faced by pharmacy staff, we collaborated with doctors and nurses to develop a harmonised workflow for the hospital, which provides guidance for healthcare providers in the process for requisitioning ad hoc emergency medications for medical transfers off-site. This workflow also includes information on the appropriate billing mechanisms to apply according to the different national subsidy programmes governing each drug. Upon implementing the new workflow, staff members' confidence levels have improved and delays in drug provision have decreased.

Conclusion: In healthcare, successful strategy implementation is dependent on a clear understanding of the challenges faced by various stakeholders and interprofessional collaboration across different disciplines. This streamlines complex work processes, improves healthcare providers' confidence in undertaking related tasks, and ultimately, enhances patient outcomes and quality of care.

Validation of an enhanced controlled drug management system linked to an operating room anaesthesia management system using two-dimensional codes

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Introduction: The use of controlled drugs in medical institutions has been increasing annually in Japan, necessitating improvements in controlled drug management efficiency. Although electronic medical record-integrating controlled drug management systems have been widely implemented, their integration with anaesthesia information management systems, primarily used for rigorous physiological monitoring, is constantly delayed. This study describes the utility of a controlled drug management system that was constructed to embed controlled drug management-related information into codes, enabling linkage not only with an anaesthesia information management system but also with other prescription types, including controlled prescriptions for oral and topical, and injectable drugs.

Methods: To improve and expand the existing controlled drug management system-related functions and enable linkage with the anaesthesia information management system, codes were implemented to contain medication administration information or prescription numbers on surgical controlled drug administration records, as well as prescriptions for oral and topical drugs, and injectable drugs. Such codes enable the controlled drug management system to gain administrative information through scanning. The

time required for controlled drug-related tasks, including administration recording and data entry, was compared between a two-week period before system implementation and a two-week period with stable operation after implementation. Furthermore, the time required for injectable controlled drug prescriptions was compared before and after system implementation, specifically focusing on the difference between manual (handwritten) and system-assisted operations.

Results: The median time required per surgical controlled drug administration record decreased significantly by 79% between the periods before and after implementation. The time required for oral and topical controlled drug prescriptions and injectable controlled drug prescriptions decreased by 43% and 37%, respectively. The estimated total reduction in controlled drug-related task time was calculated to be 76.1 hours per year, 88% of which was attributed to surgical controlled drug administration records. The use of the system dramatically reduced the time required for controlled drug-related tasks to less than one-third of that for manual (handwritten) operations.

Conclusion: The implementation of the new code usage-based system significantly improved controlled drug management efficiency, with the highest impact on surgical controlled drug administration records. The time saved through improved efficiency could be reallocated to other pharmaceutical management tasks, thereby allowing pharmacists to engage in more valuable duties.

Incorporation of artificial intelligence in oncohematology clinical practice

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Background: To identify opportunities for artificial intellingence (AI) tools integration into the national health system, and prioritize the most viable options for implementation in public hospitals

Method: Phase I: Literature Review A systematic review of the literature was conducted, categorizing AI applications by their role in disease processes. Phase II: Working Group A multidisciplinary working group of healthcare professionals from various oncology-related fields were engaged to discuss analyzed applications, review published case studies, and identify challenges and opportunities.

Results: Phase I: over 50 AI applications in diagnostics and more than 20 in therapy were identifed worldwide. These applications were categorized into therapy optimization, health outcome monitoring, and patient education/engagement. Phase II: a practical cases of the AI solutions were presented to healthcare professionals to stimulate discussion. These cases included applications in image analysis in radiology, prescription support assistance, personalized treatment support, dose optimization, patient stratification, and health outcomes monitoring. The most practical AI applications prioritized were in radiology treatments, prescription assistance, and patient stratification due to their potential to improve quality of care, health outcomes, and reduce doctors' workloads. The main drawbacks of AI included the explainability of inputs (black box issue), data governance, and the impact on the patient-doctor relationship.

Conclusions: The study aims to identify and prioritize the most impactful AI applications for optimizing medication use, patient safety, and healthcare system sustainability in oncohematology. The rapid growth of AI solutions in this field needs a focused effort to select the most relevant applications for clinical practice and patient benefit. The next steps are the of the findings and a subsequent meeting focused on promoting the implementation and scaling of promising AI solutions within the national healthcare system.

Evaluation of meropenem utilization at a quaternary care hospital in Ghana: A retrospective review

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Introduction: Meropenem, a broad-spectrum carbapenem antibiotic, is a valuable therapeutic option for the treatment of severe bacterial infections. However, its indiscriminate use can contribute to the emergence and dissemination of antimicrobial resistance, a global health crisis. To ensure optimal clinical outcomes and minimize the development of resistance, it is imperative to evaluate the utilization patterns of meropenem. Objective: To evaluate the utilization pattern and assess the appropriateness of meropenem therapy among patients at the University of Ghana Medical Centre

Method: A retrospective study was conducted at the University of Ghana Medical Centre. Medical records of both inpatients and out-patients who were administered meropenem injection at the facility from 1st January 2024 to 31st December 2024 were extracted from the Healthpro electronic medical system computer software using a carefully designed data collection tool. Data about patient

demographics and hospital stay, microbiology and pharmacological management were extracted with the tool. Data extracted were entered into Microsoft Excel 2016, cleaned and exported to STATA version 16 for analysis. Descriptive statistics were done for socio-demographic characteristics of participants. Data on utilization of meropenem and microbiology were presented in figures and tables.

Results: A total of 1001 records of patients who were administered meropenem injection at the centre were reviewed. More than half of the participants (522, 52.15%) were females. The mean age of patients was 54.39 + 24.97 years (interquartile range: 37 to 74years). Meropenem was commonly prescribed and used by the internal medicine (426, 42.56%) and emergency departments (170, 16.98%). Most common diagnoses of patients prescribed meropenem included sepsis (239, 23.88%), pneumonia (235, 23.48%) and urinary tract infection (190, 18.98%). Meropenem was mostly initiated empirically (913, 91.21%) prior to a request for culture and sensitivity tests. Culture and sensitivity tests was requested for almost two-thirds of patients (596, 65.28%) for whom meropenem was initiated empirically. Culture and sensitivity tests were done for more than half of the patients prescribed meropenem (684, 68.33%) with isolation of organisms in almost half of the samples (337, 49.27%). Most of the organisms isolated (277/337, 82.20%) were bacteria with E. coli (65/277, 23.47%), Pseudomonas aeruginosa (47/277, 16.97%), Klebsiella spp. (44/277, 15.88%) and Acinobacter spp. (24/277, 8.66%) being the most commonly isolated bacteria. The average dose of meropenem administered to patients was 0.76 + 0.32g (range: 0.002 – 2g, interquartile range: 0.5 – 1g). More than a third of the patients (418, 41.76%) received other antibiotics in addition to meropenem with more than half (231, 55.26%) receiving only one additional antibiotic. The three most commonly prescribed antibiotics were Ceftriaxone (180, 43.06%), Clindamycin (88, 21.05%) and Metronidazole (88, 21.05%).

Conclusion: Meropenem injection was predominantly utilized in internal medicine and emergency departments, often empirically. Notably, meropenem was frequently used without prior culture and sensitivity testing requests. Furthermore, in half of the patients receiving empirical meropenem therapy, no bacterial growth was detected. Additionally, unnecessary co-prescription with ceftriaxone and metronidazole was observed. These findings highlight the need for enhanced antimicrobial stewardship practices at the University of Ghana Medical Centre.

Implementation of continuous glucose monitor system at hospital discharge in diabetes patients

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Introduction: Continuous Glucose Monitor (CGM) benefits include improved A1c and quality of life, decreased risk of hypoglycemia, less fingersticks, predictive measures, and data sharing. In April 2023, the Centers for Medicare and Medicaid expanded CGM eligibility to any insulin therapy (1 or more injections per day). This increases CGM access to many patients throughout the United States. The 2025 American Diabetes Association Standards of Medical Care in Diabetes recommend CGM be offered to patients with diabetes on insulin. Previously, CGM use was limited to multiple daily injections (3-4 injections per day). These standards also recommend early introduction of CGM, even at diagnosis. To expand access, CGM devices and training was offered to patients at hospital discharge.

Method: Patients were identified prior to discharge who were new insulin starts by physician referral. Patients were asked if interested in starting CGM at discharge. Patients were provided education, setup, and device prior to discharge.

Results: Data analysis Currently in progress, will be completed in June 2025.

Conclusion/Future Directions: Expand to have other pharmacists provide CGM training, set up and device placement at discharge. Implement transitions of care clinic for patients while awaiting follow up with diabetes clinic

Opportunities for oncology pharmacists in the field of oral cancer therapy

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Introduction: Until two decades ago the major portion of cancer therapies was based on the parenteral route of administration. Considering the importance of patients' quality of life, the therapeutic focus shifted to oral administration of oncology drugs as compared to the parenteral route. Oral administration is considered as one of the most abundant and traditional ways of drug delivery; main advantages being great safety, convenience and patient preference. Oncology pharmacists play a key role in the team of healthcare professionals taking care of patients receiving oral cancer therapy.

Method: The ESOP Global Working group Oral Cancer Drugs created a survey to assess various topics about the oncology pharmacist's role regarding oral cancer drugs. A survey comprising 25 questions was distributed to all ESOP Global members (approx. 4200 members in 62 countries). The questions were grouped by four different areas: general information, health system, dispensing oral cancer drugs and medication review. The online survey was open from 23.11-22.12.2023. The results were exported to Excel (Microsoft Office 2016, Microsoft, Redmond, USA) and analysed using descriptive statistics.

Results: The survey received 383 answers from four regions of the world (Africa, America, Asia and Europe), with 168 respondents (44%) affirming their ESOP membership. According to the results of the survey, a significant majority of pharmacists (93.42%) works in urban areas. A large percentage of respondents (61.36%) lives in countries with a public healthcare system. Common tasks that pharmacists around the world always or frequently do: checking drug availability to ensure timely access for patients (always: 62%, frequently: 24%), reviewing and validating prescriptions to prevent errors (always: 48%, frequently: 18%), providing treatment explanations to promote informed decision-making (always: 33%, frequently: 29%) and checking drug-drug interactions to prevent adverse events to contribute to patient well-being (always: 28%, frequently: 27%). Tasks in direct patient care that are done less frequently: patient adherence monitoring (17%), complementary and alternative medicine counselling (16%). Tasks that are essential and can also be done by pharmacists, although based on the answers they rarely or never engage in it: providing patient information when transitioning between healthcare facilities (never: 29%, rarely: 17%) and taking blood samples to monitor pharmacodynamics pharmacokinetics (never: 59%, rarely: 19%).

Conclusion: Oral anticancer drugs have proven essential for the treatment of many types of cancer. Oncology pharmacists around the world are multifaceted healthcare professionals. By employing their resilience, precision and empathy, patient outcomes can be optimized. Expanding their traditional responsibilities and the time available for patient counselling can help contribute to treatment optimization, medication safety and patient outcomes. However, some of the skills remain underutilized.

The impact of pharmacist practitioner-led hospital placements: The hospital perspective

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Introduction: Educational placement experiences in Pharmacy degrees are essential for student learning. In Australia, pharmacy students are expected to complete at least one hospital pharmacy placement during their degree. However, this is not always feasible for hospital facilities to facilitate placement, due to limited staffing and resources. Furthermore, there is no substantial incentive for hospitals to facilitate these placements. This results in a lack of accountability, and sudden withdrawals of hospitals, leading to the sudden cancellation or rearrangement of pharmacy student placements, and in some cases, suboptimal placement experiences.

The University of Sydney established the innovative solution of 'Pharmacist Practitioners', whereby a pharmacist is employed by the School of Pharmacy and is allocated to a specific hospital to facilitate hospital pharmacy placements. This improves the capacity of the hospital and ensures that pharmacy students experience a high-quality placement that is facilitated by a dedicated preceptor who has no conflicting duties. This also reduces the workload of clinical pharmacists

to host pharmacy students alongside their competing daily duties.

The aim of this study is to explore the perception of Hospital Pharmacy Department staff on the role of Pharmacist Practitioners.

Method: This qualitative study is currently taking place across four public metropolitan hospitals that have a Pharmacist Practitioner employed by The University of Sydney. Participants involved are lead stakeholders, such as the Directors of Pharmacy, Dispensary Managers and Clinical Pharmacists. One pharmacist is in the process of conducting semi-structured interviews with 12-16 stakeholders (4 Pharmacy Directors, 4 Dispensary Managers, and 4-8 Clinical Pharmacists (1-2 pharmacists per site). The interviews are being audio-recorded and transcribed. Following transcription, the interviews will be analysed using inductive thematic analysis.

Results: The study is currently in data collection phase, and the expected completion date is June 2025. Whilst the quantitative data is still in the 'Data Collection and Analysis' phase, the qualitative data is in under analysis. Preliminary thematic analysis have identified three overarching themes: (1) Student Training; (2) Workforce supplementation; and (3) Placement Experience.

Overall, these revealed that participants expressed the Pharmacist Practitioner played a vital role for both pharmacy students and the Pharmacy Department. By having a dedicated Preceptor, this ensured that pharmacy students received focused attention and high-quality training that was not disrupted by day-to-day clinical duties that would be present for usual clinical pharmacists. Consequently, well-trained pharmacy students were able to undertake meaningful clinical work that contributed to patient care during their admission. This involved obtaining a best possible medication history, conducting medication reconciliation, documenting clinical interventions and counselling patients on discharge medications. Overall, this created a positive atmosphere for both the Pharmacy Department and the Pharmacy Students. Participants expressed a sense of relief that the burden of training students was removed and were delighted to interact with the well-trained pharmacy students.

Conclusion: Participants, Pharmacy Directors, Dispensary Managers and Clinical Pharmacists, are accepting of Educational Facilities employing Pharmacist Practitioners to facilitate hospital placement for pharmacy students. Consequently, this study highlights the ongoing need and widespread implementation of Pharmacist Practitioners across all hospital sites.

The impact of pharmacist practitioners on hospital placements for pharmacy students

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Introduction: In Australia, Schools of Pharmacy are expected to ensure that all pharmacy students undertake at least one hospital pharmacy placement during their degree. However, to ensure this, Educational Institutions must rely on Healthcare Facilities to provide the placement. This assumes that the hospitals have the capacity to facilitate placements, which involves resources such as time and staffing. However, this is not always feasible with hospital facilities having limited staffing and resources to facilitate an impactful placement experience for pharmacy students. Furthermore, there is no substantial incentive for hospitals to facilitate these placements. This results in a lack of accountability, and sudden withdrawals of hospitals, leading to the sudden cancellation or rearrangement of pharmacy student placements, and in some cases, suboptimal placement experiences.

The University of Sydney established the innovative solution of 'Pharmacist Practitioners', whereby a pharmacist is employed by the School of Pharmacy and is allocated to a specific hospital to facilitate hospital pharmacy placements. This improves the capacity of the hospital and ensures that hospital pharmacy students experience a high-quality placement that is facilitated by a preceptor who is focused on their placement experience and has no conflicting duties.

The aim of this study is to evaluate the impact of establishing the Pharmacist Practitioner role on the quality of hospital pharmacy student placement.

Method: A cross-sectional observational study was conducted using a survey, and pharmacy students provided feedback on their hospital pharmacy placement experience using a Likert's scale and free-text responses. The survey had 16 questions (7 Likert scale, 1=Extremely Poor and 7=Exceptional, 7 open questions, and 2 binary questions (Yes/No)). The survey was distributed to all pharmacy students irrespective of whether their hospital pharmacy had an allocated Pharmacist Practitioner (intervention group) or not (control group).

Results: The data collection began at the inception of the role, in July 2024, and is expected to continue for 12-months (expected completion June 2025). Although the study is still in progress, preliminary results report favourable conclusions that highlight the ongoing need and widespread implementation for Pharmacist Practitioners.

There are two types of placements ((1) two-week intensive block, where students complete 75 hours within 10 business days; and (2) longitudinal placement, where students complete 75 hours over 10 weeks). For the intensive two-week pharmacy placement experience, the capacity of Hospital Pharmacy Departments to facilitate placement increased from 30 to 75 students, due to Pharmacist Practitioners. The longitudinal data is currently being analysed. However, at this point in time, there has been a 100% response rate from students. Current data indicate that in 2024, 60% of Pharmacy students rated the quality of their supervision as exceptional, with free text responses stating, “Always kept us occupied and took care of our well-being”.

Conclusion: The role of Pharmacist Practitioners is an innovative solution that removes common barriers, such as time and staffing capacity. This solution improves the reliability of hospital facilities, by increasing staff capacity, and ensuring that the preceptor has no conflicting duties, which ultimately leads to a high-quality placement experience for pharmacy students.

Evaluating the impact of a pharmacy administration and leadership short course targeting multidisciplinary pharmacy leaders in Ethiopia

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Introduction: Pharmacy leaders across various specialties play a critical role in ensuring quality healthcare delivery. However, many pharmacists in leadership positions lack formal training in administration and leadership, leading to gaps in knowledge, confidence, and strategic decision-making. While some seek professional development through independent learning or certificate programmes, these avenues often fail to provide comprehensive pharmacy leadership training. Recognising this need, the University of North Carolina Eshelman School of Pharmacy, in partnership with Addis Ababa University School of Pharmacy, developed a Pharmacy Administration and Leadership (PAL) Short Course to equip pharmacy leaders with essential PAL competencies. This programme, tailored to the Ethiopian healthcare landscape, includes participants from hospital pharmacy, pharmacy and healthcare operations, academia, professional organisations, industry, and supply chain leadership. This study evaluates the impact of the programme on participants’ leadership confidence, skill acquisition, and perceived value in pharmacy administration.

Methods: This PAL Short Course launched in September 2024 and will conclude in July 2025, enrolling 39 pharmacy leaders from 21 institutions across Ethiopia. Participants represent seven hospitals, ten universities, one pharmaceutical industry organisation, one professional association, and three government agencies. The 12-module curriculum follows a flipped classroom pedagogical model, with two in-person workshops at the beginning and end, and ten virtual sessions. The course addresses leadership in multiple pharmacy sectors, reflecting the diverse professional backgrounds of participants.

A pre- and post-course survey is being conducted to assess demographics, confidence levels in pharmacy administration and leadership, past business and management education, interest in PAL topics, and perceived job performance. Descriptive statistics and paired t-tests will measure changes in confidence, knowledge acquisition, and skill development.

Results: Participants had an average of 12.4 years (SD=6.0) of pharmacy experience, with 7.8 years (SD=4.1) tenure at their institution and 3.2 years (SD=3.3) in leadership roles. Despite their leadership responsibilities, 35.9% (n=14) had no prior formal business or management education, while 23.1% (n=9) completed a business certificate and 17.9% (n=7) had obtained a Master of Science with some business training. Additionally, 38.5% had actively searched for PAL training opportunities prior to enrolling, demonstrating demand for structured leadership development.

Participants had the strongest confidence in applying leadership strategies to drive change and lowest confidence in designing business plans. Interest in all PAL topics was high, with leadership skills ranking the highest. The post-course survey will further assess changes in confidence, knowledge application, and leadership preparedness.

Conclusion: Preliminary findings indicate that participants anticipate that it will address their professional development needs, helping them grow into effective pharmacy administrators and leaders. By fostering confidence and capability in leadership roles, this programme aims to equip participants with essential leadership and management competencies, enabling them to strengthen their organisations and drive positive change in healthcare delivery. We hope that by building a competent and innovative pharmacy workforce, participants will be empowered to enhance patient care, optimise pharmacy services, and contribute to the advancement of the profession. Continued investment in such initiatives is critical to sustaining leadership talent and ensuring the long-term success of pharmacy administration and practice in Ethiopia.

Examining the implementation status of pharmacy services outlined in "Position paper on critical care pharmacists in Japan": A web-based nationwide questionnaire survey

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Introduction: Pharmacists play an important role in multidisciplinary collaboration in the Intensive Care Unit (ICU). To standardise and promote the widespread implementation of pharmacy services in a ICU, the "Position paper on critical care pharmacists in Japan (position paper)" was published. Evaluating the implementation status and understanding it in a "position paper" is essential for developing the role of pharmacy services. The present study aims to assess the implementation status and perceived necessity of pharmacy services outlined in the "position paper" and to identify factors influencing their implementation through a nationwide survey.

Method: A web-based nationwide survey was conducted to assess the implementation status and perceived necessity in pharmacy service respondents (10 categories, 36 items), as outlined in the "position paper." The questionnaire consisted of questions related to the characteristics of the facility and the respondent (pharmacists operating in the fields of emergency and critical care in the respective facilities) and the action objectives outlined in the position paper. The present study was conducted in compliance with the Checklist for Reporting Results of Internet E-Surveys guidelines. Both the performance status and perceived necessity were evaluated using a 4-point Likert scale. Importance–Performance (IP) analysis was performed to evaluate the relationship between implementation status and perceived necessity in respondents on each action objective outlined in the "position paper." Multivariate regression analyses were performed to identify the factors influencing the implementation status of action objectives.

Results: Responses from 85 ICU pharmacists were analysed. Five categories ([B. Management of adverse events], [C. Informed consent], [H. Education], [I. Research], and [J. Evaluations by third-party organisations]) were positioned in Quadrant III (Improvement Field). Two items under category (H. Education), (27. Developing pharmacists) and (28. Education for other professionals) were positioned in Quadrant IV (Priority Improvement Field). The engagement of the Japanese Society for Emergency Medicine, JSEM-certified emergency pharmacists was associated with the performance scores for "H. Education" ($\beta = 0.209$, $P = 0.035$) and "I. Research" ($\beta = 0.285$, $P = 0.049$).

Conclusions: The nationwide web-based questionnaire survey indicated that research and educational activities in the critical care field in Japan have not been fully advanced. Efforts should focus on developing certified pharmacists and expanding relevant certification programs to enhance educational and research activities.

Comparison of the FIP Basel Statements on the future of hospital pharmacy practice and global pharmacy school accreditation standards

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Introduction: The International Pharmaceutical Federation (FIP) Basel Statements on the Future of Hospital Pharmacy Practice provide a globally recognised framework for advancing hospital pharmacy practice. These statements define the essential roles, responsibilities, and competencies of hospital pharmacists worldwide. However, the extent to which pharmacy school accreditation standards align with these statements remains unknown, raising concerns about whether pharmacy graduates are adequately prepared for hospital pharmacy roles upon qualification. Given the critical role of accreditation in shaping pharmacy education, it is essential to understand how well current accreditation standards integrate hospital pharmacy principles. This study aims to assess the alignment between pharmacy school accreditation standards from multiple countries and the FIP Basel Statements, identifying areas of alignment, gaps, and opportunities for improvement. The findings will inform both pharmacy accrediting bodies and the FIP Hospital Pharmacy Section on how to enhance hospital pharmacy education globally.

Methods: Accreditation standards from 22 countries were identified, with 12 countries' standards secured for evaluation. When accreditation standards were unavailable in English, two pharmacists fluent in the respective language conducted the review—one performing the initial gap analysis and the second verifying accuracy. A systematic comparative analysis was conducted against the 2024 FIP Basel Statements, categorising each statement as aligned (explicitly covered in accreditation standards), not aligned (not addressed), or not applicable (beyond the scope of accreditation). As 41.5% (27) of the Basel Statements were deemed not applicable to pharmacy school accreditation, adherence was calculated based on the remaining 38 applicable statements. In total, 14 gap analyses were conducted across 12 unique countries, as both the United States (2020 vs. 2025 accreditation standards) and Canada (Bachelor of Pharmacy [BPharm] vs. Doctor of Pharmacy [PharmD] accreditation standards) were assessed separately.

Results: Alignment with the 38 applicable Basel Statements varied across countries. New Zealand (97.4%) had the highest alignment, followed by Australia (71.7%), Malaysia (68.4%), and the United Kingdom (63.2%). In contrast, China (14%) exhibited the lowest alignment, indicating potential gaps in hospital pharmacy education. The United States' accreditation standards demonstrated a decline in alignment, decreasing from 60.5% (2020) to 55.3% (2025), which may reflect the expanding scope of pharmacy practice beyond hospital settings. Similarly, Canada's PharmD accreditation standards (52.6%) aligned more closely than its BPharm standards (44.7%), suggesting that higher-level training better incorporates hospital pharmacy principles.

Conclusion: These findings highlight significant variability in the integration of hospital pharmacy principles within accreditation standards globally. In several countries, pharmacy graduates may not be fully prepared for hospital pharmacy practice upon graduation, necessitating postgraduate training to ensure competency. Accreditation bodies may consider incorporating FIP Basel Statement-aligned hospital pharmacy competencies to improve workforce readiness. Additionally, the FIP Hospital Pharmacy Section could use these findings to inform future Basel Statement revisions and develop implementation strategies for global adoption. By promoting greater alignment between accreditation standards and international hospital pharmacy best practices, this study contributes to enhancing pharmacy education worldwide and ensuring graduates are equipped to meet the evolving needs of hospital pharmacy practice.

An intervention to reduce anticholinergic prescribing in hospitalised older adults

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Introduction: Globally, there is great interest among clinicians, researchers, and policymakers (e.g., Aged Care Royal Commission) in mitigating anticholinergic drug-related hospital admissions and the associated healthcare burden. There is substantial evidence that drugs with anticholinergic properties, especially when used in combination (anticholinergic burden), carry significant risks in older people, including increased hospital admissions and greater incidence of falls, cognitive impairment, and death. Their use in combination is highly problematic, but can easily go unnoticed. The aim of this study was to design, implement, and evaluate an intervention to reduce the use of anticholinergic-type drugs in hospitalised older adults.

Method: This study explored the effectiveness of an educational intervention led by a clinical pharmacist and a geriatrician to reduce anticholinergic drug prescribing within the Royal Hobart Hospital, Australia. We included hospitalised patients aged 65 years and above, and their exposure to anticholinergic drugs was identified using a composite rating scale. The extent of anticholinergic drug prescribing was measured before and after implementing the intervention (3 months, Oct-Dec 2022). Change in mean

anticholinergic burden score was analysed using the Mann-Whitney U test.

Results: The study retrospectively analysed 350 older patients in the pre-intervention (Jan-Sep 2022) and 350 older patients in the post-intervention (Jan-Mar 2023) period using the digital medical record. We found a significant reduction in pre-to post-intervention on total anticholinergic drug burden and the number of anticholinergic prescriptions (13% reduction, $p<0.05$) at discharge. Besides, the use of high anticholinergic activity medicines (10.8%) and polypharmacy (17.7%) showed a significant reduction at discharge from the pre-post intervention period. An evaluation survey from the education workshops showed (n=16) a high satisfaction rate (>95%) among the participants, and the topic was highly regarded among doctors and pharmacists.

Conclusion: To our knowledge, this was the first intervention study conducted to lessen anticholinergic prescribing in a hospital setting. The success of the 3-month intervention period was evaluated using a pre-post comparison of anticholinergic prescriptions at hospital discharge. Overall, the educational intervention piloted in this project has improved the awareness of anticholinergic drug burden in community-dwelling older adults being admitted to the Royal Hobart Hospital and led to improved anticholinergic prescribing with subsequent benefits in the health outcomes for older Australians. Our research facilitated an intervention for a sustainable quality improvement model to further improve prescribing of anticholinergic medications.

Comparative study of pharmaceutical missions in healthcare facilities in Quebec and in France

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Introduction: Pharmaceutical practice in healthcare facilities varies from country to country. It is worth exploring the differences and similarities to retain the best of it and mutually optimize our practices. This study began with an initial desire to draw up criteria to be taken into account for the mutual recognition of pharmacists' professional qualifications. One of the objectives of this study is to define the scope of pharmaceutical missions in healthcare establishments in France and Quebec.

Method: In 2024, a delegation of hospital pharmacists from the French Chamber of Pharmacists visited Quebec on a study tour. The delegation met with the Chamber of Pharmacists of Québec, the Faculty of Pharmacy in Montreal, various associations and organizations, and visited 4 facilities in and around Montreal.

Results: Overview of qualifications required to work in hospital pharmacy: In Quebec : 2-year pre-university period (Diplôme d'Etudes Collégiales) + 4-year Doctorate in Pharmacy (Pharm. D) + Specialization with an optional Master's degree in Advanced Pharmacotherapy (MPA) - In France: Pharmaceutical studies (validation of the first 5 years) + residency in 4 years (Diplôme d'Etudes Spécialisés de Pharmacie hospitalière, compulsory to work in a healthcare facility) Missions and activities of hospital pharmacies : - Common mission : procurement, pharmaceutical analysis of prescriptions, dispensing and preparation of individual dosage systems, pharmacotechnics, sterile and non-sterile preparations, clinical research - Missions that are specific to France: authentication of the medicines packaging (European regulation), physical and logistical management of IV solutions, management of blood-derived medicinal products, management of gases for medical use, preparation of radiopharmaceutical medicinal products, management of sterile medical devices, traceability of implantable medical devices, sterilization (preparation of sterile medical devices). - Missions that are specific to Quebec: development of pharmaceutical care with very close links to medical and nursing teams, cross-disciplinary therapeutic management of patients with a developed primary care-hospital link, the right to prescribe under the framework of “agreements” (law 31). Strengths : - France: computerization and digital tools available throughout the country, diversification of missions for a broad approach to patient care. - Quebec : ratio of hospital pharmacists per hospital bed (5 times higher than in France), more in-depth clinical care for patients, including prescription.

Conclusion: Healthcare facilities' pharmacies in France and Quebec share many organisational similarities. France has a broader field of activity, covering sterile medical devices, sterilization, gases and radiopharmacy. Quebec, on the other hand, focuses on pharmaceutical care, with a strong accompaniment dimension.
This exchange provided food for thought for the development of pharmaceutical practices in both countries. It is important to remain proactive and to think about the future developments that will be needed to provide better care for our patients.

Comparative study of clinical pharmacy activities in healthcare facilities in Quebec and in France

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Introduction: Clinical pharmacy is at the heart of the pharmacist's mission in healthcare facilities, and it is interesting to note that the scope of this activity varies from one country to another. As part of a comparative study of pharmaceutical practices in France and in Quebec, we focused on comparing clinical pharmacy activities and the associated regulatory framework.

Method: In 2024, a delegation of French hospital pharmacists from the French Chamber of Pharmacists visited Quebec on a study tour. The delegation met with the Chamber of Pharmacists of Quebec, the Faculty of Pharmacy in Montreal, various associations and organizations, and visited three healthcare facilities in Montreal. In addition to discussions with clinical pharmacists in Quebec's hospital departments, an in-depth analysis of regulatory texts was carried out.

Results: Pharmaceutical care in Quebec : The Quebecers are developing clinical pharmacy towards a more psycho-social approach to the work of the clinical pharmacist, which they call “pharmaceutical care”, defined as “a process including an assessment, then the establishment of a plan incorporating objectives agreed with the patient, and the monitoring of this plan”. Quebec's clinical pharmacists, present in hospital wards, carry out medicines use review (MUR), pharmaceutical interviews, ensure the pharmacotherapeutic follow-up of medications, adjust treatments, accompany patients through their care pathway and pass on information to community pharmacists.

For more than 25 years, pharmacists practicing in the province of Quebec have been authorized to adapt medication dosages. Three years ago, under Law 31, this right was extended to prescribing, as part of an advanced practice agreement, for all pharmacists, including hospital and community pharmacists.

Renewal and adaptation of prescriptions in France: In addition to the clinical pharmacy services already available in France, since 2023, the article L.5126-1 of the French Public Health Code has introduced the prescription renewal and adaptation procedure (RAP) among the hospital pharmacies' missions. A list of the conditions concerned by this procedure is set out by decree. Under the RAP procedure, pharmacists can issue intrahospital prescriptions (during the patient's stay in the hospital) and prescriptions when the patient is discharged. They may also prescribe medical biology tests.

Comparison: The Quebec approach defines a specific mission for pharmacists, without any link to a practice structure, whereas the French system provides for RAP as a mission of the hospital pharmacy, consistent with the hospital pharmacy's other missions. This difference can be seen as an asset in the Quebec approach to deploying agreements more easily in their healthcare facilities.

Conclusion: The foundation of clinical pharmacy through the pharmaceutical analysis of prescriptions remains similar between both countries. On the subject of prescribing by pharmacists, the legislative provisions applicable in Quebec have been in place for longer than those in France. France does not have sufficient hindsight, and French regulatory constraints are holding back large-scale deployment. Hospital pharmacists in France have diversified their missions, and there is a lack of human resources to carry them out. The Quebec model demonstrates the value of pharmacists' presence in healthcare facilities.

Development and evolution of a clinical pharmacist-managed clinic at an academic medical center in the United States as a component of anticoagulation stewardship

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Introduction: In 1996, the UIC Retzky College of Pharmacy and University of Illinois Hospital and Health Sciences System (UI Health) established the Antithrombosis Clinic (ATC), a clinical pharmacist-managed, ambulatory patient care service. The goals were to maximize the benefits of antithrombotic therapy, reduce drug-related complications and side effects, improve patient outcomes and quality of life, and decrease overall healthcare costs of providing antithrombotic therapy. The clinic utilizes a protocol approved by UI Health Committees and clinic medical director, and follows clinical care guidelines that are aligned with best practices. The clinic accepts patient referrals throughout the UI Health System and the surrounding communities.

Method: Located within the Heart Center in the Outpatient Care Center at UI Health, highly-trained, specialized, clinical pharmacists in the ATC provide direct patient care to ambulatory patients who have been referred for

management of their antithrombotic therapy. At each encounter, clinical pharmacists play a crucial role in ensuring the appropriateness of antithrombotic management by initiating and adjusting medications, ordering and evaluating pertinent laboratory results, interviewing and counseling patients, coordinating peri-procedure plans, managing drug interactions, coordinating follow-up appointments, and documenting patient encounters in electronic health records (previously paper charts, then Cerner, now Epic). Clinical pharmacists maintain close communication with health care providers from various primary care and specialty services to coordinate antithrombotic treatment. What started off as a primarily warfarin-based service has evolved to incorporate direct oral anticoagulants (DOACs), low molecular weight heparin (LMWH), smoking cessation, aspirin deprescribing, medication access, and health-system wide DOAC screening and high INR monitoring efforts.

Results: Currently over 900 unique patients are seen by clinical pharmacists at the ATC each year, with nearly 5000 patient encounters per year. Through a mix of face-to-face visits and telehealth encounters, clinical pharmacists manage antithrombotic therapy for patients diagnosed with a variety of clinical conditions including venous thromboembolism, valvular heart disease, atrial fibrillation, cerebrovascular accidents, and various hypercoagulable states (sickle cell disease, antiphospholipid syndrome, etc.). Notable special populations managed include obesity, pregnancy, end stage renal disease, transplant, cancer, geriatrics, and pediatrics. The ATC has been recognized as a Center of Excellence by the Anticoagulation Forum since 2017. For patients taking warfarin, the time in therapeutic range (TTR) continues to average 70%, which is in line with national averages. The service was shown to reduce warfarin related hospitalizations and emergency department visits and save about $5,000 per patient managed. For patients taking DOACs, a screening service was created and maintained since 2016, with an intervention rate ranging between 15% - 25% on all new DOAC prescriptions issued through UI Health. In 2022, an intervention evaluating concomitant antiplatelet use was successful in reducing the rate of inappropriate aspirin from 19.5% to 4.3%. In 2023, electronic dashboards were created in Epic, allowing for ease of tracking quality metrics.

Conclusion: For almost 30 years, the Antithrombosis Clinic (ATC) continues to provide safe and effective antithrombotic therapy and brings value to patients and the health system. The service has evolved with changes in drug therapy, patient care delivery, and available technology.

Strategies to decrease the environmental impact of inhaled anaesthetics

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Background: Anaesthetic gases, namely, nitrous oxide, and the volatile halogenated gases sevoflurane, desflurane, isoflurane, and halothane, significantly contribute to the environmental impact of the healthcare sector on the environment and climate change. Anaesthetic gases are greenhouse gases with a high global warming potential, brought about by their volatility and persistence within the atmosphere for an extensive period of time. Purpose: To identify green measures being implemented to mitigate the environmental impact of anaesthetic gases.

Method: A literature review was conducted to identify green measures being implemented to lower the impact of anaesthetic gases on the environment. The databases Pubmed, Scopus and Science Direct were used for the literature review. Keywords used for the literature search, which made use of Boolean operators, included anaesthetic gases, greenhouse effects, climate change, and mitigation strategies. The search included articles published in peer-reviewed journals within the last 15 years. The identified articles were analysed thematically.

Results: A total of 21 articles were selected for the study. The mitigation strategies were thematically grouped into 4 main categories, namely (i) the use of scavenging systems (n=11), such as the active removal of gases from the air within the operating room; (ii) the use of alternatives or a combination of anaesthetics which have a lower environmental impact (n=10); (iii) regular maintenance of equipment (n=8) such as to avoid gas leaks and (iv) emission control (n=10) which includes the recovery of exhaled anaesthetics and subsequent disposal. The implementation of greener measures (n= 17) was mainly achieved through the development of policies within healthcare institutions (n=8), shifting to greener technologies such as those which enable gas capture and by raising awareness about the environmental impact of anaesthetics amongst anaesthetists and related healthcare professionals (n=3), through seminars and other educational activities.

Conclusion: There is an increase in awareness about the environmental impact of anaesthetics and some healthcare institutions are already implementing mitigation strategies to lower the impact of inhaled anaesthetics. Further research and awareness are required to decrease the environmental footprint of activities related to anaesthesia while safeguarding patient safety.

Real-world effectiveness of proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors in a specialised tertiary hospital in Kuwait: A retrospective cohort study

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Introduction: Statins are the cornerstone therapy for managing uncontrolled low-density lipoprotein cholesterol (LDL-C), with ezetimibe as an add-on for insufficient control. In 2016, proprotein convertase subtilisin/kexin type 9 inhibitors (PCSK9Is) were introduced in Kuwait for patients with persistent lipid control issues. This study aimed to assess lipid control following PCSK9I initiation at a specialised tertiary hospital (2017-2022).

Methods: This retrospective cohort study was conducted at a cardiac centre and utilised pharmacy dispensing data. The study evaluated patients who had newly been prescribed a PCSK9I (evolocumab/alirocumab). Incident PCSK9I users were defined as those without any PCSK9I prescriptions in the previous 12 months. The effectiveness of PCSK9I was assessed by relative reductions in LDL-C and non-high-density lipoprotein cholesterol (non-HDL-C) within 90 days of initiation and the proportion achieving 2021 Middle East consensus lipid targets. Descriptive statistics and relative median percentage reductions were used for analysis.

Results: Between 2017 and 2022, incident PCSK9Is users rose by 300% (n= 99). Within 90 days of PCSK9I initiation, the median LDL-C (n= 104) was 1.7 mmol/L, reflecting a 41.9% reduction (95% CI: -50.9% to -24.1%, p< 0.001), and the median non-HDL-C (n= 115) was 2.4 mmol/L, showing a 38% reduction (95% CI: -46.5% to -23.0%, p< 0.001). Lipid targets were achieved by 43% for LDL-C <1.4mmol/L and 45% for non-HDL-C <2.2 mmol/L (extreme risk), and by 52% for LDL-C <1.8mmol/L and 53% for non-HDL-C <2.6 mmol/L (very-high/high risk).

Conclusion: Although PCSK9Is achieved significant lipid reductions, these results didn't fully replicate trial outcomes. Further investigation using comprehensive patient-level data is needed to confirm their effectiveness.

Characterising the current practices of science popularisation by hospital pharmacists: A nationwide cross-sectional survey in China

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Introduction: Science popularization efforts by hospital pharmacists are essential for improving public health literacy and promoting rational medication use. However, the current practices in this effort remains unclear. This nationwide survey aims to address this gap by providing comprehensive insights into their practices and challenges.

Method: This survey was launched by the Working Committee of Science Popularisation and Patient Education, Chinese Pharmacists Association. A set of online questionnaires was distributed to pharmacist representatives from hospitals across China, including the hospital and respondents' demographics, the entire process of creating, reviewing and disseminating science popularization works, and perceptions on needed improvements in certain aspects. Descriptive quantitative analysis, along with correlation analysis based on chi-squares or t-tests when necessary, was performed.

Results: This survey encompassed 1,103 hospitals, of which 95.19% were public, 76.16% were tertiary, and the majority were general hospitals (68.54%). The participation rates were higher in the East China, South China, and North China regions, with Guangdong, Beijing, Zhejiang, Guangxi, and Jiangsu leading in representation. The questionnaire respondents predominantly had 11 to 30 years of pharmaceutical work experience (65.28%) and held senior professional titles (61.74%). The nationwide participation rate of pharmacists in science popularization was 29.88%, with more than 40% of hospitals reporting participation rates between 0% and 20%. Clinical pharmacists (44.08%) and dispensing pharmacists (30.15%) were the key contributors. The main channels for dissemination included WeChat public account articles (71.53%), lectures (62.46%), and offline materials (56.30%), as the usage of multi-media platforms (e.g., TikTok) remained low (37.35%). There were significant differences across various geographical regions and among different types and levels of hospitals. A total of 196 hospitals (17.77%) established qualification requirements for science popularization pharmacists, focusing primarily on professional titles and educational background. Furthermore, 44.06% of the hospitals provided trainings on science popularization skills, but only 29.37% assessed the audience's needs before preparing science popularization works. Evidence-based information was collected by 57.39%, with

30.83% conducting pre-trial evaluations to enhance the quality of content. In-process review processes were in place in 77.33% of hospitals, while only 29.56% evaluated the effectiveness and impacts of their disseminations. While 44.79% of the institutions lack dedicated departments for science popularization management, 26.75% of hospitals included science popularization works in the performance metrics of the pharmacy department, 36.54% incorporated it into performance assessments on individual pharmacists, and 39.26% related it to professional title promotion. According to the scoring by respondents, major areas needing optimization included the accessibility, interest, and novelty of science popularization content, the establishment of assessment and incentive mechanisms for pharmacists, the alignment of the content with audience needs, and the effectiveness of feedback evaluations.

Conclusion: This nationwide survey reveals that Chinese hospital pharmacists played a vital role in science popularization, yet only 30% participated actively. While some hospitals provided training and qualifications, many lacked comprehensive management systems. Improvements are needed in content accessibility and popularity, incentivization mechanisms, and alignment with audience needs. Addressing these challenges is critical to optimizing hospital pharmacists' impact on community health literacy and rational drug utilization in China.

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

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

Methods: Surface contamination with such cancer drugs as: 5-FU, methotrexate, cytarabine, decarbazine, DOXOrubicin, epirubicin, gemcitabine, melphalan, cyclophosphamide, DOCEtaxel, etoposide, ifosfamide, irinotecan, methotrexate, pACLitaxel, PEMEtrexed, topotecan, vinblastine, mitomycin, vincristine, bortezomib and drugs from platins group were tested at Canadian centers (oncology clinic and pharmacy sterile room) from October 2018 to December, 2024.

Results: In total, 819 samples were collected and analyzed. Overall, chemotherapy agent contamination was detected in 16 % (130/819) of the sample. In pharmacy 16.3% (110/675) of the samples were detected contamination. Samples in oncology clinic were contaminated in 14% (20/144).

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

Tacrolimus Syrup Reformulation to increase stability and suitability in pediatric patients

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Introduction: pediatric patients are a population at high risk in the treatment. There is a little information regarding drug use, lack of availability of dosage forms and drug concentrations that are suitable for pediatric. Tacrolimus is a drug with a narrow therapeutic index. There is no tacrolimus syrup available in the market. The patient should make tacrolimus syrup every day. There is a risk of medication errors. Hospital Pharmacist helped create a more appropriate tacrolimus preparation for pediatric patients. The aims are to find a formula that has better stability and the suitability of the formulation in pediatric patients.

Methods: experimental studies without using humans as research subjects. This research will test the stability of tacrolimus syrup with several solvents. There are 3 types of formula used, namely formulation A in accordance with the Nationwide Children's Formula (Tacrolimus 1 mg + Oraplus + Simple syrup), formulation B (Tacrolimus 1 mg + X-Temp Suspension+ Simple syrup), formulation C is the researcher's formula (Tacrolimus 1 mg+ aqua + simple syrup). Tools and materials are prepared. Previously, a validation test was carried out on the concentration measurement method. Thirty capsules of tacrolimus 1 mg were dissolved in 30 ml of each solvent and added with 30 ml of simple syrup. After dissolving, it was stored in a brown glass bottle. The drug concentration was measured at time 0 using High Performance Liquid Chromatography. The preparation is stored at a temperature of 15-25°C. Drug levels were measured on days 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52 and 56 to assess the stability of each formula. The validation parameters measured are System Conformity Test, Determination Limit of Detection, Limit of Quantity, Analytical Method Selectivity Test, Precision and Accuracy. The range of tacrolimus levels in the preparation is 93-105%.

Results: Results of measuring tacrolimus levels with acceptable syrup stability without any change in the syrup suspension. The stability of tacrolimus syrup for formula A is 56 days (drug level 93.18%), The tacrolimus syrup formula B is 52 days (drug level 93.24%). The tacrolimus syrup formula C is 44 days (drug level 94%). The formulation C provide an efficiency for hospital (aqua solvent and simple syrup).

Conclusions: The method used for this research has been validated and tacrolimus syrup prepared using all formulas met acceptable content requirements. The new tacrolimus syrup formula which is more cost efficient and stable uses aqua solvent and simple syrup (Formula C).

Assessing antimicrobial stewardship in selected private healthcare facilities in Lagos, Nigeria

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Background information: Antimicrobial resistance (AMR) poses a worldwide crisis that jeopardizes a hundred years of advancements in healthcare and the accomplishment of the Sustainable Development Goals. The improper utilization of antibiotics and the resulting challenges of AMR are more prevalent in low- and middle-income countries (LMICs), including Nigeria with factors ranging from limited access to diagnostic tools, inadequate infrastructure, including healthcare facilities and a shortage of trained healthcare professionals, over-the-counter availability of antibiotics, low literacy rates, poverty, limited access to healthcare and drug promotion and marketing. Antimicrobial stewardship (AMS) is an organized programme that encourages the appropriate use of antimicrobials (including antibiotics), enhances patient outcomes, diminishes AMR, and prevents the transmission of diseases caused by organisms resistant to multiple drugs. Purpose The study aimed to evaluate the current state of antimicrobial stewardship in selected private healthcare facilities in Lagos State.

Methods: A cross-sectional study involving 176 healthcare professionals (HCPs) from 11 registered private healthcare facilities in Lagos was carried out using a structured self-administered questionnaire. Data was entered into and cleaned using Microsoft Excel and IBM SPSS Statistics 27.0 while hypotheses were tested non-parametric tests after tests for normality were carried out. Level of significance was set at $p \leq 0.05$. Ethical approval was obtained from the Health Research and Ethics Committee of the Lagos University Teaching Hospital (LUTH).

Result: Most of the respondents were female (70%), Christian (87%), Yoruba (51%) nurses (36%) with 6-10 years of experience (34%) and mean age of 36.8±10.8 years. Of the 53 respondents (30%) that prescribe, 50, 41 and 39 indicated that results of lab test, hospital drugs list and cost of the antibiotic were the most significant factors that influence choice of antibiotic. Majority of the respondents (88.1%) indicated that their facilities lacked AMS programmes, 53% were aware of the national action plan on AMR, 45% were aware of the WHO AWaRE classification for antibiotics and about 38% had participated in AMS training. About 42% indicated that their hospitals had an Infection, Prevention and Control (IPC) committee, a critical structure for preventing and controlling the spread of infections within healthcare settings. Good knowledge score for AMR and AMS among the respondents was 65% and 91.5% respectively. Kolmogorov-Smirnov tests revealed that the data were not normally distributed hence non-parametric statistical, Mann-Whitney U test, was conducted to compare the AMS programme (ASP) knowledge scores between pharmacists and other HCPs. Analysis revealed no significant differences between pharmacists and doctors ($p = 0.799$), pharmacists and nurses ($p = 0.706$) but a significant difference exist between pharmacists and medical lab scientists ($p = 0.031$). Among all respondents, the study revealed substantial gaps in awareness and practice of AMS was revealed.

Conclusion: The study stresses the need for antimicrobial stewardship programmes and teams to be established within the private healthcare sector in Lagos state to contribute to the rational use of antibiotics and mitigate the global burden of antimicrobial resistance. Awareness campaigns, AMS training and screenings can help healthcare providers understand the threat of antimicrobial resistance and take preventative measures.

Acute pancreatitis management in a clinical emergency hospital: Compliance with therapeutic guidelines and hospital policy

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Background information: In 2021, acute pancreatitis (AP) affected approximately 2.75 million individuals worldwide, with a mortality rate of 20%, making it one of the most prevalent and severe disorders of the gastrointestinal tract. Prompt and effective management is crucial for the early identification and treatment of AP, aiming to mitigate complications and improve patient outcomes. Purpose: As clinical pharmacists, we aimed to evaluate the rational use of medication and antibiotics in the management of acute pancreatitis within a Clinical Emergency Hospital, assessing compliance with both the hospital's antibiotic policy and the American College of Gastroenterology Guidelines. Our objective was to contribute to improved patient outcomes by optimizing drug therapy, thereby reducing hospitalization duration and enhancing overall treatment efficacy.

Method: A retrospective analysis was conducted over a one-year period, during 2024, by clinical pharmacists in collaboration with residents in this field. In this regard, patient records of those diagnosed with acute pancreatitis were reviewed, with a focus on treatment efficacy and its impact on the patient recovery process.

Results: From the total of 380 hospitalized patients diagnosed with acute pancreatitis, 215 (57%) medical records were selected for analysis, focusing exclusively on those with acute pancreatitis as the primary diagnosis. The study included 139 male and 76 female patients, with ages ranging from 19 to 88 years. The severity of the condition varied, with 29 patients (13%) diagnosed with acute necrotizing pancreatitis. Among the total cohort, 7 fatalities were recorded. Additionally, chronic alcohol consumption was identified as a primary etiological risk factor in 28% (60) of the patients.

Regarding treatment, 51% (109) of patients received only supportive therapy, including hydration, analgesics, antispasmodics, anti-inflammatories, antiemetics, and, in more severe cases, opioid analgesics. In addition to supportive therapy, antibiotic treatment was initiated in 106 (49%) patients. Of these, 30% were administered a single antibiotic, 11% received two antibiotics, and 8% were treated with more than two antibiotics. The duration of antibiotic therapy varied based on the severity of the condition, ranging from 1 to 35 days. In the majority of cases (54 patients), antibiotic therapy lasted between 1 and 5 days, while 36 patients received treatment for 6 to 14 days. A total of 16 severe cases required antibiotic therapy exceeding 14 days. Antibiotics from all three AWaRe categories were utilized: 12.26% of patients received Access antibiotics, 78.30% received Watch antibiotics, and 9.43% were prescribed Reserve antibiotics. The most frequently used antibiotics included Ceftriaxone (16%), Meropenem (13%), Metronidazole (10%), Imipenem (7%), Vancomycin (7%), and Piperacillin/Tazobactam (7%).

Conclusion: Based on the widespread use of supportive treatment, the duration of therapy, and the types and continuity of antibiotics administered, it can be estimated that 72% of cases adhered to the recommended guidelines. Notably, only 10% of the total antibiotics used belonged to the Reserve class. A multidisciplinary approach involving attending physicians, infectious disease specialists, and clinical pharmacists can help reduce antibiotic administration and limit its use for prophylactic purposes, thereby optimizing antibiotic management.

Effect of a hospital drug formulary on antibiotic consumption and patient outcome in Japanese university hospital: An interrupted time-series analysis

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Introduction: Antimicrobial resistance (AMR) impacts human health and society. Irrational antimicrobial therapy has caused the emergence of AMR; therefore, rational antibiotic use is a crucial strategy for countermeasures for AMR. The Japanese government proposed reducing oral cephalosporins, quinolones, and macrolides as part of the National Action Plan for AMR. The hospital drug formulary (HDF) serves as a tool for rational use, and the HDF for antibiotics is expected to contribute to implement the rational use of antibiotics; however, its association with antibiotic consumption and patient outcomes remains insufficiently clarified. This study was aimed to evaluate the effects of a hospital drug formulary for antibiotics on antibiotic consumption and patient outcomes at a Japanese university hospital.

Method: This quasi-experimental design included all patients hospitalised between 2015 and 2019 in Hamamatsu

University Hospital (613 beds). In January 2016, we established the hospital drug formulary for oral antibiotics and conducted an educational lecture on rational antibiotic use by pharmacists in May 2016. The study period was divided into the pre-formulary period from January 2015 to December 2016 (period 1, P1) and the formulary implementation period from January 2017 to December 2018 (period 2, P2). Additionally, this study covered the pre-lecture from January 2015 to May 2016 (sub-period 1, S1) and the lecture implementation period from June 2016 to December 2018 (sub-period 2, S2). Antimicrobial consumption data for all periods were extracted using data from the Hamamatsu University Hospital Analytical Clinical Information System entitled D*D. We descriptively analysed antibiotic consumption patterns, the changes in antibiotic consumption, and length of stay (LOS) in hospitals in each period, which were assessed using interrupted time-series analysis. Data were measured on the day of therapy (DOT) and antibiotic use density (AUD; defined daily dose per 100 patient-days). The Ethics Committee of the Hamamatsu University School of Medicine approved the study.

Results: The AUD of oral third-cephalosporine antibiotics decreased shortly after implementation of the formulary (immediate change = -1.44, 95% CI -2.18 to -0.71). The AUD of oral first-cephalosporines and penicillin, narrow-spectrum antibiotics, increased gradually after formulary implementation (change in slope = 0.0081, 95% CI 0.0016 to 0.015, change in slope = 0.077, 95% CI 0.045 to 0.11). The DOT of oral third-cephalosporine antibiotics decreased shortly after formulary (immediate change = -1.25, 95% CI -2.18 to -0.71), followed by a gradual decrease (change in slope = -0.027, 95% CI -0.040 to -0.015). Additionally, the AUD of fluoroquinolones decreased shortly after the lecture (immediate change = -4.60, 95% CI -7.2 to -1.9). The slope of the LOS and its immediate changes did not differ before and after the invitations, and it showed a gradual decrease from before the interventions.

Conclusion: This interrupted time-series analysis approach showed that the hospital drug formulary for oral antibiotics reduced the consumption of oral third-cephalosporine antibiotics and increased that of oral narrow-spectrum antibiotics. The use of oral fluoroquinolones decreased after the educational lecture on rational antibiotic use by pharmacists.

Knowledge Attitude and Practice of Pharmacists in Transition of Care Services in Tertiary Healthcare Settings in Lagos State Nigeria

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Background: Effective transition of care (TOC) is critical in enhancing patient outcomes, reducing hospital readmissions, reducing adverse events, cost of treatment and strengthening healthcare systems. This study investigates the knowledge, attitudes, and practices of pharmacists regarding TOC services in tertiary hospitals in Lagos, Nigeria. Objective: The aim of this study is to evaluate hospital pharmacists' understanding, implementation, barriers and comparative practices of Transition of care services within the hospital setting.

Method: A cross-sectional quantitative study was conducted, utilizing non-probability sampling to select participants. A structured questionnaire, pre-tested with pharmacists from a private health facility, was distributed via Google Forms to gather data. Descriptive and inferential statistics were performed using SPSS Version 23.0

Results: 64.5% of the surveyed pharmacists participated in the study. Notably, 87.3% had not received formal training in TOC, yet 85.3% understood the component of the process. Furthermore, 76.2% believed that TOC services significantly improve patient outcomes. Regarding practice, 24.6% of pharmacists were unaware of medication reconciliation as part of TOC services. Regarding the comparison of performance across the five tertiary institutions, the study revealed significant differences in knowledge p=0.034, however no significant differences were found in attitude and perceived barriers to transition of care services p=0.057 and 0.340 respectively.

Conclusion: The findings highlight gaps and strengths in the knowledge, attitude and practice regarding transition of care services across the five tertiary hospitals. while pharmacists possess a moderate level of knowledge and a positive attitude towards TOC services, their practical application of medication reconciliation remains limited.

Drug-drug interactions in the treatment of chronic comorbidities and effects on the patient management: Type 2 Diabetes and Chronic Coronary Syndromes

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Introduction: The ageing population means more comorbidities and generally more Drug-drug interactions (DDIs) to be managed. Complications of diabetes are important, and patients with these comorbidities are often treated with multiple drugs. Type 2 diabetes mellitus and chronic coronary syndromes frequently coexist in older adults with polypharmacy. The potential risk of drug-drug interactions (DDIs) remains inadequately characterised when implementing disease-specific clinical guideline recommendations for comorbid conditions.

Purpose: This study aimed to quantify the prevalence of guideline-recommended DDIs in Chinese clinical practice and evaluate their impact on disease management outcomes.

Methods: Firstly, potential DDIs were systematically identified from pharmacological regimens endorsed by single disease Chinese clinical guidelines for both conditions. For each of the selected guidelines, two pharmacists reviewed the recommendations regarding drug usage, verified potential drug combinations for comorbidities, and then identified DDIs via three authoritative databases (Micromedex®, Lexicomp® and DDInter). Drug combinations designated as high-risk interactions across multiple databases were prioritised for analysis, including repaglinide combined with clopidogrel, and repaglinide combined with aspirin. Then, a retrospective cohort analysis was conducted on type 2 diabetes patients between year 2021-2024 to evaluate clinical outcomes following concomitant administration. Patients were included in this study: 1) having periodic outpatient or emergency visits with a diagnosis of type 2 diabetes; 2) prescribed with the concomitant use of repaglinide with clopidogrel or aspirin; 3) aged ≥18 years. Patients were excluded if they were: 1) diagnosed with chronic kidney disease and receiving hemodialysis; 2) lost to follow-up in the database (only have one medical record). This retrospective study was reviewed and approved by the institutional review board. The primary endpoint encompassed unplanned healthcare encounters within seven days post-coadministration.

Results: Lexicomp® contained the maximum number of drugs in the recommendations of clinical guidelines. DDIs were common following recommendations for prescription in the guidelines for type 2 diabetes and chronic coronary syndromes. Of these, different databases had a similar identification property in the quantity of DDIs, but the ranks were slightly different. Serious DDIs were potentially related to the concomitant use of repaglinide and clopidogrel. In the retrospective cohort study, 10,458 patients with type 2 diabetes were tracked between 2021 and 2024, among which 90 patients were managed with repaglinide and aspirin or clopidogrel, within a total of 217 medical records. Patients who were prescribed repaglinide and clopidogrel had a significantly higher risk of unplanned outpatient or emergency visits (OR=0.27, 95%CI:0.15-0.50; adjusted OR= 0.25, 95%CI: 0.084-0.75).

Conclusions: Guideline-recommended polypharmacy regimens for comorbid chronic conditions carry substantial yet frequently unaddressed DDI risks, particularly affecting older populations. These findings underscore the imperative for enhanced interaction alert systems within clinical practice guidelines and dedicated pharmacological review protocols for multimorbid patients. Future guideline development should incorporate explicit DDI risk stratification to optimise therapeutic decision-making in complex comorbidities. More attention should be put on the drug administration for patients with comorbidities in clinical practice.

The impact of undisclosed foreign medications on patient care in the United States

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Background: Pharmacists play a critical role in medication reconciliation, reducing errors during medication history intake, and supporting accurate clinical assessments. However, in Latin America, pharmacist involvement in healthcare is significantly lower than in the United States, posing challenges for clinicians treating patients who acquire medications abroad. Many community pharmacies in Latin America operate without a trained pharmacist, allowing patients to access various medications, including some without prescriptions or professional counseling. While regulations vary across countries, such as stricter controls on antibiotics and controlled substances in Mexico, the overall lack of pharmacist oversight remains a concern. Purpose: This case report examines how the inappropriate use of medications obtained from Latin American countries may contribute to hospitalizations and increased medical visits in the United States. It highlights potential gaps in medication history during hospital admissions or community care, particularly when patients are not questioned about medications acquired abroad.

Methods: This case report describes a 57-year-old female patient who traveled from Mexico to the United States and was admitted to the hospital with chest pain and later with severe headache. Initial assessments, including vital signs, electrocardiogram, echocardiogram, stress test, and CT scan,

ruled out major cardiac and pulmonary conditions. Despite a four-day hospital stay, her chest discomfort—worsening at night and with deep breaths—persisted. A few days after discharge, she was readmitted with a severe headache that did not resolve despite treatment for migraines. Following discharge, the patient disclosed using pain patches obtained without a prescription from a Mexican pharmacy, believing they were for pain relief, similar to her father's angina patches. Upon removal of the patches, her symptoms resolved. A pharmacist later determined the patches contained nitroglycerin, which contributed to her uncontrolled blood pressure during hospitalization. The patches were neither disclosed nor identified during her initial hospital stay.

Results: A thorough review of the patient's medications and hospitalization records, along with an interview about her visits to Mexico, revealed that her symptoms were caused by the use of nitroglycerin patches obtained abroad. Her symptoms resolved after removing the patches. No significant cardiovascular issues were identified, aside from high blood pressure, cholesterol, and triglycerides during her hospital stay.

Conclusions: Medication history should include questions about recent travel and medications obtained abroad. In this case, healthcare system burnout and insufficient physical examination failed to determine the patient used nitroglycerin patches worn throughout her hospitalization. Increasing awareness among U.S. healthcare professionals about pharmacist disparities in Latin America is crucial to improving patient care and preventing similar cases.

Physicochemical and microbiological stability of compounded rifaximin oral suspensions in PCCA Base, SuspendIt®

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Objective: To study the stability of extemporaneously compounded rifaximin suspensions from commercially available Xifaxan® 550 mg tablets in the contemporary vehicle PCCA Base, SuspendIt. SuspendIt is a sugar-free, paraben-free, dye-free and gluten-free thixotropic suspending agent containing a natural sweetener obtained from the monk fruit. It thickens upon standing to minimize settling of any insoluble drug particles and becomes fluid upon shaking to allow convenient pouring during administration to the patient. The study design included two concentrations to provide stability documentation over a bracketed range for eventual use by compounding pharmacists.

Methods: A stability-indicating ultra-high-performance liquid chromatographic (UPLC) assay for the determination of the chemical stability of rifaximin in PCCA SuspendIt was validated. Suspensions of rifaximin were prepared from the tablets in PCCA SuspendIt at 20-mg/mL and 40-mg/mL concentrations, selected to represent a range within which the drug is commonly dosed. Samples were stored in amber plastic prescription bottles at room temperature (250C). Samples were assayed initially, and on the following time points (days): 14, 30, 60, 90, and 180. Physical data such as pH and appearance were also noted. Microbiological stability was tested.

Results: A stable extemporaneous product is defined as one that retains at least 90% of the initial drug concentration throughout the sampling period. Rifaximin tablets were stable for 180 days in SuspendIt at room temperature. Drug concentrations were at, or above 94.5% of initial values for the commercially available tablets. No microbial growth was observed. pH values remained fairly constant.

Conclusions: A robust stability-indicating UPLC assay method for the determination of rifaximin in PCCA SuspendIt was validated. This assay was used to determine the chemical stability of the 20-mg/mL and 40-mg/mL concentrations of commercially available rifaximin tablets compounded in PCCA SuspendIt at controlled room temperature of 250C. Drug concentrations did not go below 94.5% of the label claim (initial drug concentration). pH values remained fairly constant. The preservative system in PCCA SuspendIt successfully protected the suspensions from growth of challenge microorganisms. This study demonstrates that Xifaxan® tablets are physically, chemically, and microbiologically stable in PCCA SuspendIt for 180 days at room temperature at both concentrations studied, thus providing a viable, compounded alternative for rifaximin in a liquid dosage form, with an extended BUD to meet patient needs.

The influence of gender and age on orthopaedic patients' comprehension of injury-related information

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Background: Orthopaedic surgeries are high-risk procedures demanding that patients are well-informed about injury and postoperative recuperation. Orthopaedic patients are often required to make complex decisions and follow complicated instructions. Previous studies indicated there were notable gender and age differences in comprehension of information.

However, healthcare professionals should be able to provide health information to patients and ensure patients' comprehension, regardless of their gender or age. Purpose: The aim of the study was to evaluate orthopaedic patients' comprehension regarding the injury, surgery and postoperative recovery and determine potential relationship between comprehension level and demographic factors of gender and age.

Method: A prospective observational study was conducted by administrating a questionnaire to 110 hospitalised patients at Clinic for Orthopaedic Surgery and Trauma, University Clinical Centre of Serbia, Belgrade. The questionnaire included items regarding: (1) reason for hospitalisation, (2) the injured bone, (3) type of surgical implant, (4) weight-bearing status, and (5) expected recovery time. Statistical analysis was performed using SPSS Version 26.0 statistic software package. Throughout the analysis, a p-value of 0.05 or less was regarded as statistically significant.

Results: Out of all patients included in this study, 62 were males (56.4%) and 81 were younger than 50 years (73.6%). The mean score for comprehension was 3.24±1.33 correct answers out of 5. Females (3.54±1.13) had significantly better mean score in comparison to males (3.00±1.40) (p=0.028). Moreover, patients younger than 50 years had better mean score (3.32±1.18) compared to those older than 51 years (3.00±1.69), but there is no statistically significant difference (p>0.05). Most patients knew the reason for hospitalisation (95.5%) and which bone was fractured (86.4%). Less correct answers were observed for questions regarding the type of surgical implant (46.8%), weight-bearing status (41.7%) and expected healing time (55%). Females gave more correct answers to questions regarding reason for hospitalisation (100%; $\chi2=4.055$, p=0.044), the injured bone (93.8%; $\chi2=3.947$, p=0.047), and the weight-bearing status (53.2%; $\chi2=4.547$, p=0.033) than males (91.9%, 80.6%, 32.8%, respectively), but no significant differences between age groups were found. Patients younger than 50 years, regardless of gender, were more likely to know the type of surgical implant (53.8%; $\chi2=7.043$, p=0.030) than patients older than 51 years (27.6%).

Conclusions: Orthopaedic patients demonstrated good comprehension level of their injury, surgery and postoperative recovery. Gender significantly affected comprehension of injury and weight-bearing status, and overall mean score. On the other hand, age had a significant impact on the comprehension of the type of surgical implant. The results of this study indicated that healthcare professionals should understand different comprehension level across various patient groups and implement targeting strategies.

Knowledge on antimicrobial resistance and stewardship in two health facilities in Ghana

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Background: Antimicrobial Resistance (AMR) is a global public health emergency, concerns with the rising AMR rates and the consequences have resulted in antimicrobial stewardship (AMS) strategies to address this challenge. However, there is limited evidence of the extent of healthcare practitioners' knowledge and perceptions of AMR and AMS in Ghana. Disparities in the knowledge, beliefs, and attitudes of health care practitioners may compromise efforts to improve antibiotic prescribing and infection control practices. Objective: To assess the knowledge of health workers on antimicrobial resistance and antimicrobial stewardship in the Ledzokuku Municipality.

Method: A cross-sectional quantitative study was conducted among 205 health workers using a structured questionnaire. Descriptive analysis was conducted using Excel and STATA version 17 and association between variables was tested using Chi square test at 5% level of significance.

Results: The overall average score of the respondents on the knowledge on AMR was 73.5%. The hospital facility, age, sex, duration in profession, and training on AMR had a significant relationship with the knowledge level of the health workers of AMR. Most respondents (81.5%) understood the purpose of Antimicrobial Stewardship (AMS) programmes. Although both facilities had AMS programmes, 81.6% of respondents were aware of an AMS program at LEKMA Hospital, compared to LEKMA Polyclinic, where only 29.3% were aware.

Conclusion: The health workers exhibited high (73.5%) knowledge of AMR. Although both health facilities had an Antimicrobial Stewardship (AMS) programme in place, a greater proportion of staff from LEKMA Polyclinic were not aware of it. It is recommended that administrators and policy makers organize routine sensitization and education for staff to increase awareness and to support initiatives of AMS teams to maximize impact.

A study on the impact of Dapagliflozin on HbA1c levels and proteinuria in patients with type 2 diabetes

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Introduction: Dapagliflozin is a selective sodium/glucose cotransporter 2 (SGLT2) inhibitor that reduces the reabsorption of filtered glucose in the proximal renal tubules, promoting urinary excretion of glucose and thereby reducing blood glucose levels. Clinical trials have shown that dapagliflozin can slow the progression of kidney disease.

Method: We retrospectively investigated the effect of dapagliflozin combined with other hypoglycemic drugs on the treatment of type 2 diabetes patients over a 6-month period from January 2023 to June 2024. The study observed changes in patients' fasting blood glucose levels, glycated hemoglobin (HbA1c), creatinine, estimated glomerular filtration rate (eGFR), and microalbumin levels.

Results: The study included 28 patients with an average age of 62.89 years, consisting of 13 males and 15 females. Among these patients, 17 had hypertension and 17 had hyperlipidemia. After treatment, significant reductions were observed in fasting blood glucose, HbA1c, microalbumin, eGFR, creatinine (urine), and the albumin/creatinine ratio. The specific changes were as follows:
•Fasting blood glucose decreased by 79.13 mg/dL (from 192.93 to 113.80 mg/dL)
•HbA1c decreased by 1.5% (from 8.57% to 7.07%)
•Serum creatinine increased by 0.02 mg/dL (from 1.02 to 1.04 mg/dL)
•eGFR decreased by 1.18 mL/min (from 73.91 to 72.73 mL/min)
•Microalbumin decreased by 857.195 mg/L (from 911.18 to 53.985 mg/L)
•Urine creatinine decreased by 61.75 mg/dL (from 119.52 to 57.55 mg/dL)
•Albumin/creatinine ratio decreased by 779.07 mg/gC (from 884.63 to 105.56 mg/gC)

Conclusion: The study demonstrates that dapagliflozin can significantly reduce HbA1c, fasting blood glucose, and microalbumin levels in patients with type 2 diabetes, thereby lowering the risk of kidney function damage.

Suspected Daptomycin-Induced Eosinophilia

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Introduction: Daptomycin is a lipopeptide antibiotic commonly used for treating Gram-positive bacterial infections. While effective, it has been associated with adverse effects, including eosinophilia and eosinophilic pneumonia. This report presents a case of suspected Daptomycin-induced eosinophilia in a patient with multiple comorbidities, emphasizing the importance of monitoring eosinophil levels during treatment.

Method: A 72-year-old male with a history of colon cancer, diabetes mellitus, hypertension, benign prostatic hyperplasia, and renal stones was admitted due to vomiting and decreased appetite. He developed an infection with fever and was initially treated with meropenem, targocid, and micafungin. On February 5, due to an increase in WBC and CRP levels, the antibiotic regimen was modified to meropenem, daptomycin, metronidazole, and Zavicefta. Eosinophil levels were monitored regularly, and treatment adjustments were made based on clinical progression.

Results: Eosinophil counts increased progressively after daptomycin initiation, rising from 0% on January 16 to 2.4% on February 3, 5% on February 6, and 8.1% on February 9. Following the discontinuation of daptomycin and modification of antibiotic therapy to tigecycline, ceftazidime, and micafungin, eosinophil levels continued to rise, peaking at 24.1% on February 18 before gradually declining to 17.8% on February 22. The Naraja causality assessment score was 5, indicating a probable association between daptomycin and eosinophilia.

Conclusion: This case underscores the importance of monitoring eosinophil levels in patients receiving daptomycin, as drug-induced eosinophilia can persist even after discontinuation. Clinicians should remain vigilant for this potential adverse effect and consider early drug withdrawal when significant eosinophilia is observed. Prompt recognition and management are crucial to prevent complications and ensure patient safety.

Management strategies for medications in rural mobile healthcare: A case study of Zhuoxi Township, Taiwan

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Background: Taiwan's mountainous and island regions face significant challenges due to limited healthcare resources and transportation barriers. To address these issues, the National Health Insurance (NHI) implemented the Integrated Delivery System (IDS), with mobile healthcare as a core strategy for delivering essential medical services. Effective medication management—including drug selection, transportation, and storage—is critical for optimizing healthcare delivery and resource utilization. This study examines the principles and strategies employed in mobile healthcare medication management in Zhuoxi Township, Taiwan.

Methods: Operational data from Zhuoxi Township's mobile healthcare services in 2023 were analyzed. The township spans 1,021 square kilometers and has a population of 5,990. Interviews with pharmacists responsible for these services provided qualitative insights into decision-making processes and challenges. A systematic review was conducted focusing on drug selection principles, storage and transportation considerations, and seasonal demand variations. Trends in medication utilization were classified using the Anatomical Therapeutic Chemical (ATC) code.

Results: Medication management followed a streamlined approach, limiting each pharmacological category to two essential drugs, such as two empirical antibiotics. Seasonal adjustments included additional cold remedies in autumn and winter and topical ointments post-typhoon season. Cold-chain medications were transported in insulated cooling bags to maintain efficacy in high temperatures. Medication utilization analysis identified 113 items used in mobile healthcare, distributed by ATC categories as follows: 24% digestive and metabolic drugs (A), 19% cardiovascular drugs (C), 13% nervous system drugs (N), and 11% musculoskeletal drugs (M).

Conclusion: Simplification, efficiency, and adaptability are key to effective medication management in rural mobile healthcare. By prioritizing essential drugs, strengthening transport and storage protocols, and addressing seasonal needs, this program overcame significant challenges in resource-limited settings. Future improvements could include leveraging local population health data to optimize drug allocation and integrating technological tools to enhance efficiency and reduce waste. These findings provide valuable insights for similar programs in other rural regions.

A formative evaluation of the implementation of a medication-centred discharge service in rural and regional Australia: A qualitative study of clinicians and patients

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Introduction: The transition of care from the hospital to the home is at high risk for medication-related errors. Rural and regional patients are at higher risk, facing unique challenges such as geographical isolation and limited access to supplies and healthcare. The aim of this project is to explore the formative perspectives of key stakeholders towards the implementation of a medication-centred discharge service from hospital to home.

Methods: Semi-structured interviews with key stakeholders' were conducted in person or online between August and September 2024. An interview guide was developed using the Consolidated Framework for Implementation Research. Interviews continued until data saturation occurred, and were audio-recorded and transcribed verbatim. Data analysis was conducted using the Framework Approach to identify themes.

Results: In total, 37 interviews were conducted with clinicians and patients in rural and regional New South Wales. Three main themes were identified: (1) factors affecting service acceptability (access to primary care, older patient demographic, health literacy, cultural acceptability of First Nations Peoples); (2) utilising existing components of healthcare (virtual pharmacists in rural areas, rural Home Medicine Review pharmacists, improving utilisation of allied health assistants, strategies to improve awareness); and (3) workflow of a Transitions of Care Stewardship pharmacist (coordination of Home Medicine Review referral, importance of continuity).

Conclusion: Overall, a medication-centred discharge service in the form of a virtual Transitions of Care Stewardship pharmacist and their facilitation in post-discharge Home Medicine Review was found to be an acceptable intervention for a patient's transition from hospital to home in rural and regional areas.

Five-Year analysis of drug-induced liver injury in a Chinese Tertiary Hospital: Clinical characteristics and prognostic insights

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Introduction: Drug-induced liver injury (DILI) is a significant clinical challenge characterised by diverse aetiologies and variable manifestations, often culminating in severe hepatic dysfunction. The increasing utilisation of traditional Chinese medicine, antineoplastic agents, and anti-infective drugs in clinical practice has led to a rising incidence of DILI, thereby underscoring the need for improved early detection and effective management. Given the marked differences in clinical presentation and pathological patterns among various drug categories, a systematic investigation into the clinical features and prognostic determinants of DILI is imperative. This study aims to elucidate these aspects to inform rational prescribing and optimise therapeutic strategies.

Method: A retrospective review was performed on the medical records of patients diagnosed with DILI at a tertiary hospital in China between 1 January 2019 and 31 December 2023. A total of 347 patients were included. Data extracted comprised demographic details, clinical symptoms, and liver function test results – notably alanine aminotransferase (ALT), aspartate aminotransferase (AST), and alkaline phosphatase (ALP) levels. Cases were classified into three pathological types: hepatocellular, cholestatic, or mixed injury. Additionally, the number of hepatoprotective drugs administered concurrently was documented. Comparative analyses were conducted among groups based on the causative drug category. A multivariate logistic regression model was then employed to identify independent risk factors for adverse prognosis, with original numerical data including case numbers, percentages, odds ratios (ORs), and 95% confidence intervals (CIs) preserved for accuracy.

Results: Hepatocellular injury was the predominant pattern, accounting for 67.15% of cases, followed by cholestatic injury (20.46%) and mixed injury (12.39%). The leading causative drug categories were traditional Chinese medicine (25.34%), antineoplastic agents (24.15%), and anti-infective drugs (21.26%). Regarding clinical outcomes, 7 patients (2.02%) achieved complete recovery, 269 (77.52%) exhibited improvement, and 71 (20.46%) showed no improvement. Statistically significant differences were observed among prognostic groups in terms of age, gender, liver enzyme levels (ALT, AST, ALP), DILI type, number of hepatoprotective drugs used, and implicated drug category (all $P < 0.05$). Furthermore, multivariate analysis revealed that the cholestatic type [OR = 0.237, 95% CI (0.083–0.673), P = 0.007] and the use of more than two hepatoprotective drugs concurrently [OR = 0.551, 95% CI (0.289–1.050), P = 0.018] were independently associated with an unfavourable prognosis.

Conclusion: This study demonstrates that DILI induced by different drug categories exhibits distinct clinical characteristics and prognostic outcomes. Notably, liver injury associated with traditional Chinese medicine, antineoplastic agents, and anti-infective drugs warrants particular clinical vigilance. The identification of cholestatic injury and the extensive use of hepatoprotective drugs as independent predictors of poor prognosis emphasises the necessity for cautious drug selection and the optimisation of treatment protocols. Future research with a larger sample size is warranted to further explore prognostic factors and refine individualised management strategies for DILI. These findings underscore the importance of multidisciplinary collaboration and evidence-based decision making in the management of DILI, and they provide a valuable foundation for future research in this critical area in clinical practice.

Social determinants of health and access to medicines and their association with antidiabetic medication adherence at a teaching hospital in Ghana

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Background: Antidiabetic medication adherence can improve outcomes in diabetes care. The conditions in which people are born, live, work and age [Social Determinants of Health (SDH)] and access to medicines may influence adherence to antidiabetic medicines. Aim: The aim of this study was to investigate the prevalence of adverse Social Determinants of Health (SDH), medication access and adherence and the relationship between SDH, medication access and adherence among patients with diabetes mellitus (DM) at the Korle Bu Teaching Hospital (KBTH).

Method: It was a cross sectional survey using a standardized questionnaire. The validated 4-item Adherence to Refills and medicines Scale for Diabetes (ARMS-D) was used to measure adherence to antidiabetic medicines. The study was conducted at the Diabetes Clinic, Polyclinic and the Medical Outpatient clinics of KBTH. Adult patients (18 years and above) with diabetes mellitus taking at least one drug for treatment were included. Patients attending the clinics additional times were excluded. Using systematic sampling, 553 participants were included. Adherence was scored on a 4-point likert scale. Adherence and non-adherence were

defined as overall score of 4 and above 4 respectively. Travel distance to, and time spent at the hospital, prescription filling by the hospital and out-of-pocket payments were used to measure access to medicines. SDH measures included employment, education, transportation cost and availability, income, etc. Data were analysed using SPSS. Descriptive and inferential statistics were performed. A p-value<0.05 represented statistical significance.

Results: Majority of respondents were above 60 years of age (66.2%; n=366), female (75.8%; 419) and unemployed or retired (67.6%; n=374), and 38% (n=210) spent above GHC 50.00 (USD 3.22) on transportation to the hospital. Monthly out-of-pocket spending on diabetes was above GHC200 (USD 13.00) in 53.5%. Majority of respondents (53.7%; n=297) did not have a health facility available within one hour walk. About 42% (n=231) travelled more than 12 kilometres to KBTH and 14.8% did not have access to readily available transport. Prescriptions were not filled or only partially filled by the hospital for most respondents (90.8%; n=502). Most respondents (84.8%; n=469) spent 3 or more hours at the hospital and 42.9% (n=237) were non-adherent to medication. Monthly income (p value=0.005), employment (p-value=0.019) and availability of public transport (p value =0.009) were associated with medication adherence in chi square tests. Transportation Cost was inversely related to adherence (coefficient: -0.1977; 95% CI: -0.3542 to -0.0412; p-value=0.0133); income predicted adherence (OR: 1.433; [95%CI: 1.262, 1.626]; p-value=0.0000). Travel distance was inversely related to adherence (coefficient: -0.5062; OR: 0.603; [95% CI: 0.379, 0.958]; p-value=0.0321). Longer time spent at hospital predicted adherence (OR: 2.441; [95% CI: 1.161, 5.136]; p-value=0.0187). There was significant difference in mean adherence between education levels (F = 3.28; p-value = 0.0206).

Conclusion: There was significant prevalence of adverse SDH, gaps in access and sub-optimal adherence to antidiabetic medicines. SDH and travel distance to and time spent at the hospital were associated with antidiabetic medication adherence. These findings suggest a need for social and health system policies as well as facility-contextualised interventions to improve adherence to antidiabetic medicines.

Antidiabetic drug utilization at a teaching hospital in a resource-limited setting

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Background: Clinical guidelines for diabetes guide treatment decision-making by health care professionals in the management of diabetes mellitus to improve patient care. However, in resource-limited settings, factors such as medication access and affordability can influence drug utilisation. Aim: The aim of this study was to investigate antidiabetic prescribing, pill burden and prevalence of polypharmacy at the Korle Bu Teaching Hospital (KBTH).

Method: It was a cross sectional study. A retrospective review of prescription records was conducted and patients' medication profiles were examined. The study was conducted at the diabetes clinic, polyclinic and medical OPD of KBTH. A data abstraction form was used to abstract prescription information from medical folders, and a questionnaire was administered to collect data on patients' medication. Adult patients (18 years and above) with diabetes mellitus (DM) attending the clinics who were receiving treatment were included. Patients with difficulty communicating and those already included who were attending the clinics additional times within the study period were excluded. Systematic sampling was used to include 553 participants. Antidiabetic medicines were classified based on the American Association of Clinical Endocrinologists (AACE) 2023 treatment guideline. Data on number of medicines, pills and insulin injections taken by patients was collected to determine pill burden and prevalence of polypharmacy. Descriptive statistics were performed with SPSS.

Results: There were more females (75.8%; n=419) than males. Patients aged 60 – 80 years (59.5%; n=329) were more than other age groups. Most patients had type 2 diabetes mellitus (93.5%; n=517) and hypertension (84.2%; n=466). Oral medication, oral medication plus insulin, insulin only and non-insulin injectable were prescribed for 62.0% (n=343), 32.4% (n=179), 5.2% (n=29) and 0.2% (n=1) of patients respectively. Most patients had a prescription for metformin (92.2%; n=510). Other antidiabetic drugs prescribed were sulphonylureas (28.4%; n=157), dipeptidyl peptidase 4 (DPP4) inhibitors (4.0%; n=22), sodium glucose transporter SGLT2 inhibitors (3.4%; n=19) and thiazolidinedione (0.9%; n=5). Majority of patients received a prescription for 5 to 8 drugs (61.7%; n=341). Two or three antidiabetic drugs were prescribed for 62.9% (n=348) of patients. Majority of patients (61.4%; n=340) were taking 5 to 9 pills or pills plus injections daily. More than half of patients (58.1%; n=321) were taking

4 to 6 antidiabetic pills daily. The most common type of insulin prescribed was premixed insulin (34%; n=188). Long acting or intermediate insulin was prescribed for 4% of patients (n=22).

Conclusion: Metformin and sulphonylureas were the most commonly prescribed medicines. Premixed insulin was the most common insulin prescription. There was significant prevalence of polypharmacy and high pill burden. Antidiabetic drug utilization in this setting reflects the 2023 AACE guideline for glucose-centric glycaemic control in resource limited settings. This study however, suggests a need for physicians and pharmacists to simplify antidiabetic drug therapy for patients. Future studies should test the relationship between pill burden, polypharmacy and glycaemic control.

Knowledge, attitude and practices toward stroke disease among diabetic and hypertensive patients seen at St. Martin's Catholic Hospital, Agroyesum, in Ghana

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Introduction: Stroke is characterized by the sudden onset of neurological deficit and vascular pathology of the brain and affects many people globally although it is generally preventable. Recognizing stroke symptoms in time is important for correct and timely intervention. Increasing awareness towards risk factors, warning signs, and prevention strategies of stroke for high-risk populations can lead to reduction of incidence and late reporting to the hospital. However, there is paucity of data on the level of knowledge, attitudes and practices towards stroke among Ghanaian patients. Therefore, this study aimed to determine the knowledge, attitudes and practices toward stroke among patients attending the St Martin's Hospital in Ghana.

Methods: This study employed a descriptive cross-sectional design which involved assessment of knowledge, attitude and practices among attendants to the diabetes and hypertension clinic of the St. Martin's Catholic Hospital, Agroyesum in the Amansie South District of the Ashanti region, using a pretested, hand-delivered semi-structured questionnaire. Two Hundred and Eighty (280) participants were randomly included in the study. Outcome of the study was analysed using descriptive statistics, Pearson Chi-Square and Fisher's Exact tests. Composite scores were calculated to categorise participants' knowledge into little/no knowledge (0-5), adequate knowledge (6-10) and high knowledge (11-15). Binary logistic regression was performed to assess the impact of demographic factors on the likelihood that participants would report adequate/high knowledge of stroke and corresponding odds ratios (OR) reported. A p-value<0.05 at 95% confidence level was considered statistically significant.

Results: Participants were largely females 166(59.3%) and were aged 40.91±19.40 years (range:16-84 years) with most of them between 21-40 years 116(41.4%). Most participants 251(89.6%) identified hypertension and smoking as the most common risk factors for stroke. 179(63.9%) participants were of the view that stroke could not be acquired through physical contact with an affected person whereas others 154(55.00%) believed prayers and fasting could cure it. Most participants 192(68.6%) saw prevention as the best method to control stroke. Age group was the major predictor of participant reporting adequate/high knowledge (OR=15.98, 95% CI (1.718-148.530, p=0.015). Of those who believed that stroke could be acquired through physical contact with an affected person, majority were aged above 40 years, 65(65%) whereas majority of those who thought otherwise were either 40 years old or less 35(35%), (χ2=34.052, p<0.001). Significant difference was observed in participants' responses to what they would do if they found a patient in sudden trouble while walking compared with age group (χ2=25.494, p<0.001) and educational status (χ2=25.995, p<0.001).

Conclusion: Majority of patients expressed high knowledge about stroke and a variable response for attitude and practices towards stroke was recorded.

A comprehensive approach to SGLT2 inhibitors safety: Results from a two-year quality initiative on prescription screening and patient education

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Background: SGLT2 Inhibitors (SGLT2i) are highly effective for treating Type 2 diabetes but require careful consideration in patients with low eGFR. Additionally, these medicines carry risks of urinary tract infections (UTI) and genital infections as potential side effects. With the expanding role of SGLT2i in managing cardiovascular and renal complications in diabetes, implementing appropriate prescription systems and effective patient monitoring has become increasingly crucial for enhancing treatment safety and efficacy. Purpose: To increase safety in SGLT2i use through developing systematic prescription screening and patient monitoring protocols. The study aimed to establish a comprehensive pharmacist-led screening system for eGFR-based prescribing and implement

structured patient education programmes to prevent adverse events, ultimately optimising the benefit-risk profile of SGLT2i therapy.

Method: A quality improvement initiative was implemented at ViMUT-Theptarin Hospital, Bangkok. Following ADA Standards of Care 2023, pharmacists screened SGLT2i prescriptions using specific eGFR thresholds (Empagliflozin ≥30, Dapagliflozin ≥25, Canagliflozin ≥45 mL/min/1.73m²). Prescriptions outside these thresholds triggered pharmacist notifications to physicians. Statistical analysis was performed using Fisher's exact test to compare inappropriate prescription rates and t-test for counselling rates, with significance set at $p < 0.05$. A comprehensive patient education programme was established, including standardised counselling materials and regular pharmacist consultations. Data were collected on prescription appropriateness and patient monitoring from 2023 to 2024.

Results: The system screened 1,410 prescription orders in 2023 (Canagliflozin: 592, Dapagliflozin: 437, Empagliflozin: 381) and 1,752 in 2024 (Canagliflozin: 648, Dapagliflozin: 596, Empagliflozin: 508). The rate of prescriptions identified as potentially inappropriate based on eGFR criteria increased from 0.43% to 0.77% ($p = 0.041$). Patient counselling sessions showed significant improvement from 118 patients per month in 2023 to 146 patients per month in 2024 (23.7% increase, $p < 0.001$). Implementation of standardised patient education materials improved monitoring of side effects and complications. The interdisciplinary approach enhanced prescription safety and patient care coordination.

Conclusion: The initiative demonstrated the effectiveness of pharmacist-led prescription screening and structured patient education in improving SGLT2i medicine safety. The increased detection rate of inappropriate prescriptions indicates enhanced system sensitivity. Following ADA Standards of Care 2023, the screening used evidence-based eGFR thresholds, which have been further updated in ADA 2024 allowing for expanded use in CKD patients (Empagliflozin ≥20 mL/min/1.73m²). Continuous system development and interdisciplinary collaboration remain key success factors for medicine safety improvement.

Optimisation of medical inventory management system: A five-year analysis and implementation of auto-refill System (2020-2024)

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Introduction: Traditional hospital pharmacy inventory management relies on manual systems and experience-based decision-making, leading to inefficient stock control and increased costs. Studies have shown that hospitals typically maintain excessive inventory levels of 45-60 days on hand (DOH), resulting in high holding costs and waste from expired medications. Despite the theoretical benefits of automated inventory systems, there is limited empirical evidence demonstrating their long-term effectiveness in Thai hospital settings. ViMUT-Theptarin hospital faced similar challenges with high inventory costs and suboptimal stock turnover rates before 2020. This study aimed to evaluate the effectiveness of a comprehensive inventory optimisation programme implementing automated interventions to reduce excess stock whilst maintaining service levels and to establish an evidence-based automated inventory management system suitable for Thai hospital contexts.

Method: A five-year implementation study (2020-2024) was conducted using four key strategies: optimisation of minimum-maximum levels, auto-refill system implementation, reorder point-driven procurement standardisation, and systematic dead stock clearance. Key performance metrics included DOH (calculated monthly using average inventory value/monthly consumption × 30), inventory turnover ratio (annual cost of goods sold/average inventory value), cost savings (compared against 2020 baseline), and stockout frequency (monitored daily). Statistical analysis included linear regression, paired t-tests for year-over-year comparisons, and time series analysis.

Results: The implementation resulted in a 33.2% reduction in days on hand (DOH), decreasing from 49.36 days in 2020 to 32.96 days in 2024 (95% CI: 31.24 to 34.68 days, $p < 0.001$). Linear regression analysis demonstrated a significant downward trend ($\beta = -6.42$ days/year, 95% CI: -8.07 to -4.77 days, $R^2 = 0.97$). The most substantial improvement occurred between 2021-2022, whilst DOH decreased from 58.21 days to 39.91 days. Furthermore, the inventory turnover ratio increased by an average of 15% per annum, whilst achieving 18.5% cost savings over the study period. The stockout frequency remained consistently below 2%, demonstrating that efficiency improvements did not compromise medication availability.

Conclusion: This study provides strong evidence that automated inventory management systems can significantly improve hospital pharmacy operations in Thai healthcare settings. The multi-intervention approach successfully optimised inventory levels whilst maintaining service quality. These findings address the knowledge gap regarding automated systems' effectiveness in Thai hospitals and provide a sustainable framework for future implementations. Future research should explore integration with artificial intelligence (AI)-driven demand forecasting systems and hospital-wide digital platforms.

Medication error interventions in health facilities: A qualitative study of healthcare providers' experiences, strategies and challenges in Eastern region of Ghana

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Introduction: Medication errors are a leading cause of preventable adverse drug events globally, presenting significant clinical and economic challenges. The implementation of effective interventions is crucial to reducing these risks. This study explores the experiences, strategies and challenges healthcare providers encounter in implementing medication error interventions in Ghana's public health facilities.

Methodology: This qualitative study employed in-depth interviews with 27 healthcare providers from nine systematic randomly selected health facilities across three zones (southern, central and northern) of Ghana's Eastern Region. Participants included pharmacists, pharmacy technicians, pharmacy assistants, nurses, and medical doctors involved in medication error management. Interviews were audio-recorded, transcribed verbatim and analyzed using a framework approach to identify key themes and patterns.

Results: Medication error identification primarily relies on provider vigilance, patient feedback, and communication among healthcare professionals. While institutional medication safety policies exist, their implementation is inconsistent. Reporting mechanisms are often informal and underutilized, leading to underreporting. Electronic prescribing systems have improved error detection, yet manual verification remains crucial. Key intervention strategies identified include standardized protocols, double-checking procedures, and regular training for prescribers and pharmacists. Identified contributors to medication errors include high workloads, miscommunication, and similar drug names. Barriers to error reporting include fear of punitive action, lack of standardized documentation, and overwhelming workloads. The findings underscore the need for increased awareness, regular training, and the establishment of a standardized, anonymous reporting system to encourage transparency and improve patient safety.

Conclusion: Medication errors in Ghana's public health facilities are primarily attributed to systemic issues. While electronic prescribing and improved communication have enhanced error prevention, manual verification remains essential. The inconsistent adherence to policies and the underreporting hinders effective error management process. To improve medication safety, the study recommends the implementation of a standardized, non-punitive reporting system, alongside continuous training for healthcare providers.

Combination therapy of cabergoline and metformin in Polycystic Ovarian Syndrome with hyperprolactinemia: Evidence based

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Background: Polycystic ovarian syndrome (PCOS) is a common endocrine disorder among women of childbearing age. In Taiwan, research on PCOS remains limited. Therefore, further efforts in this area may contribute to improving the healthcare system and enhancing patient care. Metformin monotherapy is a standard treatment for polycystic ovarian syndrome. However, in patients with both PCOS and hyperprolactinemia, the combination of metformin and cabergoline may offer synergistic benefits. This study aims to evaluate the efficacy and safety of this combination therapy compared to metformin alone, addressing a potential gap in current treatment strategies. Purpose: The objective of this study is to determine whether the combination of cabergoline and metformin provides superior outcomes in hormone regulation and menstrual cycle regularity compared to metformin monotherapy.

Method: A systematic review and meta-analysis were searched using the PICO framework: P (Population): Patients with PCOS and hyperprolactinemia, I (Intervention): Cabergoline + Metformin, C (Comparison): Metformin alone, O (Outcomes): Efficacy and safety. A comprehensive literature search was performed in Cochrane library, PubMed, and Google Scholar. The time frame was set from 2015 to 2025, with a language restriction to English. Excluding other irrelevant results, one systematic review fully matched PICO criteria. The Critical Appraisal Skills Programme (CASP) tool was used to evaluate the quality and reliability of the study. The review included three randomized controlled trials (RCTs) and one case-control study. Data was analyzed using a random-effects model, and risk of bias was assessed using ROBINS-I for non-RCTs and RoB 2 for RCTs. A funnel plot was used to examine publication bias. Sensitivity analysis indicated the reduction in heterogeneity after the exclusion of Matrood et al.'s study.

Results: The combination of cabergoline and metformin was more effective in lowering prolactin levels than metformin alone (SMD = -3.23, 95% CI [-4.90, -1.55], $p < 0.05$). Improved

menstrual cycle regularity was observed with combination therapy (OR = 3.07, 95% CI [2.09, 4.51], I^2 = 0%). Other hormone levels and weight-related outcomes showed no significant difference.

Conclusion: The treatment strategy can benefit patients with PCOS and hyperprolactinemia. Combination therapy appears to be more effective than metformin monotherapy in regulating the menstrual cycle and lowering prolactin levels, although it does not show significant differences in other hormone levels, body mass index, or weight. However, limitations such as a focus on short-term outcomes and potential publication bias may affect data collection. Therefore, long-term studies and broader data collection are necessary to validate these findings across different racial populations and diverse living environments.

Pharmacoepidemiology of anti-HER2 ADC induced interstitial lung disease: Real-world data analysis based on the FAERS database

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Introduction: Antibody-drug conjugates (ADCs) targeting human epidermal growth factor receptor 2 (HER2), such as trastuzumab deruxtecan (T-DXd) and trastuzumab emtansine (T-DM1), have revolutionized the treatment of HER2-positive malignancies. However, interstitial lung disease (ILD), a potentially fatal complication associated with ADCs, remains a significant concern and is under-characterized in real-world populations. Objective: The aim of the study was to compare the incidence, clinical characteristics, and outcomes of ADC induced ILD between trastuzumab deruxtecan and trastuzumab emtansine, based on FDA Adverse Event Reporting System (FAERS).

Methods: ILD cases (MedDRA v27.0) linked to trastuzumab deruxtecan or trastuzumab emtansine were extracted from FAERS (2004–2023). Disproportionality analyses (reporting odds ratio [ROR], Bayesian confidence propagation neural network [BCPNN]) and survival analyses were performed to assess risk signals, onset kinetics, and mortality.

Results: Among 8961 ADC related reports, 893 ILD cases were identified (trastuzumab deruxtecan: 737; trastuzumab emtansine: 156). Trastuzumab deruxtecan showed significantly stronger ILD signals. Median time to onset was shorter for trastuzumab deruxtecan compared with trastuzumab emtansine (73 days vs. 119 days; P=0.00057). Onsets of respiratory distress syndrome (73d vs. 403d, P=0.018) and pneumonitis (64.5d vs. 106d, P=0.036) of trastuzumab deruxtecan were both shorter than those of trastuzumab emtansine. The onset of fatal acute respiratory distress syndrome of trastuzumab deruxtecan was also shorter than that of trastuzumab emtansine (42d vs 1125.5d, P=0.081).

Conclusion: Trastuzumab deruxtecan carries a higher burden of ILD with accelerated progression compared to trastuzumab emtansine. Preemptive monitoring including early radiographic screening should be considered, particularly among patients with acute respiratory distress syndrome and pneumonitis.

Efficacy and safety analysis between first-line immunotherapy and chemotherapy in patients with KRAS mutant non-small cell lung cancer (NSCLC)

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Introduction: One of the ongoing challenges we are dedicated to addressing is how to better integrate pharmacists into clinical diagnostic and treatment teams, cooperating with physicians to fully leverage pharmacists' professional pharmaceutical expertise. This integration aims to enhance the level of rational drug use and improve pharmaceutical management skills.

Methods: With strong support from our hospital's medical department and clinical departments, senior clinical pharmacists independently conducted several specialty collaborative drug therapy management (CDTM) outpatient clinics, including for medications used in gastrointestinal stromal tumors, lung cancer, asthma, cardiovascular diseases, and COVID-19 pharmacotherapy. These clinics provide patients with therapeutic drug monitoring and individualized medication and dosage adjustments guided by genotyping. Services offered also include treatment for adverse drug reactions such as rashes, edema, hand-foot skin reactions, gastrointestinal reactions, leukopenia, and anemia. Furthermore, the clinics provide

guidance on special dosage forms of asthma medications, respiratory symptom treatments, medication optimization, and simplification, all of which are specialized CDTM pharmaceutical services with distinct characteristics.

Results: These initiatives have significantly improved patients' healthcare experiences, increasing patient satisfaction rates to 98.5%, medication adherence (MMAS-8) to 7.5 points, and steadily increasing the number of patients visiting the pharmaceutical outpatient clinics.

Conclusions: Through CDTM collaboration, the inclusion of pharmacists allows physicians to spend more time focusing on disease diagnosis and primary disease treatment, significantly enhancing work efficiency and earning high praise from physicians, thereby realizing the value of physician-pharmacist collaborative management. Our hospital's tight, efficient CDTM model has also been promoted to several other hospitals within the province to help them improve pharmaceutical services. We hope that through the CDTM model, we can inject new vitality into pharmaceutical outpatient services, allow pharmacists to truly integrate into the diagnostic and treatment teams, provide pharmaceutical services to patients, and serve as gatekeepers for rational medication use.

Hypocalcemia incidence in denosumab use: A district hospital analysis

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Objectives: Denosumab, a RANKL inhibitor, is widely used to manage bone health. It is marketed under two trade names: Prolia, approved by the FDA for treating osteoporosis, and Xgeva, indicated for cancer patients with bone metastases. Despite its efficacy, Denosumab is associated with serious side effects, such as hypocalcemia, which require careful monitoring. Patients with advanced chronic kidney disease (eGFR < 30 mL/min/1.73 m²) are particularly at high risk. This study aims to evaluate the incidence of side effects and compare differences between Prolia and Xgeva

Methods: This study included patients treated with Denosumab at a district hospital from June to August 2024. Data were analyzed using statistical software. Key research indicators included the distribution of patients receiving Prolia versus Xgeva, the incidence of hypocalcemia (defined as corrected serum calcium ≤ 7.9 mg/dL), and the proportion of patients with chronic kidney disease (CKD). Calcium levels were adjusted for serum albumin < 4 g/dL using the formula: corrected serum calcium (mg/dL) = measured calcium (mg/dL) + 0.8 × (4 − albumin [g/dL]).

Results: Following statistical analysis, 948 patients received Prolia treatment, and 164 received Xgeva. However, calcium laboratory data were available for only 177 patients treated with Prolia and 37 treated with Xgeva. Among those receiving Prolia, 12 patients (6.7%) experienced hypocalcemia, of whom 4 had chronic kidney disease (eGFR < 30 mL/min/1.73 m²). Among those treated with Xgeva, 7 patients (18.9%) had hypocalcemia, including 1 with chronic kidney disease.

Conclusions: This study evaluated the incidence of hypocalcemia among patients treated with Prolia and Xgeva at a district hospital. Xgeva was associated with a significantly higher hypocalcemia rate (18.9%) compared to Prolia (6.7%). Additionally, calcium levels were not regularly monitored in most patients. Patients with chronic kidney disease receiving Denosumab should be closely monitored. Further research is needed to identify hypocalcemia risk factors, while pharmacists can enhance safety by promptly reviewing prescriptions.

Exploring the correlation between Chinese herbal medicine and idiopathic mesenteric phlebosclerosis: A systematic review and integration into an adverse drug reaction alert system

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Background: With its long history of use and well-documented therapeutic efficacy, Chinese herbal medicine is widely integrated into healthcare services across Taiwan derive from natural sources; however, several studies have suggested that idiopathic mesenteric phlebosclerosis (IMP), a rare intestinal disorder, may be associated with the use of herbal medicine. Purpose: To clarify this potential relationship between Chinese herbal medicine and IMP, and ensure medication safety, we conducted a systematic literature review using an evidence-based approach. Additionally, we intended to implement it into the adverse drug reaction system to prevent the occurrence of IMP.

Methods: A comprehensive literature search was conducted across seven databases, including PubMed, CNKI, CETS, EBSCO, EMBASE, Web of Science, and the Cochrane Library.

Keywords used in the search encompassed “idiopathic mesenteric phlebosclerosis”, its former designation “phlebosclerotic colitis”, “mesenteric phlebosclerosis”, as well as terms related to traditional Chinese medicine, including “Chinese medicine”, “traditional Chinese medicine”, “Chinese herbal medicine”, and “herb”. All retrieved literature was systematically reviewed and classified according to the levels of evidence-based medicine (EBM level 1-5). Finally, all findings were discussed by the China Medical University Hospital’s Medication Safety Panel for Traditional Chinese Medicine, which comprises specialists from various multi-disciplines, including Western medicine physicians, traditional Chinese medicine (TCM) practitioners, TCM pharmacists, and clinical pharmacists.

Results: This study includes a total of 69 publications (EBM level 1=0; level 2=0; level 3=7, level 4=13, level 5=49), which collectively suggest a potentially significant association between the occurrence of IMP and the use of Chinese herbal medicine, particularly Gardenia jasminoides and its related formulations. The primary bioactive compound of Gardenia jasminoides, geniposide, undergoes intestinal metabolism to form genipin, which may react with proteins in the mesenteric venous plasma, leading to pigmentation and sclerosis of the mesenteric vein. This process may cause mesenteric vein calcification and thickening of the right hemicolon wall. Several studies have indicated that these pathological changes may be associated with long-term use and cumulative dosage of geniposide.

Conclusion: Through a comprehensive literature review, this study identifies IMP as a potential adverse reaction associated with long-term use of certain herbal drugs. Therefore, we propose the implementation of findings into the hospital’s adverse drug reaction alerting system to remind clinicians and pharmacists regarding patients' medication usage. Furthermore, revision of the relevant drug information to enable pharmacists to reduce the risk of adverse reactions is warranted.

Evaluation of Brexpiprazole use in elderly patients at a psychiatric hospital

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Introduction: Brexpiprazole is characterized as having equally high affinity for serotonin 5-HT1A,2A and dopamine D2 receptors and lower intrinsic activity at dopamine D2 receptors than aripiprazole. It was thought likely that brexpiprazole may be safer and less akathisia, insomnia or restlessness due to these pharmacological properties. This main purpose is exploring the evaluation of brexpiprazole in the elderly population. The aim to assess the rationality, efficacy and the safety of brexpiprazole for elderly patients to ensure pharmaceutical services and elderly medication safety.

Method: This was retrospective chart review of elderly patients who received brexpiprazole at the psychiatric hospital between January 1,2019, and December 31,2023. Elderly patients are defined as age 65 years or older, including those are 65.
Data were retrospectively collected from their medical record by 3 pharmacists. We fellow patients information includes gender, age, lipid profiles, and general biochemical values. The usage of brexpiprazole was confirmed, i.e start date, end date, dosage, and combined drugs. We also fellow emergency visit or hospitalization records in these patients. Analyses in the study were performed by descriptive statistical methods.

Result: In total of 70 elderly patients with brexpiprazole were including 45 females and 25 males with average age of 78 years. The average therapy duration was 244.7 days. 81.4% of patients have used 1 mg of brexpiprazole (average age of 79 years),35.7% of patients have used 2mg of brexpiprazole(average age of 76 years), and 15.7% of patients have used 4mg of brexpiprazole (average age of 68 years). 7 patients have used brexpiprazole during acute episodes when they were admitted to the hospital. Regarding prior antipsychotics,4 patients used with first generation antipsychotics,36 patients used with secondary generation antipsychotics,6 patients used with long action injects. 33 patients had brexpiprazole monotherapy. Medication persistence rate at 84 days was 48.5%, and 34.3% at 168 days. 8 patients have hospitalization after brexpiprazole using. In safety events,2 patients started using statin therapy and 1 patient started using oral hypoglycemic agents after brexpiprazole using . 3 patients experienced drooling and were treated with glycopyrrolate. 11 patients were treated with biperidine for extrapyramidal symptoms and 7 patients were treated with propranolol for movement disorder.

Conclusion: The results indicate there 33 elderly patients using brexpiprazole monotherapy,with an average age of 82 years. Only 1 patent started using statin and oral hypoglycemic agents after brexpiprazole monotherapy. This recommended that brexpiprazole has a more safety profile for elderly patients. Regarding dosage that the higher average age, the lower the dosage used. It is unclear whether this result is due to side effects or efficacy. Only 3 patients had re-hospitalization after brexpiprazole used.Retrospective chart review with limited documentation of patient body weight, regular laboratory tests to follow patients metabolic syndrome,and the score to assess patients illness. We need follow more detail data to follow medication safety in elderly population in the further.

Patient-centered hospital pharmacy: Opinion survey and opportunities for improvement

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Introduction: Adverse events related to unsafe healthcare practices represent one of the leading causes of morbidity and mortality worldwide. The quality of healthcare services is a key determinant in patient trust and the overall efficiency of healthcare systems. The World Health Organization (WHO) and the Pan American Health Organization (PAHO) emphasize the need to enhance effectiveness, safety, and patient-centered care within healthcare services. In response to these recommendations, a new outpatient medication dispensing model has been implemented in our institution's Satellite Pharmacy, requiering an evaluation of its impact on patient perception and satisfaction. Objective: Assess patient perception regarding the quality of care provided in the Satellite Pharmacy following the implementation of a new medication dispensing system.

Methods: A structured opinion survey was conducted among users of the Satellite Pharmacy. The survey included questions on demographic characteristics, waiting time, accuracy of medication dispensing, quality of pharmaceutical counseling, and staff courtesy. A combination of multiple-choice questions with visual aids and an open-ended question for suggestions was utilized. The questionnaire was designed to be concise to optimize participant response time.

Results: A total of 401 patients participated in the survey during the study period from November 11, 2024, to January 10, 2025.

•Age distribution: 69% of respondents (277 individuals) were aged between 19 and 49 years, reflecting the predominant patient demographic in our institution.
•Waiting time satisfaction: 100% of respondents provided positive feedback (84% rated it as excellent, 16% as good).
•Staff courtesy: 99% of respondents rated the courtesy of the staff positively (93% excellent, 6% good, 1% no response).
•Accuracy of medication dispensing: 99% of respondents confirmed receiving their prescribed medications correctly (92% excellent, 7% good, 1% no response).
•Pharmaceutical counseling: This category exhibited the greatest variability in responses:
o75% received and found the information useful.
o9% did not receive information but would have liked to.
o6% received information but desired more details.
o6% did not respond.
o4% did not receive information and had no interest in receiving it.

Conclusion: The implementation of a patient feedback survey proved to be a valuable tool for assessing service quality and its impact on patient experience. The results indicate a highly positive impact of the new dispensing model in the Satellite Pharmacy, particularly regarding medication accuracy, staff courtesy, and reduced waiting times. However, the findings also highlight opportunities for improvement, particularly in enhancing patient education on medication use and promoting rational pharmacotherapy. These insights underscore the need to further integrate pharmaceutical services into patient care to optimize medication use, prevent adverse events, and address drug-related problems. This study supports the continuous improvement of Satellite Pharmacy services and the implementation of patient-centered strategies to enhance healthcare outcomes.

Assessment of chemotherapy-induced nausea and vomiting (CINV) management strategies in a resource-constrained oncology setting

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Background: Chemotherapy-induced nausea and vomiting (CINV) remains a major source of distress for cancer patients, often more debilitating than the cancer itself. Effective antiemetic strategies are available, but resource-constrained settings face challenges in accessing modern, highly effective antiemetics, leading to inadequate symptom control. Evaluating existing strategies in such settings is crucial to improving patient outcomes and quality of life. Purpose: This study aimed to assess the effectiveness of antiemetic strategies in preventing acute and delayed CINV among breast cancer patients receiving high-risk intravenous chemotherapy at Korle Bu Teaching Hospital. The objective was to determine the incidence and severity of CINV and explore associations with demographic factors to guide improvements in supportive care.

Method: A cross-sectional study was conducted among 222 adult breast cancer patients selected through simple random sampling. Participants received high-emetic-risk intravenous chemotherapy (≥90% emesis frequency according to National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2017). Data on acute (≤24 hours) and delayed (>24 hours to 4 days) CINV were collected using the Multinational Association for Supportive Care in Cancer (MASCC) Antiemesis Tool (MAT), an eight-item scale designed to enhance communication between patients and healthcare providers about CINV prevention and control. The standard antiemetic regimen included dexamethasone and serotonin 5-HT3 receptor antagonists for acute CINV, with dexamethasone and dopamine receptor antagonists for delayed CINV. Data analysis was performed using SPSS version 28, employing descriptive and inferential statistics.

Results: Among the 222 participants, 34.2% experienced acute nausea and 16.2% experienced acute vomiting. Delayed

nausea and vomiting occurred in 37.4% and 21.6% of patients, respectively. The average nausea intensity, measured on the MAT scale (0-10), was 3 for both acute and delayed phases. Patients vomited an average of two times during each phase (SD=2.0 for acute and SD=2.5 for delayed). Combined acute and delayed vomiting occurred in 7.7% of patients, while 18.9% experienced both acute and delayed nausea. Patients over 50 years experienced slightly higher rates of acute vomiting (9.5%) compared to those 50 years or younger (6.8%). No significant associations were found between gender and CINV occurrence.

The study demonstrates that current antiemetic strategies are effective in reducing acute and delayed CINV among breast cancer patients receiving high-risk chemotherapy **Conclusion:** in a resource-constrained setting. However, gaps remain, particularly in managing delayed CINV. Expanding access to newer antiemetics, such as neurokinin-1 (NK1) receptor antagonists, may further improve outcomes. Future studies should explore cost-effective strategies to optimize antiemetic regimens in low-resource oncology settings, contributing to better supportive care and improved patient quality of life.

Safety of JAK and TNF inhibitors in rheumatoid arthritis: A systematic review and meta-analysis of real-world evidence

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Introduction: In 2022, "ORAL Surveillance" trial demonstrated that tofacitinib might increase the risk of major adverse cardiovascular events (MACEs) and malignancies compared to Tumor necrosis factor (TNF) inhibitors in rheumatoid arthritis (RA) patients aged ≥50 years old with at least one cardiovascular risk factor. Higher risks were observed in patients aged ≥65 years and smokers. These findings raised concerns about the safety of Janus kinase (JAK) inhibitors in RA patients. US Food and Drug Administration (FDA) and the European Medicines Agency (EMA) launched safety warnings about JAK inhibitors. Nevertheless, recent registries and real-world data did not observe risks similar to those of the "ORAL Surveillance" trial. Given these conflicting findings, we conducted a meta-analysis of real-world evidence to investigate cardiovascular and malignancy risks associated with JAK inhibitors versus TNF inhibitors in patients with RA."

Methods: We searched MEDLINE, Embase, and the Cochrane Central Register of Controlled Trials (CENTRAL) from database inception until March 9, 2025, to identify cohort studies comparing JAK inhibitors with TNF inhibitors. Two reviewers independently screened articles for inclusion and extracted data from the eligible studies. Outcomes of interest included venous thromboembolism (VTE), MACEs, and malignancy. If multiple articles reported analyses of the same database and outcome, we chose the study with the largest sample size and longest study period in the primary analysis. Random-effects meta-analyses were conducted to assess the outcomes of interest compared to JAK and TNF inhibitors in RA patients. In sensitivity analysis, we included all studies using duplicate databases to examine result robustness. Secondary analyses focused on RA patients aged ≥50 with at least one cardiovascular risk factor—similar to the "ORAL Surveillance" trial population.

Results: Twenty-four studies were identified, including 545,197 patients with rheumatoid arthritis. Compared to TNF inhibitors, JAK inhibitors were associated with a significantly higher risk of VTE (hazard ratio [HR]: 1.39; 95% confidence interval [CI]: 1.18–1.63; I^2 = 24.8%; 7 studies). No significant difference were observed between JAK inhibitors and TNF inhibitors in terms of MACEs (HR: 0.96; 95% CI: 0.86–1.08; I^2 = 0.0%; 10 studies), and malignancy (HR: 1.15; 95% CI: 0.96–1.38; I^2 = 12.1%; 8 studies). Sensitivity analysis indicated similar results. In secondary analyses, VTE (HR: 1.49; 95% CI: 1.01–2.22; I^2 = 0.0%; 2 studies), malignancy (HR: 1.23; 95% CI: 0.95–1.59; I^2 = 1.1%; 3 studies), and MACEs (HR: 0.90; 95% CI: 0.67–1.20; I^2 = 47.5%; 5 studies) showed a similar magnitude.

Conclusions: In real-world settings, JAK inhibitors are associated with a higher risk of VTE than TNF inhibitors in rheumatoid arthritis patients; however, no increased risk was observed for MACEs and malignancy. These results were consistent among patients aged ≥50 years with at least one cardiovascular risk factor. Further research is warranted to explore the high risk population of those aged 65 and older and smokers.

Combined diazoxide and octreotide therapy for congenital hyperinsulinemia: A case report

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Introduction: Congenital hyperinsulinemia (CHI) is a rare disorder characterized by persistent hypoglycemia due to excessive insulin secretion, posing a significant risk of neurological damage. While diazoxide is the first-line treatment, some patients exhibit partial or complete resistance, necessitating alternative or adjunctive therapies. Octreotide serves as a second-line treatment for diazoxide-unresponsive cases. This report presents a pediatric CHI patient resistant to diazoxide, highlighting the outcomes of combined diazoxide and octreotide therapy.

Method: A 3-month-old female infant presented with recurrent neonatal hypoglycemia. Genetic testing identified an ABCC8 heterozygous missense mutation (c.4451G>A, p.Gly1484Glu), and F-18 FDOPA PET/CT revealed diffuse pancreatic involvement, confirming the CHI diagnosis. Diazoxide therapy was initiated at 3 mg/kg/day and titrated up to 11.9 mg/kg/day, yet glycemic stability remained unachievable. Due to persistent hypoglycemia, diazoxide was discontinued. Given the inadequate response, subcutaneous octreotide 4 mcg/kg/day (Q6H) was introduced, with subsequent dose escalation to 5.2 mcg/kg/day (Q6H); however, glucose fluctuations persisted. To enhance glycemic control, octreotide was further increased to 6.52 mcg/kg/day, and combination therapy with diazoxide 13.96 mg/kg/day (Q8H) was initiated, gradually up-titrated to 19.55 mg/kg/day.

Results: Combination therapy achieved partial glycemic control, maintaining blood glucose above 63 mg/dL for over 90% of the time. However, fluctuations persisted despite dosage adjustments. Given the ongoing challenge in achieving stable glucose levels, the patient's family pursued a second opinion and ultimately opted for surgical intervention. The patient was subsequently discharged against medical advice for further surgical management.

Conclusion: This case highlights the potential benefits and limitations of combined diazoxide and octreotide therapy for CHI. While partial glycemic control was achieved, monotherapy resistance persisted, and combination therapy alone was insufficient for long-term stability. These findings underscore the need for individualized treatment approaches, including surgical intervention when necessary, in managing diazoxide-unresponsive CHI.

Effectiveness of pharmaceutical care for outpatients with chronic kidney disease in a regional teaching hospital in Taiwan: A retrospective study

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Introduction: In 2021, the prevalence of chronic kidney disease (CKD) among adults aged 20 and over in Taiwan was approximately 12%. Over 80,000 patients were on dialysis, making Taiwan the country with the highest dialysis prevalence globally. CKD progression is influenced by several factors such as poorly controlled blood sugar and blood pressure, along with excessive use of non-steroidal anti-inflammatory drugs (NSAIDs) or self-medication with traditional Chinese medicine or dietary supplements. To address these issues, the Ministry of Health and Welfare included pharmaceutical care for pre-end-stage renal disease (pre-ESRD) care program to the National Health Insurance coverage in 2021, promoting collaboration among pharmacists, nephrologists, nurses, and case managers for better medication safety and kidney protection. This study aims to evaluate the role of pharmacists in CKD patient care, focusing on medication reconciliation, patient education, and renal health counseling. The objectives include improving medication adherence, reducing NSAIDs use, and educating patients on avoiding self-medication with traditional Chinese medicine or dietary supplements.

Method: This retrospective study included patients diagnosed with CKD (stages 2–5) who had at least two comorbidities (e.g., hypertension, diabetes), prescribed 10 or more medications, recent NSAIDs use, or requiring intensified education. Pharmacists provided pharmaceutical care after nephrology visits. Patients were followed up at intervals of at least 60 days. Data on NSAIDs use, self-medication with traditional Chinese medicine or supplements, and medication adherence assessed using the Adherence to Refills and Medications Scale (ARMS). Statistical analyses were conducted to evaluate the impact of pharmacist interventions.

Results: From November 2021 to February 2025, a total of 196 patients were enrolled, with 120 completing follow-up and included in the analysis. The mean follow-up interval was 286.86 (±244.52) days, with an average of 2.34 (±1.81) follow-up visits per patient. Among the participants, 93.33% were aged 60 or older. CKD stage distribution was as follows: stage 2 (4.17%), stage 3a (7.50%), stage 3b (31.67%), stage 4 (40.00%), and stage 5 (16.67%). Estimated glomerular filtration rate (eGFR) changes calculated using the MDRD equation showed a mean difference of -1.63 (95% CI: -2.73, -0.54, $p<0.05$), while the CKD-EPI equation showed a mean difference of -1.82 (95% CI: -3.03, -0.62, $p<0.05$). Six patients progressed from CKD stage 4 to stage 5. Changes in the number of prescribed medications were not statistically significant (mean difference = 0.2, 95% CI: -0.22, 0.62, $p=0.35$). Medication adherence, assessed by ARMS, improved significantly (mean difference = -0.4, 95% CI: -0.72, -0.08, $p<0.0142$). NSAIDs use significantly decreased from 10.00% (±2.73%) before intervention to 3.33% (±1.64%) after intervention ($p<0.05$). Eighteen patients who self-medicated with traditional Chinese medicine or supplements at baseline discontinued use by the last follow-up, with no significant changes in renal function observed in this subgroup.

Conclusion: This study demonstrates that pharmacist interventions in CKD patient care can significantly improve medication adherence and reduce NSAIDs use. However, eGFR continued to decline, suggesting that additional early renal protection measures and closer interdisciplinary collaboration are needed to optimize long-term treatment outcomes.

Evaluation of a transitions of care stewardship pharmacist in facilitating post-discharge medication reviews: A qualitative study of pharmacists

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Background Information: Transitions of care from hospitals are periods of high risk of medication errors and adverse events, with 50% of adults discharged with at least one medication-related problem. Pharmacist-led medication reviews at home after discharge can reduce medication errors and prevent unplanned readmissions; however, such reviews remain underutilised. A Transition of Care Stewardship (TOCS) pharmacist has been proposed to facilitate and coordinate a patient's discharge process, ensuring timely follow-up through a post-discharge home medication review. Purpose: This study aims to investigate pharmacists' perspectives regarding post-discharge medication reviews and the acceptability of the TOCS pharmacist role.

Method: Pharmacists who have completed a post-discharge medication review initiated through the TOCS pharmacist were invited to participate in semi-structured interviews. Interview guides were developed using the Consolidated Framework for Implementation Research. Interviews were digitally recorded, transcribed verbatim and analysed using the Framework Approach to identify emerging themes.

Results: Three key themes emerged from the preliminary analysis of the interviews: 1) Importance of post-discharge HMRs, 2) the need for coordination and TOCS, and 3) Patient-centred care; considerations for pharmacists. Pharmacists highlighted the importance of promptly reviewing a patient's medication post-discharge as an effective strategy to address medication-related errors during transitions of care. These reviews were an important opportunity to provide patients with additional education and support. However, they acknowledge the complexity of readmissions, recognising that a single medication review may not prevent them entirely.

Conclusion: Results suggest pharmacists perceive an underutilisation of post-discharge medication reviews, with a general consensus supporting the role of a TOCS pharmacist in facilitating post-discharge medication reviews. Pharmacists expressed confidence in implementing the service and felt well-supported. However, they highlighted the need for further funding, particularly travel allowances, to support their practice.

Enabling direct medication error reporting from hospital pharmacists to the Drug Commission of German Pharmacists via a technical interface: DokuPIK

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Introduction: Pharmacists in Germany are required to report adverse drug events including (potential) medication errors (ME), to the Drug Commission of German Pharmacists (AMK). ME are among the most common treatment errors and corresponding AMK reporting forms are available as an online form or PDF files. However, ME reporting rates to the AMK still remain low. To overcome current restrictions of low reporting rates, AMK and the German Society of Hospital Pharmacists (ADKA) aimed to advance implemented technical processes for spontaneous reports of ME.

Method: Previous versions of the DokuPIK database allowed hospital pharmacists to provide internal documentation and evaluation of pharmaceutical interventions and identified ME in a structured manner. The aim was to develop and implement a new interface connecting internal DokuPIK ME datasets from German hospital pharmacists with the AMK reporting forms for ME.

Results: The suitability of the new DokuPIK system for reporting ME to the AMK was initially confirmed by selected hospital pharmacists as pilot users during a beta testing phase in January/February 2025. In March 2025, the adapted DokuPIK was released to record and transmit ME reporting forms to the AMK in accordance with the common validity criteria for spontaneous reports. Additional information (e.g. drug names) were set as mandatory fields to generate a valid report and to reduce queries from the AMK to the reporter. Bidirectional data transfer enables transmission of the AMK processing status in return to DokuPIK.

Conclusion: The technical interface facilitates the direct transmission of ME documented by hospital pharmacists in DokuPIK to the AMK. Although initial acceptance was confirmed by beta testers, monitoring of reporting rates and the ongoing refinement of the (technical) parameters are potentially needed to establish DokuPIK as a simple and efficient spontaneous reporting system in hospital pharmacies in Germany. Three months post-implementation, an initial evaluation study will assess the quantity and quality of ME reports transmitted to the AMK.

Introducing inpatient holistic pharmacy services for advanced pharmacy practice experience student education in one of medical center in southern Taiwan

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Holistic pharmacy service is based on holistic health care. It is people-oriented with suitable medication care at its core. For pharmacists, we can do medication reconciliation to increase medication safety and reduce the risk of polypharmacy and complex medication. In order to practice pharmaceutical education in inpatient holistic pharmacy services, we have been committed to bring its concepts into the pharmacy practice experience (APPE) student program since 2024. An APPE student is who has completed the classroom portion of their pharmacy education and is now in the advanced stage of training. The goal of the APPE student program is to equip students for a successful transition from academic learning to professional practice and help them cultivate the knowledge, skills, and attitudes to provide high-quality patient care.

Most of APPE student programs are based on clinician teaching. In order to enhance students' understanding of inpatient holistic pharmacy services and pharmacists core values, we employ multi-faceted inpatient pharmaceutical care in our teaching program. It includes: heart failure discharge medication education, first chemotherapy education, hospice & palliative care and medication reconciliation. At the same time, we use journal reading reports, mini-CEX and SOAP writing to examine students' learning effectiveness.

In this year, twenty-four APPE students participated in this training program. Most of the students gave us positive feedback, as described below. In medication education, students learn how to educate patients the importance of taking medicine on time. It may need more practice communication skills before education. In medication reconciliation, they realize how to evaluate the overall medication of patients like judging the continuity of patients' medication, the presence of corresponding indications and the rationality of dosage frequency. In hospice & palliative care, understanding what the purpose of medication changes from treating the disease to maintaining the quality of life in the terminal stage of the disease is their learning objectives.

We will continue to retrospectively analyze and explore whether the students' participation in inpatient holistic pharmacy services in the past is conducive to the learning of patient education, communication strategies and attitudes, so as to serve as references and indicators for improving related teaching activities in the future.

Improve medication administration safety for inpatient with CLMA

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Background: According TPR report, medication error is most common for patient safety. Medication error not only causes physical harm to patients but also damages the image of medical staffs. Closed-Loop Medication Administration (CLMA), with intelligent medication bins configured for patients, accompanied by electronic paper displays for information. The accuracy of dispensing is ensured by the pharmacy, and the safe transportation from the pharmacy to the nursing station, as well as the correct medication dispensing at the patient's bedside, is guaranteed.

Purpose: Drug errors include prescribing errors, dispensing errors, compounding errors, and administration errors. The entire process utilizes CLMA to assist in medication preparation, transportation, and dispensation, achieving a closed-loop medication management system to lower the rate of medication error and reduced the length of hospital stay to enhance patient safety is our primary goal.

Method: The pharmacy utilizes intelligent medication bin setup system, binds the bin to the patient, and synchronizes patient information on the electronic paper label. Medications are categorized into oral and injectable/topical, placed in the patient's medication bin, and then placed in the UD(Unit Dose) medication cart for delivery to the ward. Then, nurses take out patient's medication bin from UD medication cart and place it in medication Cart. During the prescribed medication time, using E-healthcare mobile medication system, the nurse scans the patient's wristband barcode, selects the medication bin to be dispensed, and the system will open the correct bin. The nurse takes out the correct quantity of medication from the bin, following the standard medication dispensation process to dispense the medication to the patient. In addition, we use a smart medication management system "iMedication" that can integrate the HIS/NIS system of hospital, so that pharmacists view prescriptions through the platform which correct and timely to dispensing and distribute medicines, additionally can flow-direction tracking, therefore significantly reduced medication error.

Result: This study found that the introduction of CLMA, the results showed that the average dispensing near miss rate was 0.0013%($p<0.05$) after 18 months followed up, that below ourself threshold 0.02% and neighbor community hospitals. Finally in Satisfaction Survey showed that over 82% of pharmacist and over 83% of nurses are satisfied with the CLMA. Through paperless of CLMA we also reduced carbon footprint about 22,500 g every month.

Conclusion: Our CLMA is the first of its kind in TAIWAN,it significantly not only decreased medication error rates but also ensure the safety and accuracy of dispensing and administration to improve patient safety. Furthermore we contribute our share to the environmental protection.

Case report on Congenital Syphilis: Diagnosis, treatment, and outcomes

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Background: Congenital syphilis remains a significant public health concern, leading to severe perinatal complications if left untreated. The vertical transmission of Treponema pallidum can cause intrauterine fetal demise, premature birth, or congenital infections with multisystem involvement. Early detection and timely treatment are crucial in preventing adverse neonatal outcomes. This case report presents a newborn diagnosed with congenital syphilis despite maternal treatment, highlighting the importance of rigorous prenatal screening and postnatal follow-up.

Purpose: This report aims to detail the clinical presentation, diagnostic process, treatment course, and outcomes of a newborn with congenital syphilis, emphasizing the effectiveness of maternal treatment and neonatal management.

Method: A 20-year-old pregnant woman (G2P0A1) was diagnosed with syphilis through routine prenatal screening, showing a positive T. pallidum particle agglutination assay (TPPA) with a rapid plasma reagin (RPR) titer of 1:1280. She received three doses of intramuscular Benzathine Penicillin G (2.4 MIU) at 24 weeks, 34 weeks, and 37 weeks of gestation. The newborn was delivered vaginally at 38+1 weeks with a birth weight of 2530g (<3rd percentile). Neonatal RPR testing was positive (titer 1:4), and a confirmatory T. pallidum antibody test yielded a reactive result (S/CO 25.34).

Results: The newborn was admitted for evaluation and received intravenous Penicillin G Sodium (0.06 MIU/kg Q8H) for ten days. During hospitalization, the infant experienced transient hyperbilirubinemia requiring phototherapy and mild respiratory distress, resolving with supportive care. Follow-up serologic testing at five months showed a significant decrease in antibody titers (S/CO 5.83), indicating an effective treatment response. The infant remained asymptomatic upon discharge and was scheduled for continued serologic monitoring.

Conclusion: Despite adequate maternal treatment, congenital syphilis remains a risk, necessitating thorough neonatal evaluation and treatment. This case underscores the importance of rigorous antenatal screening, adherence to

treatment guidelines, and postnatal follow-up to prevent and manage congenital syphilis effectively. Further research is needed to refine perinatal management strategies and improve outcomes for at-risk neonates.

Efficacy and safety of co-administration of albumin and diuretics compared to diuretics therapy in patients with Edema: A systematic review and meta-analysis

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Background: The effectiveness of co-administering albumin and diuretics in enhancing diuresis in patients with edema compared to diuretic therapy alone has been widely debated. Published trials have reported inconsistent findings on the impact of this combination therapy. Purpose: To conducted a meta-analysis to evaluate the efficacy and safety of co-administration of albumin and diuretics in patients with edema.

Method: PubMed, Embase, Cochrane library and CHINAL databases were searched from inception to 1 June 2024 using PRISMA flow diagram. Randomized controlled trials (RCTs) comparing co-administration of albumin and diuretics compared to diuretics alone were included. Revman (version 5.4) software was performed to synthesize the results. The outcomes including diuretic effects were extracted. Subgroup analysis was performed to examine the potential causes of heterogeneity of treatment effects.

Results: 18 RCTs were included. Compared to diuretic therapy alone, co-administration of albumin and diuretics significantly increased urine output by 20.8 mL/h (95%CI 12.99-28.61). In patients with serum albumin <2.5 g/dL, the urine output was increased by 29 mL/h (95%CI 10.57-47.43). In critically ill patients, co-administration of albumin and diuretics improved P/F ratio within 24 hours (OR 10.86, 95%CI 3.41-34.54) but was not associated with ventilator-free days (mean difference, 0.08, 95%CI -2.69 to 2.84). Co-administration of albumin and diuretics was not associated with 30 day mortality (OR 0.86, 95%CI 0.47-1.58) but reduced the risk of hypotension (OR 0.26, 95%CI 0.09-0.72).

Conclusion: Co-administration of albumin and diuretics significantly improved urine output in patients with edema and reduced the risk of hypotension but with high heterogeneity in treatment response. Due to high heterogeneity and limited enrolled participants, further parallel randomized controlled trials are warranted to examine the effects of co-administration of albumin and diuretics.

Pharmacist-led antimicrobial stewardship programme in two tertiary hospitals in Malawi

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The ultimate goal of antimicrobial stewardship (AMS) programmes is to decrease the occurrence and spread of antimicrobial resistance (AMR). In response to this, a pharmacist partnership was established between Malawi and Wales (UK) with the aim of strengthening antimicrobial stewardship (AMS) activities in Malawi, with the initial project focusing on two tertiary referral hospitals. The Global Point Prevalence Survey (GPPS) was undertaken for the first time in Malawi at these sites and demonstrated a prescribing rate slightly lower than the African average, with ceftriaxone indicated for almost every bacterial infection. An educational intervention was also delivered, with a train-the-trainer approach upskilling pharmacists at the two sites, who then cascaded co-produced training sessions to an additional 120 multidisciplinary health professionals. A toolkit to support AMS at an individual patient level was also developed and disseminated to provide an ongoing reference to refer to. Both the trainings and toolkit were well received. Over the course of this project, significant progress has been made with the AMS programmes at the two sites, with local staff empowered to implement AMS activities. These interventions could be easily replicated and scaled and support the delivery of some of the AMS elements of the Malawi Ministry of Health National Action Plan for Antimicrobial Resistance.

Improving medication safety through barcode scanning in Southern Taiwan regional hospital

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Introduction: After the Covid-19 pandemic, patients who were accustomed to visiting hospitals for consultations have helped the healthcare system return to pre-pandemic levels. With the increasing demand for medical services, hospital pharmacies face significant challenges in managing prescription volumes efficiently. The daily prescription volume typically ranges from 1,500 to 2000, placing significant time pressure on pharmacists during the dispensing process. This increases workload raises the risk of medication errors, which can potentially compromise patient safety. According to the 2024 Taiwan Patient Safety Report, medication-related incidents accounted for 40% of all reported cases, maintaining a consistently high proportion among medical errors. Among the errors occurring at the hospital pharmacies, the most common types were medication name errors (49.1%), quantity errors (21.7%), dosage errors (10.2%), and dosage form errors (5.1%). By analyzing these errors and optimizing the dispensing progress, we may significantly enhance medication safety.

Purpose: Reducing dispensing errors and medication-related incidents

After brainstorming with fellow pharmacists, we identified **Method:** three key strategies to enhance medication safety. First, we compiled an LASA (Look-Alike, Sound-Alike) medication list, highlighting easily confused drugs and officially announcing it hospital-wide to raise awareness among healthcare professionals. To further reduce errors, we collaborated with the information department to integrate this list into the pharmacist's system,when dispensing the listed medicine, an alert appears beneath LASA medication names, stating: "This medication has other formulations/dosages with the same name", serving as a real-time reminder during the dispensing process. Additionally, despite previous improvements, certain medications continued to be frequently confused, especially under high workload conditions. To solve this problem, we introduced a partially barcode verification system for these high-risk drugs. When dispensing such medications, an audible alert notifies pharmacists that barcode scanning is required. However, to avoid unnecessary delays, scanning is only mandated for these selected high-risk drugs, while the standard dispensing process remains unchanged for all others medicine. These measures aim to enhance medication safety while maintaining workflow efficiency.

Results: After implementing these strategies in March 2024, the rate of dispensing error decreased from pre-intervention 0.36% to post-intervention 0.24% (6 month average), marking a 33% improvement. Furthermore, after introducing barcode scanning for selected medications, the maximum outpatient waiting time consistently remained within the designated limit (<30 minutes), with an average waiting time of 10 minutes, ensuring that the dispensing workflow was not disrupted. Ultimately, the barcode verification system effectively eliminated errors in previously high-risk medications.

Conclusion: Although barcode scanning has effectively reduced dispensing errors, there are still hardware limitations, such as the availability of scan-able barcodes on medications and the potential impact on waiting times if too many drugs are included in the system. To solve these challenges, future plans include upgrading all outdated dispensing stations to smart dispensing stations equipped with light guidance technology. This advancement will eliminate the need for barcode scanning while further enhancing both dispensing efficiency and accuracy, ensuring a safer and more effective medication management system.

Infectious diseases stewardship program (IDSP) implementation in a Greek tertiary ospital

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Background information and purpose: For protection, prevention and treatment of infectious diseases cases in our hospital we establish the IDSP, a network of interventions that combines the actions of a) Microbiology laboratory (Diagnostic Stewardship) b) Infection Prevention Office (Infection Control Stewardship). and c) Pharmacy regarding the rational use of antibiotics (Antibiotic Stewardship -ASP). Over the last decade hospital pharmacists have been actively involved in this program along with other IDSP team members.

Methodology: Our ASP is implemented by: a) handshake policy, a method that is considered mostly an auxiliary tool for the prescriber to take the appropriate clinical decision. We have created two types of antibiotics prescriptions, one for all hospital prescribers and a separate for the infection disease specialist. The physician in order to prescribe tigecycline, carbapenems, colimycin, ceftaroline, ceftolozane/tazobactam, dalbavancin, daptomycin, voriconazole, caspofungin, and amphotericin B has to record whether a pathogen has been isolated or not, the type of treatment (empirical, microbiologically based, prophylactic) and the site of infection. In the infectious diseases specialist's prescription, we monitor the use of the latest antibiotics against MDR bacteria, (imipenem-cilastatin-relebactam, ceftazidime-avibactam, meropenem-vaborbactam, cefiderocol, fosfomycin.) and the antifungal isovuconazole The two prescription system was accepted by the hospital

administration. b) The daily list of perioperative, and restricted antibiotics is included in the hospital network daily report c) In case of multi antibiotic resistant organisms (Enterococcus faecium, S.aureus, Klebsiella pneumonia, Acinetobacter sp., Pseudomonas aeruginosa and Enterobacter sp. an infectious disease consultation is acquired.

Results: We measured every six months the antibiotics DDDs/100 bed days. We record DDDs separately for the medical and surgical department and the ICU. We managed to achieve our goal for reducing the total use of colimycin in the hospital in favor of the combinations of a carbapenem with b-lactam inhibitor.

Using the morning report, we can record useful information about prescriptions and the pharmacy interventions. (PK/PD associated, documentation of indications for antibiotics, dose adjustments, detection and prevention of antibiotic-related drug-drug interactions, side effects, tracking allergies). Along with the above actions, education programs are organized for the nursing staff, MDs and the pharmacists. The IDSP intervention team has written guidelines for the prescribers, reviewed the newly developed antibiotics and organized clinical meetings every week for all the interested parties. The value of ID consultation is undoubtedly high especially for those difficult treatment situations.

Conclusion: The IDSP is a coordinated program that promotes the appropriate use of antimicrobials, improves patient outcomes, reduces microbial resistance, and decreases the spread of infections caused by multidrug-resistant organisms. Our goal is to continue and improve the program and achieve broader acceptance from the prescribers.

Impact of a clinical decision support system on optimizing guideline-directed medication prescribing in heart failure

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Introduction: Guideline-directed medical therapy (GDMT) improves outcomes in heart failure with reduced ejection fraction (HFrEF), yet adherence remains suboptimal. Clinical decision support systems (CDSS) can enhance prescribing practices by providing real-time alerts and requiring justification for non-prescribing. Objective: To evaluate the impact of a CDSS on the prescribing rates of four GDMT drug classes for HFrEF at hospital discharge.

Methods: A CDSS was implemented on December 29, 2023, automatically cross-referencing patients' medication histories when discharge prescriptions were issued for HFrEF patients (EF <40%). If any of the four GDMT classes were missing: β-blockers, renin-angiotensin system (RAS) inhibitors, mineralocorticoid receptor antagonists (MRA), or sodium-glucose cotransporter-2 (SGLT2) inhibitors, an alert prompted prescribers to input a reason before saving the prescription. Prescribing rates before and after implementation were compared using chi-square tests.

Results: Following CDSS implementation, prescribing rates significantly increased for β-blockers (78.4% vs. 86.4%, p = 0.012) and SGLT2 inhibitors (56.9% vs. 67.8%, p = 0.005). Although RAS inhibitors (73.9% vs. 76.5%, p = 0.432) and MRA (72.0% vs. 76.7%, p = 0.285) exhibited upward trends, these changes were not statistically significant. In terms of clinical outcomes, the 6-month rehospitalization rate decreased from 34.35% to 31.65%, and mortality declined from 8.94% to 5.84%, though further analysis is required to determine statistical significance.

Conclusion: The implementation of a CDSS with mandatory justification significantly increased the use of β-blockers and SGLT2 inhibitors at discharge in HFrEF patients. While RAS inhibitors and MRA showed a positive trend, the changes were not statistically significant. These findings highlight the role of CDSS in optimizing medication adherence and suggest further interventions to enhance uptake.

Impact of pharmacist intervention on Vancomycin Therapy: A retrospective analysis from 2020 to 2023

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Introduction: Vancomycin requires therapeutic drug monitoring (TDM) to optimise efficacy and minimise nephrotoxicity. This study evaluates the impact of pharmacist intervention on vancomycin use, focusing on pharmacist evaluations, TDM execution, physician acceptance, and intervention types to assess their contribution to therapy.

Method: This retrospective study analysed hospitalised patients receiving intravenous vancomycin at a regional teaching hospital in Taiwan from 2020 to 2023. Patients under 18 years old and those receiving vancomycin for surgical prophylaxis were excluded. Collected data included patient age, renal function, therapy duration, pharmacist evaluation frequency, and physician acceptance of recommendations. TDM execution, correct sampling, and target attainment were recorded as binary outcomes (performed or not performed) and analysed using Spearman's rank correlation and logistic regression to identify factors influencing TDM execution.

Results: A total of 277 cases were included, with a mean age of 69.9±14.7 years. The proportion of cases in each creatinine clearance group was 27% for >60 mL/min, 9% for 30-60 mL/min, 3% for <30 mL/min, and 61% for dialysis/end-stage renal disease. The average vancomycin treatment duration was 9.5±8.4 days. Over four years, pharmacist evaluations were conducted 25, 87, 113, and 107 times, respectively. TDM execution rates were 19.4%, 31.2%, 40.8%, and 51.2%; correct sampling rates 81.0%, 75.0%, 85.0%, and 77.3%; target attainment rates 47.6%, 41.7%, 55.0%, and 72.7%; and physician acceptance of pharmacist recommendations 58.3%, 84.4%, 76.9%, and 82.9%.

Statistical analysis showed a significant positive correlation between pharmacist evaluations and TDM execution ($r=0.677$, $p<0.001$) but none with correct sampling or target attainment. Logistic regression identified pharmacist evaluations ($p<0.001$, OR=3.93, 95% CI: 2.758-5.595) and dialysis status ($p=0.012$, OR=2.67, 95% CI: 1.240-5.757) as significant factors for TDM execution, while vancomycin duration and renal function in non-dialysis cases were not. Pharmacists provided 118 recommendations over four years: pharmacist-initiated TDM monitoring (50.0%), dose adjustments (14.4%), follow-up TDM (11.9%), re-monitoring due to incorrect sampling time (6.8%), drug switching (5.9%), discontinuation (4.2%), adverse effect monitoring (2.5%), and others (4.2%). Overall physician acceptance rate was 77.1%.

Conclusion: This study demonstrates that pharmacist intervention may be associated with increased TDM execution. Pharmacist evaluations were significantly correlated with TDM execution, and the rising TDM execution rates, greater physician acceptance of pharmacist recommendations, and pharmacist-initiated TDM monitoring (50% of interventions) highlight the expanding role of pharmacists in optimizing TDM practices.

Prior to mid-2021, TDM at our hospital relied on physician-initiated sampling, with pharmacists providing post-report evaluations. Following pharmacist-led interventions, including appropriateness assessments, dose adjustments, and pharmacist-initiated TDM monitoring, TDM execution rates increased, indicating a shift from passive assessment to active intervention.

This cross-sectional study does not establish causality, and unmeasured factors may have influenced the observed trends. Although dialysis patients had higher TDM execution rates, this may reflect clinical judgment rather than a direct impact of pharmacist intervention. Additionally, logistic regression did not adjust for comorbidities or infection severity, which could influence TDM execution decisions. Future longitudinal studies are required to assess the long-term impact of pharmacist-led TDM interventions on infection control and renal outcomes to further optimize vancomycin management.

Enhancing chemotherapy drug compounding safety and efficiency: An AR and AI-based monitoring system for pharmacists

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Introduction: Compounding chemotherapy drugs is a high-risk process that necessitates double verification by two pharmacists to ensure the correctness of the drug name and volume before adding the solution to the diluent. This step is crucial for patient safety but presents significant challenges due to the complexity of the process and the manpower requirements involved. This study proposes an innovative augmented reality (AR) and artificial intelligence (AI)-based monitoring system that utilises smart glasses and edge computing to assist pharmacists, thereby improving both efficiency and accuracy in the compounding process.

Methods: The system comprises AR smart glasses, edge AI computing devices (ECDs), and a remote monitoring platform (RMP). Pharmacists wear smart glasses to capture first-person view images, which are then transmitted to the ECD for drug and dosage recognition. The YoloV7 model, a state-of-the-art deep learning technology, is employed to identify drugs and dosages accurately. Pharmacists also scan QR codes on prescriptions to obtain the necessary information and follow step-by-step instructions for compounding the drugs.

Results: In the study, over 3,400 image samples of 26 different chemotherapy drugs, three types of saline solutions, and six syringe sizes were captured and meticulously annotated. The system demonstrated impressive performance metrics, achieving a 95.9% accuracy rate, 98.5% precision, and a 97% recall rate for chemotherapy drugs. For saline solutions and syringes, the system achieved perfect scores, with all metrics reaching 100%. Additionally, the dosage identification accuracy in syringes was found to be 98%, further underscoring the system's reliability and effectiveness. And concurrently decreasing the requirement for one pharmacist.

Conclusions: The implementation of the AR and AI-based monitoring system significantly enhances the accuracy of the chemotherapy drug compounding process. Simultaneously, it reduces the need for intervention from pharmacists and staff during the preparation process by utilizing AI as a virtual pharmacist. This system represents a substantial advancement in the field of pharmaceutical compounding and alleviates the workload on pharmacists.

Enhancing chemotherapy drug compounding safety: An AR and AI-Based monitoring system for pharmacists

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Logistic chain between Denmark and Greenland for medical transport

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Background: Efficient medical transport between Denmark and Greenland is critical to ensuring timely access to essential pharmaceuticals. The geographical and logistical challenges posed by Arctic conditions necessitate a well-structured supply chain.

Introduction: This poster presentation, prepared for the FIP Congress 2025, examines the logistics of pharmaceutical distribution between Denmark and Greenland, with a focus on Nuuk's central pharmacy at Dronning Ingrids Hospital. It highlights the key transportation modes, including maritime and aerial routes, essential for maintaining a stable supply chain.

Method: The poster will present existing shipping and flight schedules, particularly those associated with Herlev Hospital, to map out the efficiency and challenges of current transport routes. Factors such as weather conditions, route optimisation, and emergency supply strategies are also considered.

Results: Findings indicate that a combination of scheduled shipping and flight routes forms the backbone of Greenland's medical supply chain. While maritime transport provides bulk shipments, air routes offer crucial support for urgent deliveries. Variations in transport frequency and weather-related disruptions present significant logistical hurdles.

Conclusion: Ensuring a reliable pharmaceutical supply chain between Denmark and Greenland requires a coordinated approach integrating sea and air transport. Strategic planning, adaptive scheduling, and infrastructure improvements can enhance supply chain resilience, ultimately benefiting healthcare accessibility in Greenland.

From vision to reality: Implementing a robotic pharmacy for comprehensive hospital integration

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Introduction: The implementation of automated and computerised medication management in hospitals is essential for enhancing medication safety, operational

efficiency, and patient care. Medication administration errors, pharmacist shortages, and the increasing demand for precision in hospital settings necessitate innovative solutions. This study presents the deployment of an integrated automated and computerised medication management system at Bnai Zion Medical Center, incorporating robotic dispensing, real-time inventory management, and prescription verification. The objective is to optimise workflows across all stages of the medication supply chain. The project has significantly transformed the hospital's medication distribution process, shifting pharmacists from logistical tasks to clinical roles while alleviating the nursing staff's workload.

Method: The system integrates multiple technologies, including a Multi-Dose Robot (RIDEL) for dispensing medications in their original packaging to department stock and a Unit-Dosing Robot (Swisslog) for preparing patient-specific medication rings for 24-hour periods. The process involves seamless synchronisation between hospital information systems to ensure medication accuracy and availability. A Warehouse Management System (WMS) enables real-time tracking of medication inventory, while an advanced verification wizard supports pharmacist validation of prescriptions. The project was implemented in inpatient departments, ensuring smooth integration with existing hospital workflows.

Results: The automated system significantly improved medication safety by reducing dispensing and administration errors. The new workflow has repositioned pharmacists as integral members of the clinical team, allowing them to actively participate in patient care rather than focusing on logistical tasks. The nursing staff has also experienced reduced workload and increased efficiency, as medication distribution has become more streamlined and reliable. Real-time inventory tracking has minimised medication shortages and wastage, ensuring continuous medication availability for patients. Additionally, the integration with hospital electronic health records (EHRs) has improved prescription accuracy and reduced transcription errors.

A 2024 review by pharmacists at Bnai Zion Medical Center found that 10% of patient records contained medication order errors, stemming from various causes, including incorrect dosage, drug interactions, and improper frequency. The implementation of the automated system has played a crucial role in identifying and mitigating these errors, further enhancing patient safety and treatment efficacy.

Conclusion: The implementation of an automated and computerised medication management system successfully optimised the hospital's medication distribution process. The integration of robotic dispensing, real-time inventory management, and prescription verification improved medication accuracy, reduced errors, and enhanced overall hospital efficiency. This initiative allowed pharmacists to transition from logistical duties to clinical roles, strengthening their role in the multidisciplinary care team and improving patient outcomes. Future developments will focus on expanding smart medication distribution, including bedside verification and smart cabinets, further enhancing medication safety and operational effectiveness.

Predicting the unpredictable: Challenges in forecasting medicine demand in Sri Lanka

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Introduction: Forecasting or quantification of medicine requirement (demand) is undoubtedly a challenging supply chain activity that contributes to medicine availability and shortages, and thereby impacting on patient health outcomes. Many countries have overcome this challenge with the support of advanced technological applications. However, countries like Sri Lanka still rely on a manual forecasting approach that could hinder the accuracy and contribute to medicine shortages. Therefore, this study aimed to identify the status of medicine demand forecasting, in terms of process, enablers, barriers, and suggestions to enhance the accuracy in the Sri Lankan State sector, as per key supply chain stakeholders' perceptions.

Method: Participants were pharmacists and medicine supply distributors involved in forecasting the demand for medicine in the Sri Lankan state sector. In the centralised medical supply system in Sri Lanka, pharmacists are responsible for forecasting the medicine requirement for their respective hospitals, while distributors at the distribution unit consolidate the forecasted amounts from all hospitals and forward them to the national procurement unit for the State sector institutions. Participants were purposively selected, in addition to the use of the snowball sampling technique. Participants were interviewed using an interview guide with seeding questions until data saturation of themes was reached. The interviews were transcribed and translated into English and then analysed for thematic concepts using content analysis.

Results: There were a total of 22 participants, composed of 12 pharmacists and 10 distributors. Both pharmacist and distributors reported that the demand forecasting process executed in the current practice differed from the process documented in the process guide. This difference was associated with the use of a computerised inventory control system and the consideration of medical consultants' requirements, which were not specified in forecasting process guidelines. Nevertheless, the factors related to consultants' requirements act as a barrier for accurate forecast, in addition to the issues related to the supply chain.

All participants appreciate the support of the computerised inventory management system that enables easy access to data during the manual process of forecasting medicine demand in the state sector. Additionally, they suggested implementing advanced technological support, standardised protocols for the forecasting process, and effective information flow to enhance the accuracy of medicine demand forecasts.

Conclusion: These findings reflect the subjective decision-making inherent in the manual method, which lacks the structured, data-driven approach facilitated by technology. The participants' suggestion aligns with the recommended strategies to enhance the accuracy in medicine demand forecasting. However, the capacity and effectiveness of those strategies are required to be assessed within the strategic implementation plan, considering the country-specific nature without compromising the medicine availability.

Improving vaccination workflow efficiency and patient experience with refrigerated automated dispensing cabinets

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Background: With the rapid advancement of medical technology, smart healthcare devices are not only transforming the way medical services are delivered but also demonstrating significant potential in medication management. Against this backdrop, Automated Dispensing Cabinets (ADCs) have emerged as an innovative technology gradually being adopted in pharmacies, hospitals, and other healthcare settings to enhance the efficiency and quality of medical services.

Objective: To reduce the workload of healthcare professionals and ensure patient medication safety, we have redefined traditional medical workflows by introducing refrigerated injection ADCs (IADC) in alignment with the government's "Flu and COVID-19 Vaccination: Left Flu, Right COVID-19 for Health and Safety" policy. Through cross-departmental collaboration, we optimized the vaccine dispensing and administration process, offering patients a one-stop service that not only minimizes their waiting time for medication pickup but also improves the overall healthcare environment and service quality.

Methods: IADC were placed in outpatient injection rooms, storing influenza vaccines, pneumococcal vaccines, and COVID-19 vaccines. After scanning the patient's prescription barcode, the IADC automatically identify the required vaccine type and dosage based on the physician's orders, ensuring precise and automated dispensing. Nurses retrieve the vaccine from the IADC and administer it to the patient, streamlining the entire vaccination process.

Results: Between October 1, 2023, and September 30, 2024, a total of 16,186 vaccine doses were administered in our hospital, averaging 60 vaccinations per day. From October 1, 2024, to November 22, 2024, a total of 9,482 vaccine doses were administered. Project implementation results showed that under the traditional workflow, the total vaccination process took 32 minutes per patient, whereas with ADCs, it was reduced to 9 minutes, cutting down patient waiting time by 23 minutes. Additionally, the vaccine administration accuracy rate reached 100%. After optimizing the medication dispensing management process, pharmacists can save approximately 1.5 hours per day, allowing them to devote more energy to other professional tasks. The IT department developed an API to integrate with the National Immunization Information System (NIIS), enabling automated vaccine tracking and real-time updates. Nurses simply scan the barcode, and the ADCs automatically dispense the vaccine and upload the vaccination record, significantly reducing manual workload for both pharmacists and nurses.

Conclusion: Refrigerated ADCs significantly improve dispensing efficiency, reduce medication errors, and enhance patient satisfaction. Through automated storage, dispensing, and real-time inventory management, healthcare institutions can optimize vaccine management processes, ensure medication safety, and improve overall healthcare quality. As technology continues to advance, ADCs will play a crucial role in the smart transformation of medical workflows and enhancing healthcare services.

Use of proton pump inhibitors during the first year of life and late complications

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Background: Proton pump inhibitors (PPIs) are the most prescribed drug classes for pediatric gastroesophageal reflux disease (GERD). Several studies reported on the dramatic increase in the use of PPIs among infants, despite the limit efficacy in relieving GER symptoms. Inappropriate PPI's use is a matter of great concern, especially after the last studies reports, that showed an increased prevalence of late complications/diseases: pneumonia asthma, acute gastroenteritis (AGE), inflammatory bowel disease (IBD), allergic disorders, obesity. among infants who received PPIs in the first years of life. The objective of this study is to evaluate the hypothesis that exposure to PPI's during the first year of life is associated with an increased risk of development late adverse diseases: pneumonia, asthma, AGE, IBD, celiac disease, allergic disorders, obesity, attention

deficit hyperactivity disorders (ADHA), autism spectrum disorders (ASD).

Methods: The study is a retrospective case control cohort study based on computerized database of Clalit Health Services (CHS). It includes 9844 children born between 2002-2018, and reported to complain of at least one of the symptoms (reflux/ spitting up, irritability, feeding difficulties, colics). The study population included the study group (n=4922) children exposed to PPIs at any time prior to the first year of life, and a control group (n=4922) child not exposed to PPI's who were matched to each case of the study group on age, race, socioeconomic status, and year of birth.The prevalence of late complications/diseases in the study group was compared with prevalence of latecomplications/diseases diagnosis between 2002-2020 in the control group. Odds ratios and 95% confidence intervals were calculated by using logistic regression models.

Results: The study cohort included 9844 children's (55% boys),4922 (50%) prescribed PPIs in the first year of life, we found that compared to the control group, children exposed to PPIs in the first year of life had an increased risk of developing several late complications/ disorders, Children prescribed PPIs had an increased risk of developing pneumonia, odds ratio (OR)1.2 (95% CI, 1.111-1.325) and 1.198 (95% CI,1.044-1.374) for pneumonia being diagnosed with asthma respectively. They had also an increased risk of developing various allergies (urticaria, allergic rhinitis or allergic conjunctivitis) OR 1.136 (95% CI, 1.014-1.273), inhalant allergies OR 1.094(95%, CI, 1.013-1.182), and food allergies, OR 1.542 (95% CI, 1.143-2.079). In addition, they showed an increased risk of being diagnosed with ADHD, OR 1.275 (95% CI, 1.132-1.436) and ASD, OR 1.483 (95% CI,1.135-1.938). In our study children exposed to PPIs in the first year of life had decrease the risk of obesity by 17% (OR 0.825, 95%CI 0.697-0.976).

Conclusions: This study adds more evidence about the safety of the use of PPI's during the first year of infancy. We found significant associations between the use of PPI's during the first year of life and subsequent development of late complications/diseases such as respiratory diseases, allergy diseases, ADHD and the ASD. More studies are needed to prove causality and determine the mechanism behind the effect of PPI's and the development of late complications.

Minimum clinically important differences of functional pain tools: A systematic review

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Introduction: Functional pain tools assess pain in conjunction with its impact on activities, providing a more comprehensive evaluation of recovery than unidimensional pain scales. The minimum clinically important difference (MCID) of these tools is crucial for determining meaningful changes in patient outcomes and informing sample size calculations in clinical trials. The aim of this study was to summarize MCID values for functional pain tools used in the postoperative settings, providing a reference for clinical and research applications.

Method: A systematic search was conducted on three electronic databases by two independent reviewers. Original research articles reporting MCID values of functional pain tools were included. Quality assessment was performed by two independent reviewers.

Results: Out of 336 full texts assessed for eligibility, 10 were included in this review. Reported MCID values varied by tool and methodology. The PROMIS-PI ranged from 2.3 to 9.7, the Quality of Recovery tool from 0.92 to 8.0, and the Neck Disability Index from 16 to 27.6. The Oxford Shoulder Score ranged from 4.6 to 6.9, the Western Ontario and McMaster Universities Osteoarthritis Index was 11.16, and the Roland Morris Disability Questionnaire ranged from 2 to 8.1.

Conclusion: This review provides reference MCID values for functional pain tools, aiding clinical trial design and sample size calculations. The variability in MCID determination highlights the need for standardized methodologies.

Prognostic factors and survival analysis in Acute Myeloid Leukemia (AML) patients: A retrospective study from 2016 to 2024

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Background: Acute myeloid leukemia (AML) is a hematologic malignancy with highly variable survival outcomes influenced by patient-specific factors such as age, initial laboratory values, treatment approaches, and genetic mutations. Certain genetic mutations are known to contribute to treatment resistance and relapse, making genetic profiling an essential component in AML prognosis and treatment planning. Identifying prognostic factors can help refine treatment strategies and improve patient outcomes.

Purpose: This study aims to investigate key determinants affecting treatment response and survival in AML patients diagnosed between 2016 and 2024. By analyzing survival trends and treatment outcomes, with a particular focus on genetic mutations, this study provides insights into optimizing therapeutic approaches and identifying high-risk patient groups.

Methods: A retrospective analysis was conducted on AML patients from a hospital database between 2016 and 2024. Patients diagnosed with myelodysplastic syndrome (MDS), acute promyelocytic leukemia (APL), double cancers, loss to follow-up, or those without treatment initiation were excluded. Kaplan-Meier survival analysis was performed to assess overall survival trends. ANOVA tests were used to determine significant differences in treatment responses among subgroups, while multiple regression analysis was conducted to explore factors influencing survival duration. Additionally, genetic mutation patterns were analyzed to assess their correlation with treatment response and survival outcomes.

Results: Kaplan-Meier survival analysis revealed substantial variability in patient survival. Bone marrow transplantation (BMT) was associated with prolonged survival compared to chemotherapy alone. ANOVA results indicated that age at diagnosis, white blood cell count (WBC), platelet count, and hemoglobin (Hb) levels significantly influenced treatment response. Genetic analysis identified several mutations that correlated with poor treatment response, increased risk of relapse, and shorter survival duration. Notably, patients with specific mutations, such as FLT3-ITD and TP53 alterations, demonstrated higher resistance to standard chemotherapy and poorer overall survival rates. Multiple regression analysis further confirmed that higher initial WBC levels and lower platelet counts were associated with shorter survival, while certain gene mutations played a crucial role in disease progression.

Conclusion: This study highlights the importance of patient-specific prognostic factors in AML survival. Age, initial blood parameters, and genetic alterations significantly impact treatment response and survival. Genetic profiling plays a crucial role in predicting treatment resistance and guiding therapeutic decisions. These findings support the need for personalized treatment strategies to optimize AML management. Future studies should focus on integrating molecular markers and targeted therapies to further refine prognostic models and improve patient outcomes.

Unveiling job satisfaction among state hospital pharmacists: Insights from selected teaching hospitals in Colombo District, Sri Lanka: A study protocol

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Introduction: Beyond conventional dispensing responsibilities to more patient-centered activities, including promoting appropriate medication use, improving safety, and enhancing patient outcomes, pharmacists' evolving role as healthcare professionals is becoming ever more important. However, hospital pharmacists in Sri Lanka are mostly concerned with procurement, distribution, and dispensing, with little patient or prescriber contact. Studies conducted worldwide have revealed that the performance and patient care received from pharmacists depend on their level of job satisfaction. Nevertheless, job satisfaction among Sri Lankan pharmacists is still an area under investigation. Thus, this is a crucial area for research as enhanced job satisfaction among hospital pharmacists will maximize their contributions to implement better healthcare practices in Sri Lanka.

Aim: This study will evaluate the level of job satisfaction among pharmacists in selected teaching hospitals in the Colombo district, Sri Lanka, and compare job satisfaction levels among those pharmacists to improve their professional satisfaction and patient care.

Methods: A self-administered, validated, and structured questionnaire will be used in this cross-sectional, descriptive study to evaluate pharmacists' job satisfaction among pharmacists who are currently employed at the National Hospital, Colombo 10, Colombo South Teaching Hospital, and Colombo North Teaching Hospital. Pharmacy students, interns, and retired pharmacists will be excluded from the study.

All the participants will receive a clear explanation of the objectives of the study. Ethical approval has been requested from the Ethics Review Committee, The Open University of Sri Lanka, and permission will be obtained from each hospital to

conduct the study. All participants will be requested for their informed consent, guaranteeing their privacy and confidentiality. At any point, participants will have the option to leave if they are uncomfortable. Participants in the study would not face any particular risks or immediate advantages, and all data will be safely stored, only accessible by authorized staff, and used only for research purposes.

Results: Microsoft Excel will be used to organize the information gathered from printed survey forms distributed among the pharmacists in selected hospitals. SPSS (Version 26) will be used for statistical analysis in order to ascertain job satisfaction levels and investigate correlations among influencing factors. The study will be completed by June 2025. A comprehensive report summarizing the findings of the study will offer practical suggestions for improving hospital pharmacists' job satisfaction in Sri Lanka.

Conclusion: This study will offer a thorough understanding of job satisfaction among hospital pharmacists in Sri Lanka, an area that has received relatively little attention. The study will identify important factors influencing pharmacists' job satisfaction by examining their experiences in selected teaching hospitals in the Colombo district. The results will provide evidence-based suggestions for strengthening pharmacists' roles in patient care and improving their integration into multidisciplinary healthcare teams by improving job satisfaction. In addition to improving healthcare outcomes, this study will assist in aligning Sri Lanka's pharmacy practices with international standards, and will help to reform practices that promote pharmacists' well-being and professional development.

Creating a waste data dashboard

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Background: Medication waste is a significant challenge in hospitals, leading to financial losses and environmental concerns. Traditional inventory methods are often insufficient to meet the fluctuating demands and availability of medicines. In Danish hospitals medicines are available in medication rooms in each ward, which complicates the stock management further.

Serving more than 500 medication rooms in the hospitals in the Capital Region, the hospital pharmacy staff needs elaborate understanding, insight and overview of the medication needs, locations, expiration dates, etc. By introducing a digital waste data system, we aimed at reducing waste by creating data insights.

Method: A working group was established to explore the options for creating and implementing a structure for collecting, processing, exhibiting, and utilizing data. Realizing that Excel was insufficient, we developed a dashboard in Power BI. Metrics such as medication type, location, expiration date, and quantity are exhibited online for pharmacy staff. The dashboard is improved continuously based on user feedback and developer skills.

Results: It proved challenging to find a format which could comprehend and convey all relevant factors:
-WHAT (product, substance, ATC-group)
-WHERE (regional/hospital/ward)
-HOW MUCH (value/amount)
-WHEN (this/last month/year)
-WHY (expiration/improper storage/withdrawal/complaint/clear-out)

The dashboard now contains several visualizations providing answers to many different questions, such as which products:
-are discarded most often and at highest cost?
-could have been redistributed before expiration?
-often have a short shelf-life?
-are discarded from many different wards?

While these questions are directed backwards, we focus on using the answers constructively – improving our future practice by
-Creating awareness of waste reduction potential, e.g., upcoming expiration dates or suitable stock amounts
-Reducing stock and order sizes (frequent/expensive/short shelf-life products in particular)
-Informing supply chain managers of expected changes in procurement.

Conclusion: Creating a Power BI dashboard has provided a powerful waste reduction tool. Further, constructive dialogues among pharmacy and hospital staff improve quality of medication use and reduce use of resources.

Next steps are adding procurement data, providing insight into the product flow, and further deployment among pharmacy staff.

National recommendations for Y-site compatibility in handbook Parenteralia

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Introduction: Intravenous therapy is one of the most common treatments in hospitals. Most patients have a peripheral intravenous catheter and receive multiple parenteral drugs. In clinical practice, simultaneous administration of multiple parenteral drugs via the same lumen is unavoidable. For patient safety, it is important to know Y-site (in)compatibility of different drugs, to prevent

the administration of two incompatible drugs simultaneously through the same line.

Purpose: To expand information regarding Y-site compatibilities in the national handbook Parenteralia and to standardize the recommendations.

Method: A systematic literature review was conducted to investigate the Y-site compatibility of various parenteral drugs. Data were retrieved from the Summary of Product Characteristics, King Guide, Stabilis, Micromedex and ASHP Injectable Drug information. Additionally, a literature search was performed in PubMed. A working group consisting of (hospital) pharmacists was established to discuss uncertain compatibilities and to provide recommendations based on the collected data.

Results: The data are presented in a table, categorizing combinations of two drugs as either compatible, incompatible, or uncertain. Each combination is provided with a recommendation regarding the concentration range and additional information sourced from literature. Additionally, pharmacists have the option to create a Y-site compatibility table that presents selected drug combinations.

Conclusion: Information on Y-site compatibilities is presented in the KNMP Kennisbank database. This is a digital information source designed for pharmacists and pharmacy teams, which requires a subscription to acces. This way, we have provided nationwide recommendations based on all collected information from literature.

Real-world impact of finerenone on renal function in Type 2 Diabetes-Related Chronic Kidney Disease

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Introduction: Finerenone, a selective nonsteroidal mineralocorticoid receptor antagonist, was approved in Taiwan on July 1, 2022, for adults with type 2 diabetes-related chronic kidney disease (CKD). It reduces the risk of CKD progression, ESRD, cardiovascular events, and heart failure hospitalizations. Based on the FIDELIO-DKD and FIGARO-DKD studies, finerenone showed better outcomes than placebo, though with a higher risk of hyperkalemia. This study aims to assess its real-world clinical application and efficacy in our hospital.

Methods: Finerenone was introduced at our hospital in January 2024 as a self-paid medication. We retrospectively reviewed 192 patients who were newly prescribed finerenone in 2024. We tracked all estimated glomerular filtration rate (eGFR), microalbumin creatinine ratio (UACR), protein creatinine ratio (UPCR), and serum potassium (K) values for patients 6 months before starting the medication and 12 months after. Based on the duration of medication use, trends in eGFR, ACR, PCR, and serum potassium values were statistically analyzed at pre-treatment, 3 months, 3-6 months, 6-9 months, and 9-12 months intervals. Kidney function and serum potassium values were analyzed using one-way ANOVA. Due to fewer measurements of proteinuria indicators (UACR and UPCR), generalized estimating equations (GEE) were used to analyze the data to reduce the effect of outliers.

Results: The majority of patients using finerenone were male, and the most common CKD stages at the time of initiation were stage 3b (33.9%) and 3a (22.4%). The average UACR was 1276 mg/g, and UPCR was 2516 mg/g. Most patients were prescribed finerenone at a dose of 10 mg daily (76.6%), with an average treatment duration of 145 days. Within the first 3 months of treatment, renal function continued to decline; however, after 3-6 months, the rate of decline in eGFR showed signs of slowing. Both UACR and UPCR demonstrated a downward trend post treatment ($p<0.05$). No significant differences were observed in serum potassium levels before and after using finerenone.

Conclusion: Finerenone, in addition to ACE inhibitors (ACEi), angiotensin receptor blockers (ARB), and SGLT2 inhibitors, contributes to delaying the progression of renal function deterioration and proteinuria in chronic kidney disease patients. Real-world data analysis shows similar efficacy to clinical trials, which may improve the quality of care for diabetic kidney disease (DKD) and delay progression to ESRD.

A step towards safety: Enhancing heparin infusion protocol compliance through pharmacist-led interventions

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Introduction: Anticoagulants like UFH are high-risk medications per the Institute of Safe Medication Practices (ISMP). UFH requires stringent monitoring due to its narrow therapeutic window and high risk of complications. Compliance with institutional heparin infusion protocols is essential for therapeutic anticoagulation, minimizing adverse effects, and improving patient safety. A quality improvement project was initiated to assess adherence to the heparin infusion protocol and implement targeted interventions for enhanced compliance.

Purpose: To evaluate and improve compliance with the institutional heparin infusion protocol and assess its impact

on achieving therapeutic anticoagulation outcomes in adult patients receiving unfractionated heparin infusions.

Method: Heparin is designated as a High Alert Medicine in the Shifa International Hospital. Hence the hospital developed and approved the heparin infusion protocol for systemic anticoagulation in adult patients. A retrospective analysis of 126 patients started back in 2022 revealed deviations in APTT monitoring, documentation, and dosing. Interventions suggested point-of-care monitoring, pharmacist follow-ups, and daily TDM.Standardized dosing, reduced APTT turnaround time, streamlined bolus-to-infusion transitions, continuous staff education, and pharmacist-led daily rounds were implemented to sustain adherence and minimize delays. Post intervention phase were divided into two phases (Aug 2023–Jan 2024, Feb–Sep 2024.Compliance monitoring continues in 2025 will focus on sustaining improvements, preventing deviations, and optimizing patient safety through ongoing staff training and protocol refinement.

Primary Endpoint: Assess the compliance of the heparin infusion protocol in patients aged 16 years and above who received intravenous heparin for more than 24 hours and had at least two APTT measurements.

Results: Pre-intervention data showed low compliance (22%) and suboptimal therapeutic APTT attainment (23.3%), with high supra-therapeutic (31.6%) and sub-therapeutic (45%) levels.

Post-intervention data (197 patients in 2023, 218 in 2024, total 415) showed enhanced compliance. From April 2023 to September 2024, therapeutic APTT improved from 23% to 89%. The phased approach (April 2023–Sept 2024) demonstrated steady progress, reinforcing the impact of protocol optimization, staff training, and pharmacist-led interventions. Ongoing compliance monitoring in 2025 aims to sustain and further enhance patient safety.

Conclusion: Targeted pharmacist-led interventions markedly enhanced adherence to the heparin infusion protocol, driving superior patient safety and therapeutic outcomes. Sustained compliance was achieved through continuous staff education, proactive pharmacist oversight, and strategic dosing optimizations. Ongoing surveillance and dynamic protocol refinements will further elevate anticoagulation safety and efficacy in hospital settings.

Self-medication and contributing factors among pregnant women attending antenatal clinic in a regional hospital in Ghana

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Background: Self-medication is a common practice worldwide with different groups of people indulged in the practice. Self-medication during pregnancy is an issue of public health concern because of the adverse effects the medications have on both mothers and the growing fetus. Hence, the study aims to assess the prevalence of self-medication and practices among pregnant women attending antenatal clinic at selected Regional Hospital in Ghana.

Method: A cross-sectional study was carried out at the Tema General Hospital. Pregnant women attending antenatal clinic at the health facility were sampled using the stratified random sampling technique. Collection of data was done using a structured questionnaire on the utilization of self-medication and its contributing factors amongst the pregnant women. Data obtained was analyzed using STATA version 15.0. A descriptive statistic was done for all the socio-demographic characteristics of respondents. The prevalence of self-medication among the pregnant women was summarized as frequencies and percentages. Logistic regression analysis was used to determine the significance of the association between the outcome and independent variables.

Results: Of the 122 pregnant women participating in the study, 13.9% reported self-medicating. Sources for self-medication included hospital pharmacies (61.9%), community pharmacies (15.3%), a combination of both (21.1%), and herbal shops (1.7%). Factors influencing self-medication were prior experience with similar symptoms (8%), advice from a doctor friend (7%), and lack of disease/medication knowledge (7%). Headache (57%) and nausea/vomiting (19%) were the most common reasons for self-medicating with paracetamol being the most frequently used medication (70.5%). Bivariate analysis revealed significant associations between self-medication and age, education, and number of children. Self-medication tended to increase with age, particularly in the 31-35 and 36-40 age groups, while it decreased with higher education, with the highest rates among those with Junior High School or Primary education. Participants with more than 3 children also showed a higher proportion of self-medication. However, in multivariate analysis, these associations were not statistically

significant, indicating that age, education, and number of children were not strong independent predictors of self-medication in this population when adjusted for other factors.

Conclusion: Self-medication remains a significant public health issue among pregnant women, primarily sourced from hospital pharmacies and driven by prior symptom experience and knowledge gaps. While initial bivariate analyses suggested links between self-medication and age, education, and parity, these associations were not independently significant in multivariate analysis. This underscores the complexity of self-medication behaviors and highlights the need for further investigation into other potential drivers to develop effective interventions for promoting safe medication practices during pregnancy.

A comparative documentary analysis of antifungal policies from NHS trusts participating in BioDrive Antifungal Stewardship

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Introduction: BioDrive Anti-Fungal Stewardship (AFS) is a National Institute for Health and Care Research (NIHR) funded trial which aims to identify effective ways to identify, prevent and treat fungal infections in haematology patients with acute leukaemia undergoing chemotherapy. Biomarkers such as beta D-glucan and galactomannan can help detect fungal infections before symptom-onset, helping to reduce inappropriate antifungal prescribing and combat antifungal resistance, which is a global priority.

This embedded work within the BioDrive trial aimed to:
• Compare antifungal policies for invasive fungal diseases in haematology patients across NHS Trusts
• Identify antifungal blood test biomarkers recommended in these policies

Method: A documentary analysis was conducted on 17 antifungal policies from NHS Trusts that are sites for or have had contact with the BioDrive AFS trial. To ensure a comprehensive approach, two independent reviewers extracted data using a predefined data extraction matrix. Any disagreements or discrepancies were reviewed and discussed. Extracted data was thematically analysed, and each reviewer generated a descriptive comparative report.

Results: 17 policies were analysed. All policies adopted a similar risk stratification system, with high-risk patients being primary candidates for antifungal prophylaxis. Among these, 88% (n=15/17) recommended mould active antifungal primary prophylaxis. Posaconazole was the most frequently recommended first-line prophylactic, cited in 80% (n=12/15) of policies, followed by itraconazole or fluconazole in 18% (n=3/17) and voriconazole in 6% (n=1/17). Where azoles were contraindicated, AmBisome or caspofungin was recommended in some policies. Eight policies recommended secondary prophylaxis, with voriconazole being the antifungal of choice in 63% (n=5/8) of these policies. Commonly used biomarkers were galactomannan and beta-D-glucan, though data on testing frequency, protocols, and turnaround times varied or was unavailable.

Conclusion: Overall, the antifungal prophylaxis policies were similar, but notable variability was observed in blood test biomarker use. Some heterogeneity between policies was noted in relation to patient monitoring therefore, potential differences in patient care may result. These should be investigated further within BioDrive but also across a larger sample of NHS Trusts.

Association between proton pump inhibitor use and renal function decline in chronic kidney disease: A Retrospective Analysis using data from a regional hospital in Taiwan

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Introduction: Proton pump inhibitors (PPIs) are among the most commonly prescribed acid-suppressive medications. According to drug labels and previous studies, PPIs have been associated with acute kidney injury and an increased risk of chronic kidney disease (CKD). However, most research has focused on the impact of PPI use on renal function in patients with normal kidney function, with limited studies addressing the effects in the CKD population. Therefore, this study aims to investigate the changes in renal function following PPI use in CKD patients and to determine whether PPI use accelerates the deterioration of renal function in this population.

Methods: This retrospective study included CKD patients (eGFR <60 mL/min/1.73m²) who were newly prescribed PPIs in the outpatient department of our hospital between January 1 and December 31, 2023, with a PPI treatment duration exceeding 84 days. Patients were excluded if they lacked eGFR data within 0–180 days prior to PPI initiation, lacked follow-up eGFR data until December 31, 2024, or were undergoing dialysis at the time of PPI initiation. The study employed a Generalized Estimating Equations (GEE) model to analyze the eGFR of CKD patients in the 6 months before and after PPI use. The goal was to explore the association between PPI use and renal function decline and to assess any

differences in impact across different CKD stages and types of PPIs.

Results: This study included 362 patients, with 51.9% being male and an average age of 74.3 ± 10.8 years. The CKD stages of the patients were as follows: 46.4% in stage 3a, 28.5% in stage 3b, 16.9% in stage 4, and 8.3% in stage 5. The PPIs prescribed included pantoprazole (74.9%), lansoprazole (12.4%), esomeprazole (7.7%), and rabeprazole (5.0%). The GEE analysis revealed that following PPI initiation, the average eGFR decreased by 3.55 mL/min/1.73m^2; however, this decline was not statistically significant (p= 0.112). The trend of eGFR decline was consistent across different CKD stages, with no significant interaction observed (p= 0.264). When evaluating the impact of different PPIs, pantoprazole was used as the reference. The p values for lansoprazole (p = 0.632), esomeprazole (p = 0.584), and rabeprazole (p = 0.240) were not statistically significant, indicating that no specific PPI had a greater effect on renal function. In terms of CKD stages, using stage 3a as the reference, the p values for stage 3b (p= 0.214), stage 4 (p= 0.771), and stage 5 (p= 0.054) showed no significant differences in the trend of eGFR decline across CKD stages.

Conclusions: Our study demonstrates that PPI use does not accelerate the deterioration of renal function in CKD patients. Additionally, no significant differences were observed in the trend of kidney function decline across different PPIs or CKD stages. Further research are required to assess whether the combination of other risk factors and PPI use contributes to renal function decline.

Low monitoring rate of hematologic adverse effects in sulfasalazine users: A retrospective study in a Northern Taiwan medical center

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Background: Sulfasalazine is a disease-modifying anti-rheumatic drug (DMARD) widely used to treat rheumatologic and inflammatory conditions. However, serious hematologic adverse drug reactions (ADRs), including bone marrow suppression and leukopenia, have been reported in Taiwan. These adverse effects typically occur within the first three months of therapy but may resolve upon drug discontinuation. Despite these risks, real-world data on hematologic monitoring practices remain limited.

Objective: This study aimed to evaluate the monitoring rate of hematologic parameters among new sulfasalazine users in a major medical center in northern Taiwan. Additionally, the study aimed to assess the subsequent clinical management of patients who developed hematologic abnormalities, including drug discontinuation and other therapeutic interventions.

Methods: A retrospective analysis was conducted using hospital pharmacy records and electronic medical records. Patients who initiated sulfasalazine therapy for the first time between January and June 2024 were included. Those with prior sulfasalazine use or incomplete hematologic data were excluded. Hematologic parameters, including red and white blood cell counts and platelet counts, were assessed before and after treatment initiation.

Results: A total of 261 patients were identified, of whom 165 were excluded due to incomplete laboratory data, leaving 96 patients in the final analysis. The overall monitoring rate of hematologic parameters was 36.8%. The mean age was 52.7 years (IQR: 40.8–64.0), and 67.7% were female. Four patients (4.17%) developed new-onset leukopenia during treatment; among them, three continued therapy, while one discontinued due to laboratory abnormalities. Additionally, three patients had pre-existing leukopenia before therapy, with two showing recovery during treatment. Similarly, four patients (4.17%) experienced low platelet counts, including one (1.04%) with new-onset thrombocytopenia.

Conclusion: Despite the potential for hematologic toxicity, the monitoring rate in this cohort was suboptimal. While the incidence of hematologic adverse effects was relatively low, regular blood count monitoring remains essential for early detection and management. To enhance patient safety, an alert system will be integrated into the prescribing system to remind physicians to conduct hematologic monitoring before and after sulfasalazine initiation.

Pharmacist-led medication reviews in dementia care: addressing drug-related problems in Taiwan

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Introduction: The prevalence of dementia in Taiwan is increasing. Patients with dementia often require multiple medications to address cognitive impairments, behavioral and psychological symptoms, and comorbidities, which places them at high risk of drug-related problems (DRPs). DRPs, such as medication errors and drug interactions, are a major cause of hospitalization in this population. Pharmacists can help identify DRPs and offer solutions through comprehensive medication reviews. This study aimed to report the types and frequencies of DRPs identified by

pharmacists in dementia patients and how they are addressed at a hospital in Taiwan.

Method: We conducted a retrospective review of the records of dementia patients admitted to the inpatient department of a hospital between January 2024 and February 2025. Pharmacists followed a standardized process when assessing dementia patients' medications, which included evaluating medication reconciliation and appropriateness, such as dosage, drug interactions, indications, and adverse drug reactions. Pharmacists identified DRPs through comprehensive medication reviews and offered recommendations to physicians. DRPs were classified according to Cipolle et al., a model widely used in medication therapy management. Descriptive statistics were used for data analysis, with categorical variables presented as frequencies and percentages, and numerical variables presented as means and standard deviations.

Results: A total of 53 dementia patient records were reviewed, with 34 (64.1%) being women, and the mean age was 82±7 years. Alzheimer's disease was the most prevalent type of dementia among patients with DRPs, with an average Mini Mental State Examination (MMSE) score of 16.1±6.9. There were 18 DRPs identified in 23% (12/53) of the patients. The most common DRP was the need for additional drug therapy (n=7, 39%), followed by the need for monitoring (n=3, 17%), transition errors (n=3, 17%), unnecessary drug therapy (n=2, 11%), ineffective/inappropriate drug (n=2, 11%), and dosage too high (n=1, 5%). When DRPs were identified, pharmacists communicated with physicians and offered solutions via telephone. Suggestions were also recorded in the pharmacist's notes for further reference and follow-up.

After follow-up, the suggestion acceptance rate was 72% (13/18), with 28% (5/18) of suggestions rejected. For the rejected suggestions, pharmacists engaged in further discussions with physicians to understand their concerns and identify possible alternative solutions. Of the rejected DRPs, 60% (3/5) were adjusted to alternative solutions, while 40% (2/5) were not accepted because the patients were preparing for discharge.

Conclusion: The most frequent DRP was the need for additional drug therapy, highlighting the challenges of managing multiple health conditions in patients with dementia. The findings underscore the crucial role of pharmacist-led medication reviews in identifying and addressing DRPs in this population. This study also emphasizes the importance of interdisciplinary teamwork in managing DRPs and improving health outcomes for dementia patients.

Evaluation of a Hub and Spoke Model to enhance capacities of healthcare professionals in the Volta Region of Ghana in the practice of Antimicrobial Stewardship

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Introduction: Antimicrobial Resistance (AMR) poses a critical global health challenge, particularly in resource-limited settings. A hub-and-spoke model, decentralising expertise and building capacity in peripheral facilities, has been proposed as a strategy to enhance Antimicrobial Stewardship (AMS) capacity in low- and middle-income countries. This study sought to understand healthcare professionals' experiences of a hub-and-spoke AMS model in the Volta Region of Ghana and its influence on clinical practice, leadership, and collaborative endeavours to address AMR.

Method: A qualitative descriptive design was adopted. In-depth semi-structured interviews were conducted with 11 healthcare professionals in Ghana participating in the AMS program. We developed an interview topic guide and conducted interviews via a teleconference call. Thematic analysis was used to identify key themes related to knowledge and skills gained, clinical and leadership practice changes, capacity building, and challenges.

Results: All participants reported increased awareness of AMR, particularly regarding the clinical implications of antimicrobial misuse. Clinical practice improvements included more judicious prescribing and enhanced adherence to infection prevention and control measures. Many respondents highlighted stronger leadership skills and a commitment to capacity building through AMS committees, multidisciplinary collaboration, and cross-organisational knowledge exchange. Despite resource constraints and logistical hurdles, participants expressed optimism, citing data-driven approaches such as the Global Point Prevalence Survey to track progress and inform policy. Engagement with hospital management and public outreach were viewed as essential to sustaining AMS efforts and curbing over-the-counter antibiotic misuse respectively.

Conclusion: The hub-and-spoke model resulted in observable improvements in AMS knowledge, clinical practice, and leadership capacity among healthcare professionals in Ghana. While challenges remain, particularly in securing sustainable resources and shifting community behaviours, these findings underscore the potential of network-based programs to

catalyse systemic changes in tackling AMR. Future research should explore long-term outcomes and strategies for embedding AMS practices more deeply within healthcare systems and communities.

Case report: Off-label use of magnesium sulfate for cerebral palsy prevention in preterm infants

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Introduction: Magnesium sulfate ($MgSO_4$) is commonly used to treat hypomagnesemia and manage eclamptic seizures. Studies suggest fetal exposure to $MgSO_4$ before preterm birth may reduce cerebral palsy (CP) risk. Its neuroprotective mechanisms include cerebral blood flow stabilization, oxidative stress reduction, and anti-inflammatory effects. This case report presents a 31-week pregnant woman at risk of preterm birth who received $MgSO_4$ for fetal neuroprotection.

Case Report: A 35-year-old woman at 31 weeks and 5 days of gestation (GA 31+5) presented on January 22, 2025, with vaginal watery discharge. Laboratory tests showed negative results for RPR, HBsAg, and HIV, with equivocal rubella IgG and mildly abnormal Oral glucose tolerance test, OGTT (80, 154, 153 mg/dL). Pelvic examination revealed cervical dilation of 0.5 cm with poor effacement and a floating presenting part. Non-stress test (NST) recorded a fetal heart rate of 120-150 bpm with contractions every 2-5 minutes. Ultrasound confirmed fetal viability, breech presentation, an estimated fetal weight of 1532 g, and an amniotic fluid index of 6.6 cm. Diagnosed with preterm premature rupture of membranes (PPROM), the patient was admitted for tocolysis and infection prevention. Treatment included $MgSO_4$ 10% 20ml/amp (loading 200ml, maintenance 200ml for one day) for neuroprotection, Dexamethasone 6mg Q12H for four doses for fetal lung maturity, and Nifedipine 10mg Q4H PRN with Ritodrine for tocolysis. Maternal vitals and fetal heart rate were closely monitored. On January 25, 2025, the patient developed lower abdominal pain and vaginal bleeding. A cervical examination revealed 1 cm dilation with significant bloody discharge. Given the breech presentation and risk of birth trauma, an emergency cesarean section was performed. A male infant was delivered at GA 32+1, weighing 1600 g, with an Apgar score of 7 at 1 minute and 8 at 5 minutes. He was admitted to the NICU for respiratory support and monitoring. No major complications occurred, and he was discharged in stable condition on March 15, 2025, without signs of cerebral palsy.

Discussion: CP is a major neurological injury in infants, with preterm birth and low birth weight as key risk factors. $MgSO_4$ may provide neuroprotection by stabilizing cerebral blood flow, exerting antioxidant effects, and reducing inflammation. Studies suggest $MgSO_4$ administration before preterm birth lowers CP risk, particularly in neonates born before 32 weeks. A recommended regimen includes a 4 g loading dose followed by a 1 g/hour infusion (maximum 24 hours, total 28 g/day), which has fewer side effects than higher-dose regimens. Our institution administered 20 g/day, with no maternal complications such as respiratory depression or cardiac arrest. The lower dose may help minimize maternal side effects while maintaining neuroprotection.

Conclusion: Although $MgSO_4$ for fetal neuroprotection remains off-label, growing evidence supports its role in reducing CP risk in preterm infants. Compared to the UpToDate-recommended 28 g/day, the 20 g/day regimen used in this case was effective and well-tolerated. This dosing strategy may be beneficial, particularly in Asian populations. Further large-scale studies are needed to validate its efficacy and safety, as well as to determine optimal dosing strategies tailored to different populations.

Off-label use of imiquimod for the treatment of oral leukoplakia: A case report

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Background: Imiquimod cream is a skin and mucous membrane agent that modulates the immune response by inducing interferon production. It is commonly used to treat external genital and perianal warts, including condyloma acuminata. Oral leukoplakia is a potentially malignant disorder (PMD) of the oral mucosa, presenting as white patches, and is associated with an increased risk of oral squamous cell carcinoma (OSCC). This case report presents the use of Imiquimod for the treatment of oral leukoplakia.

Case Presentation: In January 2025, a patient presented to our dental clinic with white patches in the oral cavity. Clinical ex potentially malignant disorder amination revealed ulceration in the right gingival region with erosion along nearly all gingival margins. A white lesion was also observed on the edentulous ridge of the left mandible. The initial diagnosis included candidiasis with lichen planus and burning mouth syndrome. The patient was prescribed Triamcinolone (6g/tube) for lichen planus and Nystatin suspension (100,000 U/mL, 24 mL/bottle, 6 mL q6h mouth rinse) for Candidiasis. After two months of treatment with no significant improvement and progressive lesion spread, oral leukoplakia was considered as a differential diagnosis. Consequently, the treatment was switched to Imiquimod 5% cream (250 mg/pk), applied daily for 40 minutes before rinsing, to minimize the risk of ulceration, sore throat, or headache. After one week of treatment, no lesion progression or adverse effects were observed. A biopsy was performed to determine the presence of dysplasia or malignant transformation. The final treatment plan will be determined

based on lesion size, homogeneity, and histopathological findings.

Discussion: The pathogenesis of oral leukoplakia remains largely unknown but is considered an intermediate stage in oral carcinogenesis, driven by somatic mutations affecting keratinocyte proliferation, survival, and cell cycle regulation. Imiquimod exerts its immunomodulatory effects via Toll-like receptor 7 (TLR-7) activation, leading to increased cytokine production and immune cell recruitment. This mechanism may contribute to its therapeutic potential in oral leukoplakia. According to the literature, topical Imiquimod 5% cream has been used at a regimen of five days per week for 60 minutes per application, with a treatment duration of 3 to 28 weeks. The protocol in this case is comparable, with adjustments made to optimize patient tolerance and minimize adverse effects.

Conclusion: The primary goal of treating oral leukoplakia is to prevent or reduce the risk of malignant transformation to OSCC. Currently, there is no consensus on the optimal treatment approach. Compared to surgery and destructive therapies (e.g., laser ablation, cryosurgery), Imiquimod 5% cream presents a promising alternative due to its ease of application and favorable safety profile, despite being an off-label use for oral leukoplakia. Further studies are warranted to evaluate its long-term efficacy and safety. This case contributes to the growing body of evidence supporting Imiquimod 5% cream as a potential treatment option for oral leukoplakia.

Off-label use of Indomethacin and Nifedipine for tocolysis in acute preterm Labor: A case report

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Introduction: Indomethacin, primarily used as an antipyretic, analgesic, and anti-inflammatory agent, and nifedipine, commonly prescribed for hypertension, are both utilized off-label for tocolysis in cases of acute preterm labor. This case report presents the tocolytic management of a pregnant woman hospitalized at 22+5 weeks of gestation for preterm labor.

Case Presentation: A 34-year-old gravida 3, para 1 woman with a history of one prior induced abortion and no spontaneous miscarriages presented at 22 weeks and 5 days of gestation (October 17, 2024) with uterine contractions occurring every 5 to 10 minutes. She had previously undergone cervical cerclage at 20 weeks due to cervical insufficiency. Routine serologic tests were unremarkable, and fetal ultrasound confirmed normal fetal growth and development.

On pelvic examination, the cervix was closed, and the cerclage remained intact. A non-stress test (NST) revealed a fetal heart rate (FHR) of 130–160 bpm with good variability. Ultrasound examination showed an FHR of 133 bpm, an estimated fetal weight of 560 grams, a normal amniotic fluid index (AFI), and a cephalic presentation.

Ritodrine was initially administered to suppress contractions; however, contractions intensified, occurring every 4–5 minutes with pressures ranging from 20 to 40 mmHg. Due to persistent contractions, the patient was admitted to the labor ward for further management.

During hospitalization for tocolysis, she received Ritodrine (50 mg/amp, 3 amps daily, every 8 hours) alongside indomethacin (from October 19 to October 28, 2024) and nifedipine (from October 19, 2024, to January 24, 2025). Indomethacin was discontinued due to the development of oligohydramnios. Additionally, magnesium sulfate was administered for fetal neuroprotection, and a complete course of antenatal corticosteroids (dexamethasone: four doses of 6 mg intramuscularly, 12 hours apart) was given to enhance fetal lung maturity. The patient remained stable and was discharged at 36 weeks and 6 days of gestation in good condition.

Discussion: Current guidelines recommend indomethacin as the initial tocolytic for patients less than 32+0 weeks of gestation, whereas nifedipine is preferred for patients between 32+0 and 34+0 weeks. The combined use of indomethacin and nifedipine is acceptable for patients receiving antenatal corticosteroids. In this case, indomethacin was administered from October 19, 2024, to October 28, 2024, and nifedipine from October 19, 2024, to January 24, 2025. Indomethacin was discontinued due to oligohydramnios, in accordance with recommendations. The dosages of indomethacin (25 mg orally every 4–6 hours) and nifedipine (10–20 mg every 3–8 hours) were consistent with established literature.

Conclusion: This patient received tocolytic therapy from 22+5 to 36+6 weeks and was discharged in stable condition. Although indomethacin and nifedipine are used off-label for tocolysis, their ease of administration, cost-effectiveness, and flexible dosing make them indispensable in clinical practice. Pharmacists should monitor for potential adverse effects, including ductus arteriosus constriction and oligohydramnios with indomethacin, as well as headache, dizziness, palpitations, and hypotension with nifedipine, to optimize efficacy and safety. The experience from this case is shared with obstetric healthcare providers.

Prophylaxis strategies for venous thromboembolism in patients undergoing total hip or knee arthroplasty in Southern Taiwan

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Introduction: Venous thromboembolism (VTE) is the most common complication after total hip arthroplasty (THA) or total knee arthroplasty (TKA). Several international guidelines recommend antithrombotic prophylaxis for patients undergoing THA or TKA to VTE. In recent years, the Taiwanese National Health Insurance Bureau has approved the coverage of several antithrombotics for the prevention of VTE, eg., rivaroxaban, dabigatran and so on. The aims of this study was to examine the pattern of prophylaxis strategy, as well as the efficacy and safety of antithrombotic medication after surgery in Taiwanese population.

Methods: This population-based retrospective study was conducted based on the database of Kaohsiung Veterans General Hospital, a medical center in southern Taiwan. Patients who underwent TKA or THA between January 1, 2014, and June 30, 2024, were included, and analyzed them based on the type of pharmacological prophylaxis (aspirin, direct oral anticoagulants [DOACs]) or without any antithrombotic prophylaxis. However, patients who experienced a lower limb joint fracture within 90 days before surgery or had taken any antithrombotics prophylaxis within 30 days preoperatively were excluded. The primary outcome was the risk of VTE at 90 days. The secondary outcomes included major bleeding events, length of hospital stays, in-hospital mortality and all-cause mortality within 90 days post-surgery. Logistic regression analysis or linear regression analysis were performed to analyze the differences between prophylaxis and non-prophylaxis groups, adjusting for other VTE risk factors.

Results: A total of 4622 participants were included, with 3409 (73.8%) experienced total knee arthroplasty, while1213 (26.2%) experienced total hip arthroplasty. Among them, 2899 patients (62.7%) received medication prophylaxis. The most commonly used anticoagulant was rivaroxaban (n=2217, 76.5%), followed by aspirin (n=678, 23.4%). At 90 days, the incidence of postoperative VTE in antithrombotic prophylaxis group was 0.2% and 0.4% in non-prophylaxis group. Multivariable logistic regression analysis showed no significant difference between groups (adjusted OR 0.41, 95% confidence interval (CI) 0.13-1.32). The major bleeding rate was 0.3% in prophylaxis group compared to 0.2% in the non-prophylaxis group, with no significant difference (adjusted OR:1.3, 95% CI 0.38- 4.41). Similarly, in-hospital mortality rate showed no significant difference between the two groups (adjusted OR:0.69, 95%CI 0.09- 5.30). However, pharmacological prophylaxis was associated with a significantly shorter hospital stay (-0.34, 95% CI: -0.47 to -0.21; $p < 0.001$) and lower all-cause mortality (adjusted OR: 0.63; 95% CI: 0.51–0.78; $p < 0.001$) compared to the non-prophylaxis group.

Conclusions: In this cohort, approaching two-thirds of patients who underwent total hip or total knee arthroplasty received thromboprophylaxis. Although the risk of VTE and major bleeding event were relatively low in Taiwanese population, the results of this study indicate that the use of antithrombotics after total hip or total knee replacement surgery can significantly reduce the length of hospital stay and all-cause mortality, highlighting additional benefits beyond VTE prevention. Surgeons should encourage all patients receiving thromboprophylaxis following TKA or THA surgery.

Enhancing type 2 diabetes management using pharmacist interventions

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Introduction: The worldwide management of type 2 diabetes remains a considerable public health concern. Conventional care teams, which generally consist of physicians, nurses, and dietitians, are essential in facilitating diabetes management. This research examines the effects of integrating pharmacists into the care team, with a particular emphasis on patients exhibiting HbA1C levels greater than 9%. The objective is to evaluate the potential for enhanced health outcomes and the overall quality of diabetes management.

Method: This prospective observational study, carried out from January 2024 to November 2024, aimed to evaluate the effects of pharmacist-led interventions on the management of type 2 diabetes. The interventions encompassed ongoing prescription reviews, assessments of medication adherence, and patient counseling. The study examined alterations in HbA1c levels and estimated glomerular filtration rate (eGFR), employing paired t-tests to determine the statistical significance of the findings.

Results: A total of 386 patients participated in pharmacist-led interventions, with a demographic composition of 40.2% male and 59.8% female participants. The analysis conducted using a paired t-test demonstrated a statistically significant decrease in HbA1C levels (mean ± SD: 7.6 ± 1.5 prior to the intervention compared to 7.3 ± 1.3 following the intervention; $p < 0.001$), indicating an enhancement in glycemic control as a result of the interventions. Regarding renal function, the observed changes in estimated glomerular filtration rate (eGFR) were minimal and did not reach statistical significance (mean ± SD: 88.2 ± 28.2 before the intervention versus 87.8 ± 28.4 after; $p = 0.510$). This finding suggests that the pharmacist-led interventions successfully preserved stable kidney function without any indication of deterioration throughout the study duration.

Conclusion: Pharmacists are assuming an increasingly essential role in the holistic management of diabetes. This study highlights their substantial contributions to the improvement of glycemic control, enhancement of medication adherence, and optimization of therapeutic outcomes. The findings provide compelling evidence for the broader incorporation of pharmacists into diabetes care teams, emphasizing their capacity to support patients in attaining improved health outcomes and sustaining long-term glycemic stability.

The efficacy of Neurokinin-1 receptor antagonists in chronic pruritus: a systematic review and meta-analysis

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Background information: Chronic pruritus (CP) is a persistent condition that significantly impairs patients' quality of life, often leading to frequent scratching, skin lesions, sleep disturbances, and depression. CP may result from underlying diseases or medication use, such as atopic dermatitis, prurigo, or epidermal growth factor receptor inhibitors (EGFRi). Neurokinin-1 (NK-1) receptor antagonists, which inhibit substance P—a mediator of pruritus—have shown potential in treating CP in some studies. However, robust evidence supporting the efficacy of NK-1 receptor antagonists in managing CP remains lacking.

Purpose: This study aims to provide an updated review of the latest evidence and assess the efficacy of NK-1 receptor antagonists in the treatment of CP.

Method: A systematic search for both randomized controlled trials and observational studies evaluating the association between NK-1 receptor inhibitors and pruritus was conducted. Relevant keywords and Medical Subject Headings (MeSH) were used to query PubMed, EMBASE, and Cochrane Library databases from inception to January 2025. Two authors independently screened the reference and extracted data. Studies comparing NK-1 receptor inhibitors with placebo or active control and reporting efficacy outcomes of pruritus were included. The risk of bias was assessed by using Cochrane risk-of-bias tool for randomized trials (RoB 2.0) and the Newcastle-Ottawa Scale (NOS). The Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system was employed to evaluate the overall certainty of evidence. The improvement of itching intensity and the percentage of patients achieving significant symptom relief were the endpoints of the quantitative analysis. Statistical analyses, including standard mean difference (SMD) and risk ratio (RR) with 95% confidence intervals (CI), were performed using a random-effects model in Review Manager 5.4.

Results: This meta-analysis included 12 prospective trials and 1 observational study, involving a total of 711 participants. Two trials were identified as having a high risk of bias, while others were assessed with some concerns. The observational study received a score of 6 points on NOS. The analysis demonstrated a significant improvement in itching intensity using NK-1 receptor antagonists (SMD 1.53, 95% CI 0.83–2.24). Additionally, a notable reduction in itching score changes, measured by the visual analogue scale (VAS) and numerical rating scale (NRS), was observed compared to placebo (SMD -0.25, 95% CI -0.48 – -0.01). Furthermore, more patients in the NK-1 receptor antagonist group achieved substantial symptom relief, defined as an improvement of at least 3 points on the NRS (RR 1.85, 95% CI 1.39–2.45) and 4 points on the VAS (RR 2.07, 95% CI 1.48–2.90), compared to the placebo group. Although the pooling result of the Dermatology Life Quality Index (DLQI) did not reach statistical significance, it still suggested a trend toward improved quality of life with the use of NK-1 receptor antagonists.

Conclusion: NK1 receptor antagonists demonstrate superior outcomes in the treatment of chronic pruritus compared to placebo. Additionally, NK1 receptor antagonists may improve the quality of life for CP patients; however, the optimal agent and regimen remain to be clarified. Given the limitations of this study, larger and more rigorous prospective studies are still warranted.

Readmission rates for hospital-associated thrombosis following TKR and THR: A comparison of Aspirin and Enoxaparin

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Introduction: Venous thromboembolism (VTE), including deep vein thrombosis and pulmonary embolism, is a recognised complication following orthopaedic surgery, particularly total knee replacement (TKR) and total hip replacement (THR). Current clinical guidelines recommend pharmacological thromboprophylaxis during hospitalisation and often beyond discharge with either aspirin or enoxaparin. While randomised trials have examined aspirin as an alternative to enoxaparin for post-operative thromboprophylaxis, real-world data specifically reporting hospital-associated thrombosis (HAT) readmissions after discharge remain less frequently explored in clinical practice settings. This audit aimed to compare the incidence of HAT-related readmissions in patients undergoing TKR or THR who were discharged on aspirin versus enoxaparin.

Method: A retrospective cohort study was conducted using hospital records from orthopaedic patients who underwent TKR or THR within a 24-month period. Patients were categorised based on the discharge thromboprophylaxis prescribed: aspirin 150mg or enoxaparin based on patient weight. The primary outcome was readmission due to HAT, defined as VTE occurring during or within 90 days of hospitalisation. Data were analysed using a chi-square test to determine statistical significance, and risk ratios and odds ratios were calculated with 95% confidence intervals.

Results: A total of 193 patients were included, with 133 discharged on aspirin and 60 on enoxaparin. Of those discharged on aspirin, 10 (7.5%) were readmitted with HAT, compared to 2 (3.3%) in the enoxaparin group. The chi-square test indicated no statistically significant difference in readmission rates ($p = 0.265$). The calculated risk ratio was 2.26 (95% CI: 0.51–9.98), and the odds ratio was 2.36 (95% CI: 0.50–11.11), suggesting a trend toward higher readmission with aspirin, though this was not statistically significant. The wide confidence intervals indicate considerable uncertainty due to the small sample size.

Conclusion: This study did not demonstrate a statistically significant difference in HAT readmissions between aspirin and enoxaparin for post-discharge prophylaxis following TKR or THR. However, a numerical trend towards increased readmissions in the aspirin group was observed. These findings support the need for larger, adequately powered studies to assess the safety and effectiveness of aspirin as a routine alternative to enoxaparin in this context. A power calculation reflected a sample size of 9000 patients per group (18,000 in total). Future research may include a multi-centre retrospective audit to achieve this sample size. Real-world data such as these are essential in informing both cost-effective prescribing practices and patient safety in orthopaedic thromboprophylaxis.

Evaluation of advanced hospital pharmacy practice and specialisation in a Nigerian tertiary health institution: Trends, challenges, and solutions

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Introduction: Hospital pharmacy has evolved beyond dispensing medicines to encompass specialised advanced clinical functions, including medication therapy management, pharmacogenomics, and collaborative prescribing. Advanced pharmacy practice (APP) improves healthcare accessibility, reduces costs, enhances the quality of patient care, and improves patient outcomes and satisfaction (FIP, 2015). Understanding the trends and barriers to APP in Nigeria is crucial for evidence-based improvement strategies. AIMS: To assess the level of APP and specialization in the University of Abuja Teaching Hospital (UATH), identify challenges limiting specialisation in hospital pharmacy, and provide recommendations to improve APP in Nigeria

Method: This cross-sectional quantitative study collected responses from hospital pharmacists in UATH. Data was collected using a self-administered online questionnaire over three weeks from 28 August to 17 September 2024. Survey questions were designed based on FIP's report on advanced practice and specialisation. Census sampling was employed to capture data from all pharmacists in UATH. Data was analysed using SPSS (v23). Descriptive analysis and the Pearson Chi-square test assessed whether demographic information influenced participants' interest in advanced hospital pharmacy practice. Ethical approval was obtained from the UATH Ethical Review Board (approval number UATH/HREC/PR/2024/0/9192).

Results: 48 out of the 56 pharmacists completed the survey, yielding an 86% response rate. While 79% expressed interest in hospital pharmacy specialisation, only 37% had started their residency program, and 44% had relevant certifications. Qualification significantly influenced specialisation interest, with B.Pharm/M.Pharm holders showing greater interest ($p=0.014$). Only 50% participated in any form of APP, and two-thirds, 64.6%, reported no prescribing rights in the hospital. Major motivations for specialisation were career advancement (54%), personal interest (50%), and improved

patient care (40%). Major barriers were high workload (31%), lack of organisational support (29%), limited training opportunities (23%) and financial constraints (21%). A small sample size potentially limits this study.

Conclusion: Despite a strong interest in specialisation, UATH pharmacists face significant barriers, including workload, limited organisational support, training opportunities, and costs. Providing affordable, accessible, and short-term board certification training programs; providing scholarships and reimbursement for training; and implementing favourable work-study policies; recognition; incentives; and increased salary for specialised pharmacists are key recommendations that could potentially improve APP and specialisation in Nigeria. Additionally, delegating non-patient-centred tasks to supervised pharmacy technicians and support staff could create more time for APP while strengthening interprofessional collaboration and enhancing opportunities for collaborative prescribing.

You think you're the only sick person? Others are sick too.' From bureaucracy to bedside: Breast cancer patients' experiences with special approval medicines in Malaysia

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Background: Ensuring timely access to innovative oncology treatments remains a priority in Malaysia's public healthcare system. The Special Approval Medicine (SAM) system provides an alternative access pathway through case-by-case approvals in public hospitals for patients requiring non-formulary, off-label, or unregistered medications. While SAM facilitates treatment access, the application process is complex, involving multiple administrative steps, strict eligibility criteria, and financial considerations, often creating delays and uncertainty. Given the involvement of various healthcare professionals in medication access, understanding how breast cancer patients experience these processes, particularly in relation to hospital pharmacists, is essential for identifying areas for improvement.

Purpose: This study explores breast cancer patients' experiences with the SAM application process, focusing on the challenges they encounter and their perceptions of hospital pharmacists' roles in facilitating medication access. By examining patient narratives, this research seeks to identify the barriers within the SAM system and explore opportunities to enhance pharmacist involvement and support mechanisms within the healthcare system.

Method: The lived experiences of breast cancer patients were explored through semi-structured interviews with 24 patients at two Malaysian university hospitals. Participants were purposively sampled based on treatment history, socioeconomic background, and engagement with the SAM process. Interviews were conducted primarily in Malay, with one in English, and were digitally recorded, transcribed in intelligent verbatim and translated into English for consistency. An initial phase of thematic analysis was conducted using NVivo software to identify broad patterns, ensuring structured data organisation. This was followed by constructivist grounded theory coding, incorporating iterative initial and focused coding, constant comparison and memo-writing to develop emerging theoretical insights. The analytical process was informed by theories of Bureaucratic Disentitlement (Davidson, 2011; Lipsky, 1980), Financial Toxicity (Zafar et al., 2013), Burden of Treatment Theory (May et al., 2014), and Role Theory (Katz & Kahn, 1978) which provided a conceptual foundation for understanding participants' experiences.

Results: Findings reveal multifaceted challenges in obtaining SAM approval. Four key themes were identified: (1) Regulatory Barriers & Administrative Complexity—bureaucratic requirements, inconsistent hospital decision-making, and extended approval timelines contributed to treatment uncertainty; (2) Financial Toxicity & Cost-Related Coping Strategies—patients struggled with the financial burden of oncology treatments, often relying on savings, family support, or external funding; (3) Health System Navigation as Patient Work—patients engaged in extensive self-advocacy, administrative effort, and emotional resilience to secure medication access; and (4) Pharmacists' Role in Medication Access—while pharmacists could support patients in navigating SAM, their role remained ambiguous due to institutional constraints, limited direct patient engagement, and a lack of formalised involvement.

Conclusion: This study deepens the understanding of patient experiences in accessing high-cost cancer therapies within Malaysia's public healthcare system. By highlighting systemic barriers within the SAM framework, findings underscore the need for policy refinements to streamline approval processes, enhance financial assistance mechanisms, and strengthen pharmacists' roles in medication access. This study serves as the first phase of a broader exploration incorporating the perspectives of hospital pharmacists, healthcare professionals, and key stakeholders to develop a comprehensive understanding of SAM accessibility in Malaysia.

Development and evaluation of a novel antibiotic point prevalence survey method in primary healthcare (APC-PPS); Results from the Korle bu Polyclinic

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Introduction: Globally, most antibiotics are consumed in primary healthcare settings. The World Health Organisation (WHO) AWaRe Antibiotic Book recommends Access antibiotics as first-line treatment for majority of the common infections in primary care. In low- and middle-income countries (LMIC), there is limited data on the relative burden of different clinical infections and associated antibiotic prescribing to inform policy interventions. The Antibiotic Prescribing in Primary Healthcare Point Prevalence Survey (APC-PPS) was therefore devised to evaluate primary care antibiotic use in LMIC by adapting the WHO hospital antibiotic point prevalent survey (PPS) method.

Aims:
•To quantify the presentation rates of different clinical infections at the Korle bu Polyclinic
•To determine the proportion of those who receive an antibiotic prescription
•To classify prescribed antibiotics based on AWaRe classification

Method: Eight (8) half day surveys of all consultations presenting with acute infection symptoms was conducted between 05 June 2023 to 05 Oct 2023 at the Korle bu Polyclinic. Data was collected using the Open Data Kit (ODK) Collect App and analysed with jamovi (v.2.3.28).

Results: A total of 221 consultations were recorded over the time period from 7 prescribers in 5 consulting rooms. More females (156; 71%) presented compared with males (65; 29%) and the mean age was 43.4 years. The top three symptoms recorded were acute cough (21.1%), fever lasting for less than 7 days (17.6%) and runny nose/nasal congestion (10.2%). Almost half of all consultations {103/221 (47%)} were prescribed/dispensed at least one antibiotic. Access antibiotics comprised 46%, Watch Antibiotics 50% and Reserve antibiotics 4%.

Conclusion: A high rate of overall antibiotic prescribing was found at the Korle bu Polyclinic. The most common presenting symptoms were respiratory symptoms and fever. High use of oral Watch antibiotics was also identified.

Patterns of antimicrobial use in 4 major departments in Ghana's largest teaching hospital during two global point prevalence surveys in 2023 and 2024

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Introduction: The Global Point Prevalence Survey (Global PPS) is an easy and freely available web-based tool to measure and monitor antimicrobial prescribing and resistance in hospitals and healthcare centers worldwide. The Korle bu Teaching Hospital (KBTH), the largest teaching hospital in Ghana with over 2000 bed capacity, has been actively participating in the Global PPS since 2019. The 2019 Global-PPS in KBTH encompassed the whole hospital while the 2023 and 2024 ones were done in four major departments namely Department of Medicine, Obstetrics & Gynaecology, Surgery and Child Health.

Method: We retrospectively compared the data collected by KBTH during the 2023 and 2024 Global PPS. The 2023 survey took place in July while the 2024 survey took place in October. Electronic medical records and paper records of all in-patients on admission at 0800 hours on the survey days were reviewed for antimicrobial use. Data on antibiotic use, including indications for use and the presence of quality indicators, were recorded. Outpatients and detained patients were excluded from the survey. Administrative approval was obtained in all the departments before the surveys were done.

Results: The total number of patients on admission in 2023 and 2024 were 567 and 559, respectively. The proportion of patients on at least one antimicrobial was 44.3% (251/567) in 2023 and 49.4% (276/559) in 2024. Pneumonia was the most common medical condition for which antimicrobial was prescribed in both years; 21.1% for 2023 and 20.1% for 2024. Third-generation cephalosporins (J01DD) were the most prescribed antibiotic in 2023 while penicillins (J01CR) were the most prescribed in 2024. There was a decrease in healthcare-associated infections from 12.2% in 2023 to 9.1% in 2024. Reserve antibiotics were not used among inpatients while the use of Access and Watch antibiotics remained consistent at 60% and 40% respectively in both years. Empirical antibiotic prescribing rose from 92.7% to 95.3% from 2023 to 2024.

Conclusion: The results from these surveys underscore the need for active anti-microbial stewardship (AMS) activities in the Korle bu Teaching Hospital. The establishment of two such committees in two departments in 2024 marks a good

starting point to continuously measure, monitor and improve antimicrobial in KBTH.

Enhancing pharmacy students' academic performance and empathy through an exploratory learning approach

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Background: Empathy is a crucial attribute and a core professional competency for pharmacists, enabling them to deliver compassionate, patient-centered care. However, in Taiwan, pharmacy education has traditionally placed limited emphasis on medical humanities and empathy development. To bridge this gap, this study implemented an innovative curriculum utilizing 360-degree virtual reality (VR) immersive environments to replicate authentic hospital settings. The primary objective was to explore the impact of this curriculum on undergraduate year (UGY) pharmacy interns' learning motivation, empathy, and overall educational outcomes.

Methods: This pilot study was conducted at a leading medical center in northern Taiwan, involving both UGY students and postgraduate year (PGY) pharmacists. The curriculum incorporated a 360-degree VR environment to immerse participants in realistic medication administration scenarios, focusing on specialized dosage forms such as suspensions, inhalers, and effervescent tablets. Following these simulations, students engaged in reflective discussions and provided feedback via self-administered structured questionnaires.
The evaluation framework included a learning motivation scale, the Jefferson Scale of Empathy, a self-perceived value scale, and computational thinking assessments. Post-test measures also assessed participant satisfaction and the flow experience. Statistical analysis was performed using paired t-tests and Pearson correlation analysis, with significance defined as $p < 0.05$.

Results: A total of 20 participants successfully completed the curriculum. The results demonstrated a statistically significant improvement in learning motivation (22.97±3.23 vs. 24.24±3.21, $p<0.001$) and empathy, as reflected in the increased scores on the Jeffersonian Empathy Scale (103.00±14.44 vs. 108.85±15.81, $p<0.001$). These findings highlight the curriculum's effectiveness in fostering students' empathy and strengthening their appreciation for the humanistic dimensions of pharmacy practice. Participants found the curriculum engaging and insightful, helping them better understand the challenges patients face when taking medications. Post-course interviews provided deeper insights into students' perspectives on the program. One student remarked, "This course had a strong sense of engagement. It transformed abstract and rigid medication instructions into tangible, firsthand experiences, enabling us to offer patients more concrete descriptions and empathetic guidance."

Conclusion: This study provides compelling evidence that a 360-degree VR-based experiential curriculum can significantly enhance empathy and learning motivation among pharmacy students and early-career pharmacists. The overwhelmingly positive feedback underscores the curriculum's practical relevance and adaptability to broader pharmacy education initiatives. Future applications could extend this approach to patient education and drug information services, further fostering professionalism and patient-centered care among pharmacy trainees. The integration of immersive technologies in pharmacy education represents a promising avenue for cultivating essential competencies in future pharmacists.

Efficacy and safety of colchicine on adverse cardiovascular outcomes in patients with myocardial infarction: A systematic review

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Inflammation may play an important role in acute coronary syndrome and stable coronary artery disease that contributes to post-Myocardial infarction (MI) prognosis. The 2025 ACC/AHA/ACEP/NAEMSP/SCAI guideline provided a class 2b recommendation for the use of colchicine, an anti-inflammatory agent, in patients after acute coronary syndrome. However, a recently published clinical trial revealed that colchicine did not reduce adverse cardiovascular events. This study aims to assess the efficacy and safety of colchicine in secondary prevention for patients with established myocardial infarction.

A comprehensive electronic search was conducted across PubMed and Cochrane Library for randomized controlled trials (RCTs) assessing the efficacy of colchicine on major adverse cardiovascular (MACEs) in myocardial infarction patients from inception until February 2025, using the following keywords: colchicine and myocardial infarction. Studies reported the incidence of recurrent MI, MACEs and mortality rate in patients with MI were included. The primary outcome was recurrent MI, after colchicine administration. The secondary outcomes were incidence of MACEs, included cardiovascular death, all-cause death, resuscitated cardiac arrest, recurrent MI, stroke, ischemia-driven coronary revascularization, heart failure. Risk ratio (RR) and 95 % confidence intervals (CI) were extracted or calculated from each study. Statistical analysis was performed using Review Manager (RevMan) version 5.4.

A total of 6 RCTs with 18,091 patients (9,038 patients in the colchicine group and 9,053 patients in the control group) were included. The length of follow-up varied from 6 months to 36 months. Colchicine had a trend to reduce recurrent MI (RR: 0.75, 95% CI 0.55-1.02, P =0.06, I2=64%) and MACEs (RR: 0.81, 95% CI 0.66-1.00, P =0.05, I2=73%) but was not statistically significant. Moreover, there was no significant difference in all-cause death (RR: 1.03, 95% CI 0.85-1.23, P =0.78, I2=0%) and cardiovascular death (RR: 0.94, 95% CI 0.79-1.22, P =0.99, I2=0%). The incidence of adverse events, included any adverse effects (RR: 1.03, 95% CI 0.88-1.19, P =0.72, I2=62%), serious gastrointestinal side effects (RR: 1.13, 95% CI 0.88-1.44, P =0.34, I2=0%) and serious infection (RR: 0.99, 95% CI 0.80-1.22, P =0.90, I2=36%) are similar across the two groups.

This meta-analysis concludes that colchicine did not impact the incidence of recurrent MI, MACEs and mortality in secondary prevention for patients with established myocardial infarction. Although gastrointestinal events were historically reported at a higher rate in patients on colchicine, this meta-analysis did not observe such findings.

Real-World venetoclax dosage in patients with Acute Myeloid Leukemia receiving moderate or strong CYP3A4 inhibitors

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Introduction: Regimens containing venetoclax (VEN) are becoming the standard treatment for patients with acute myeloid leukemia (AML) who are ineligible for intensified chemotherapy. However, VEN is primarily metabolized by CYP3A4, necessitating careful consideration of potential drug interactions. When moderate or strong CYP3A4 inhibitors are used concomitantly, VEN blood concentrations may increase. Therefore, in Japan, a reduced VEN dose is administered in accordance with the dose reduction criteria outlined in the Guide for Appropriate Use. Thus, we aimed to investigate whether VEN dose reduction is appropriately implemented when used in combination with moderate or strong CYP3A4 inhibitors.

Method: This study was designed as a single-center, retrospective, observational study. Eligible patients were those aged 18 years or older who had been diagnosed with AML and treated with VEN between March 1, 2021, and October 31, 2024, at the Department of Hematology and Oncology, Kameda General Hospital. The study parameters included age, gender, AML subtype, regimen, VEN dose, and the presence or absence of concomitant moderate or strong CYP3A4 inhibitors during VEN treatment. The observation period was 90 days, during which neutropenia, a common adverse event associated with VEN, is most likely to occur for the first time. The primary endpoints were the dose of VEN in patients receiving concomitant moderate or strong CYP3A4 inhibitors. The secondary endpoint was the proportion of dose deviations from the dose reduction criteria. Primary statistical analyses were performed using JMP Pro 18.

Results: A total of 130 patients were included in the study after excluding two patients who did not reach the maintenance dose. Among them, 71.5% (n=93) received concomitant strong CYP3A4 inhibitors. During the period of concomitant use of strong CYP3A4 inhibitors, the mean maximum VEN dose was 47.9 mg/day in patients undergoing VEN plus azacitidine therapy (AZA+VEN therapy) and 50 mg/day in those receiving VEN plus low dose cytarabine therapy (LDAC+VEN therapy). Among these patients, 10.8% (n=10) deviated from the dose reduction criteria, with 2.2% (n=2) classified as the overdose group and 8.6% (n=8) as the underdose group. On the other hand, 12.3% (n=16) of the patients received concomitant moderate CYP3A4 inhibitors. In this group, the mean maximum VEN dose for AZA+VEN therapy was 200 mg/day, while no patients received LDAC+VEN therapy. Among these patients, 12.5% (n=2) deviated from the dose reduction criteria, all of whom were classified as the overdose group.

Conclusion: This study showed that 83.8% (n=109) of the patients received concomitant moderate to strong CYP3A4 inhibitors. Although most cases adhered to the dose reduction criteria outlined in the Guide for Appropriate Use, deviations were observed in 9.2% (n=12) of the patients. Previous studies have not sufficiently examined the impact of such deviations on the safety and efficacy of treatment. Additionally, international differences exist in the dose reduction criteria for VEN. Given these factors, we will conduct further investigations to address aspects not covered in the present study.

Dose-dependent effects of amantadine on neurological recovery in ICU patients with severe neurological impairment: A retrospective study

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Introduction: Amantadine has been shown to enhance neurological recovery by improving the Glasgow coma scale (GCS) score in patients with traumatic brain injury, acute

ischaemic stroke, intracerebral haemorrhage, and subarachnoid haemorrhage. However, the dose-dependent effects of amantadine have not been well characterized. This study aims to evaluate the impact of different amantadine doses on neurological outcomes, measured by GCS score, to provide further insights into its therapeutic potential.

Method: Adult patients with a GCS score ≤8 following stroke, traumatic brain injury, encephalopathy, or post-neurosurgical conditions who received treatment in the Intensive Care Unit between January 2019 and November 2024 were enrolled. Patients with Parkinson's disease were excluded. The enrolled patients were then categorised into three groups based on their daily amantadine dosage: >200 mg, 200 mg, and 100 mg. The GCS score prior to amantadine administration was recorded as baseline. The GCS scores on day 1, day 3, day 7, and day 14 were collected, and the difference in GCS scores from baseline was analyzed. All the data were analysed using the Statistical Package for Social Sciences version 22.0.

Results: A total of 21 patients were included. Among them, 5 patients receiving a daily amantadine dose greater than 200 mg, with 4 patients receiving 400mg per day and 1 patient receiving 300mg per day. Additionally, 12 patients receiving a daily dose of 200 mg, and 4 patients receiving a daily dose of 100 mg. No significant differences were observed in age, gender, renal function or baseline GCS score among these groups. The median baseline GCS score were 6 (IQR 3 - 6). Patients receiving more than 200 mg of amantadine per day demonstrated a significantly greater improvement in GCS difference on Day 3 compared to those receiving 200 mg or 100 mg groups (median change: 3 [2–6] vs. 0 [-1–2] vs. 0 [-0.8–1.5], respectively; $P < 0.033$), suggesting a potential dose-dependent effect on early neurological recovery. However, no statistically significant differences in GCS change were observed among the groups on Day 1, Day 7, or Day 14. Additionally, a significant improvement in GCS score was observed on day 14 in the >200 mg group compared to baseline ($P = 0.007$), whereas no significant change was observed in the other two groups. No amantadine-related adverse effects were observed across different dosage groups. The primary reason for amantadine discontinuation were hospital transfer or disease-related mortality.

Conclusion: This study suggests a potential dose-dependent effect of amantadine on early neurological recovery in patients with severe disorders of consciousness, as indicated by a significantly greater GCS improvement on Day 3 in those receiving >200 mg/day. Additionally, amantadine was well tolerated, with no observed adverse effects. Further large-scale studies are warranted to validate these findings and determine the optimise dosing strategy for improving neurological outcomes.

Real-world evidence of SGLT2 Inhibitors in slowing kidney disease progression in diabetic nephropathy: A retrospective cohort study

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Background: Diabetic nephropathy is a common and serious complication of diabetes mellitus, representing one of leading causes of end-stage renal disease (ESRD) worldwide. As the global prevalence of diabetes continues to rise, effective management strategies to prevent or slow the progression of kidney disease are of paramount importance. Sodium-glucose cotransporter 2 (SGLT2) inhibitors have emerged as a promising class of medications, providing not only glucose-lowering effects but also renal protection. However, real-world data on the long-term effects of SGLT2 inhibitors in the management of diabetic nephropathy remains limited.

Purpose: This study aims to evaluate the effect of SGLT2 inhibitors on the progression of kidney disease in patients with diabetic nephropathy in real-world clinical practice.

Method: A retrospective cohort study was conducted using the electronic medical record database of a medical center in Taiwan. All patients diagnosed with diabetic nephropathy (ICD-9 code 250.4) between January 2011 and December 2019 were included to assess the clinical effects of SGLT2 inhibitors on kidney disease progression. The patients were grouped based on propensity scores, which were estimated using age and renal function, and were matched in a 1:1 ratio by gender. The primary endpoint was the incidence of kidney disease progression, defined as a sustained decrease in estimated glomerular filtration rate of at least 40% from baseline. All enrolled patients were followed for up to 5 years, or until death or the end of the study (December 2021), whichever occurred first. Survival analysis was performed by the Kaplan–Meier method and Cox proportional hazards regression.

Result: A total of 502 patients were included and followed for a median of 3.8 years (IQR=2.3-4.8 years). During the 5-year follow-up period, the incidence rate of kidney disease progression was 63.7 per 1000 person-years. Compared to the non-SGLT2 inhibitors group, the SGLT2 inhibitors group showed a lower risk of kidney disease progression (crude HR=0.62, 95% CI: 0.42-0.93). In multivariate analysis, the SGLT2 inhibitors group continued to demonstrate a lower risk (HR=0.61, 95% CI: 0.40-0.94).

Conclusion: Among patients with diabetic nephropathy, SGLT2 inhibitors were associated with a reduced risk of kidney disease progression, according to real-world evidence from a medical center in Taiwan.

Analysis of abnormal drug dispensing events in a medical center

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Introduction: The basic requirement for maintaining patient medication safety is to ensure correct medication administration. In order to avoid medication errors, our hospital has implemented the staging method in the dispensing process by placing easily confused drugs (e.g. same medication in different strengths, similar tablet or capsule shapes or colors, similar medication foil packaging) in separate dispensing stations. According to the nature of these drugs, they are recorded on the computer system and when the doctor prescribes these medications, their labels/bags will be printed and distributed at different dispensing stations in order to avoid dispensing errors. In addition, pharmacists are encouraged with incentives to report any dispensing and administration errors. Weekly meetings are conducted to review the possible causes of dispensing errors that occurred and measures are proposed to avoid similar errors and improve dispensing accuracy. However, despite the implementation of the above measures, dispensing errors and medication administration events still occurs. Therefore, this study mainly explores the reasons for the occurrence of dispensing error events as well as determining their correlation in order to reduce these events.

Method: This study is a Cross-sectional study design which retrospectively analyzes all medication dispensing errors incidents from 2020 to 2022 and the nature of the pharmacist staff, patient category, prescription period and prescription volume when the incident occurred to explore possible occurrences and reasons for these errors.

Results: The least experienced pharmacist had one month of service, while the most experienced had 26 years. The youngest pharmacist was 23 years old, and the oldest was 55 years old. Between 2020 and 2022, 122 dispensing errors were reported before delivery, including 88 item errors and 33 quantity errors. Of these, 114 occurred at outpatient pharmacies and 8 at inpatient pharmacies. Among the item errors, 10 involved mixing medications (all occurring in outpatient pharmacies). After delivery, 89 dispensing errors were detected, with 40 occurring in outpatient pharmacies, 41 in inpatient pharmacies, and 8 in the emergency department. Types of medication errors included 65 instances of medication errors, 5 instances of mixed drugs, 5 instances of patient errors, 4 instances of missing medication or medication being mixed with others' prescriptions, 3 instances of both patient and medication errors, 2 instances of patient receiving extra medicines while carrying another patient's medicines, 1 instance of missing medication, 1 instance of overdosing, 1 instance of incorrect total parental nutrition (TPN) formulation concentration, 1 instance of providing reconstituted medication, and 1 instance of quantity errors. A total of 211 dispensing error events occurred, including 154 at outpatient pharmacies, 49 at inpatient pharmacies, and 8 at emergency departments.

Conclusion: The causes of medication dispensing anomalies are mostly related to human negligence and failure to follow operating protocols. However, separating medications that are easily confused at different counters has helped eliminate the chances of dispensing errors. The future goal is to improve the workflow to further reduce human errors and enhance the overall medication dispensing process.

Development of entrustable professional activities in a clinical pharmaceutical care training program for hospital pharmacists

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Background: The pharmaceutical care model has evolved to provide integrated, patient-oriented care through multidisciplinary collaboration nowadays. However, in our hospital, high patient volume limits pharmacists' engagement in clinical pharmaceutical care, with most focusing on dispensing duties. Additionally, a structured approach to integrate multiple assessment tools and comprehensively evaluate pharmacists' learning progress is lacking. Competency-based medical education (CBME) has become the leading model in medical education, with entrustable professional activities (EPAs) serving as an effective bridge between theoretical CBME principles and practical clinical practice. EPAs are increasingly used in various healthcare fields, including pharmacy.

Purpose: This study aims to: (1) establish a clinical pharmaceutical care training model for all pharmacists; (2) incorporate EPAs as a framework for training and assessment, and build EPAs development framework within the pharmacy department of a medical centre in southern Taiwan.

Method: This study was conducted from September 2021 to April 2023. Pharmacists experienced in clinical practice and teaching in clinical pharmacy were invited to design a clinical pharmaceutic care model in this program, focusing on enhancing pharmaceutical care skills through ward-based patient care with other healthcare professionals. EPAs workgroup consisted of experts in clinical pharmaceutical care, pharmacists training, and EPAs. Development framework of EPAs could be divided into following stages: (1) Select EPAs topic: EPAs topics were identified through

literature reviews, pharmacists' core competencies, and hospital clinical pharmaceutical practice. Workgroup members rated topics on importance and appropriateness, with a ≥60% agreement threshold in both categories for selection; (2) Draft the EPAs and content validation: EPAs were drafted using a template defined by ten Cate. Relevance, importance, comprehensiveness, and clarity were evaluated by workgroup members using a 4-point Likert scale. A content validity index (CVI) of ≥80% in all categories confirmed consensus; (3) Refine and finalize the EPAs: content of each EPAs was revised based on validation results and qualitative feedback; (4) pilots the EPAs: EPAs were introduced into training.

Results: In stage 1, six workgroup members participated in EPAs topic selection, and two EPAs topics were adopted for this program. In stage 2, ten experts validated the content, achieving a CVI ≥80% for all categories of both EPAs, with no additional EPAs deemed necessary. In stage 3, one EPAs underwent content revision based on expert qualitative feedback. Seven pharmacists completed clinical pharmaceutical training and EPAs evaluation during the study period. Over 70% of trainees achieved the expected level of supervision in both EPAs. Feedback analysis indicated that most trainees found EPAs to be a more effective tool for assessing their learning progress.

Conclusion: In this study, we established clinical pharmaceutical training model for pharmacists, EPA development framework and EPAs for clinical pharmaceutical training. Introduction and implementation of EPAs in this training program not only make instructors and trainees efficiently evaluate learning outcomes, but also may assist in overseeing the development of competencies for pharmacists. We hope this preliminary experience may serve as a reference of future clinical pharmaceutical training and other training activities in our pharmacy department.

Evaluation of the use of progesterone drugs to prevent premature birth

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Introduction: Progesterone is essential in the early stages of pregnancy, and in the event of abnormal bleeding during the 20 weeks of pregnancy, progesterone is often supplemented with lutein to reduce the risk of preterm birth due to its high safety. Progesterone is divided into four types: injection, oral, vaginal plug and vaginal gel.

Method: This study retrospectively evaluated pregnant women hospitalized with progesterone from October 2023 to September 2024. Evaluation of pregnancy weeks, dosage, course of treatment, contraindications (severe liver dysfunction or liver disease, thrombophlebitis, thromboembolic disease, malignant breast or reproductive tumor) and adverse effects.

Results: A total of 15 people with an average age of 34 years, had an average gestational week for 14 weeks. The course was 3 days to 1 month. 1 people with mild liver dysfunction and 10 days of oral medication. No contraindications. 2 people can't tolerate the oral side effects instead of vaginal stuffing into soft capsules. The number, type and dose of progesterone used is as follows: 300mg-400mg/day was taken orally with 13 people (87%); Two people (13%) had the vagina tucked into the soft capsule 100 mg before bedtime; Injection of needles 25mg-50mg/dose 7 people (47%); In addition, 4 people (27%) were injected with Hydroxyprogesterone 125mg per week.

Discussion and Conclusion: 87% of the oral population, 2 people (13%) unable to tolerate oral side effects (dizziness, nausea, etc.) switched to vaginal stuffing. Acupuncture injection local pain, more difficult to push away, long-acting type of injection once a week, less pain but all through the liver metabolism recirculation of the body's side effects larger than the stopper. Oral and plug agent uses the same soft capsule, but the route is different, plug from the vagina into about 1 middle finger deep, by the vagina direct suction, there is currently no recommended oral method guidelines. International Society of Ultrasound in Obstetrics and Gynecology (ISUOG) recommended cervical length (CL) 24 weeks ago At ≤25 mm, the vagina is administered 200 mg per night, starting at short notice and lasting 36 weeks. In April 2024, The National Institute for Health and Care Excellence (NICE), the only formulation licensed for this indication is the vaginal 200mg soft capsule. May 17, 2024 European Medical Administration (EMA) Drug Safety Surveillance Risk Assessment Committee (PRAC) Review the study found that hydroxyprogesterone, which may increase the risk of cancer, does not have the clinical benefit of preventing premature birth.

Drug use assessment of naldemedine

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Introduction: Naldemedine is an FDA (U.S. Food and Drug Administration) approved Peripherally- Acting Mu-Opioid Receptor Antagonists (PAMORA). Treatment of Opioid-Induced Constipation (OIC) in adults. New drug for type μ, δ, κ opioid receptor antagonist effect, which improves constipation caused by opiates, mainly acts on type μ opioid receptors in the gastrointestinal tract but has no significant effect on the pain relief of δ, κ type opioid receptors in the central nervous system. The recommended dose for adults is 0.2 mg per day. The purpose of this study is to understand the

clinical use of Naldemedine in the treatment of constipation caused by opioids in adults.

Method: In this study, naldemedine outpatients and inpatients were evaluated retrospectively from October 2023 to March 2024. Evaluation of indications, course of treatment rationality of prescription (Cessation of opioids and opioid drug should be stopped at the same time), monitoring liver function, age, contraindications (Patients with known or suspected gastrointestinal obstruction or gastrointestinal perforation who may be at risk of recurrent gastrointestinal obstruction). Adverse Effects Observation (Opioid Withdrawal Syndrome may occur: The following signs or symptoms are greater than or equal to 3 in a few minutes or days: Anxiety, nausea, vomiting, muscle pain, tears, nosebleeds, hair loss, sweating, diarrhea, yawning, fever, insomnia).

Results: The study included 6 people (4 men and 2 women), average age 64. Treatment course 7~28 days; The types and ratios of drugs used are as follows: Morphine 15 mg/tab, 50% (3 people). Morphine 30 mg/tab, 33% (2 people). Morphine 10 mg/ml/amp, 17% (1 people). Fentanyl 25 mcg/hr/patch, 67% (4 people). Fentanyl 12 mcg/hr/patch, 17% (1 people). Oxycodone 10 mg, 17% (1 people). Laxative: Lactulose 300 ml/bot, 33% (2 people). Bisacodyl 10 mg/supp, 33% (2 people). Sennoside 12.5 mg/tab, 50% (3 people). No laxatives, 17% (1 people). Liver function mild abnormal 1 people; liver function normal 5 people. No adverse effects. No contraindications.

Discussion and Conclusion: During Naldemedine use, no one stopped taking opioid drugs. Opioid withdrawal syndrome is not present. Constipation may occur in over 50% of non-cancerous chronic pain diseases with long-term opioid use in Taiwan; About 75% of cancer patients have a significant impact on their daily lives, social activities and work performance, and even negative feelings such as depression and anxiety have a medical and financial burden. The longer the opioid morphine and fentanyl, the more likely constipation occurs, the literature indicates that the incidence of OIC constipation between men and women is not significantly different. If the response is poor, it can be combined with PAMORA or another laxative. Or increase the dosage of the original dosage. If there is no improvement, consider replacing the type of opioid or the route of administration, such as the irrigation, and recommend further assessment or examination. And to teach the patient to increase moisture and fiber intake, increase the amount of activity, convenient, immediately use the toilet, if the toilet posture can be added to the footstool to make the patient more relaxed and healthy lifestyle.

Assessment of drug use of oseltamivir phosphate for oral suspension powder

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Introduction: Learn about the use of publicly funded oseltamivir phosphate oral suspension flu antiviral drug for children under 0-5 years of age to collect data and assess the reasonableness and safety of the use of flu-like flu in publicly-funded expanded conditions, including influenza-like symptoms, and in cases of influenza-like illness among family members/colleagues/classmates.

Method: This study retrospectively evaluated children under the age of 0-5 who used a government-funded oral suspension powder between October 2023 and March 2024. Evaluate indications, prescription dosage, course of treatment, age reasonableness, and track for 30 days to determine recurrence and side effects.

Results: 43 people in this study (23 men and 20 women) of which 13 were infants under the age of 1 (approximately 30%). Its average dose by weight is 3mg (0.5ml) / kg/dose, single dose range: 18mg (3ml) to 30mg (5ml). 30 young children (approximately 70%) from 0-5 years old: 22 people were given doses by weight ≦15kg (approximately 51%) it gives 30mg (5ml) /dose. > 15-23 kg, there are 8 people (approximately 19%) who give 45mg (7.5ml) /dose, each taking 2 times a day, for a total of 5 days. No adverse reactions.

Discussion and Conclusion: Tracked for 30 days. No one returned due to flu or incorrectly diluting the volume. 0-5 years old often with oseltamivir 75 mg/cap capsule all open powder poured into empty bottles to add cold boiling water until the total dilution volume shakes. And store refrigerated 2-8 °C. However, the number of capsules and dilution volume is different depending on the child's weight. The pharmacist should indicate the total dilution volume on the empty bottle and write the number of ml taken each time and teach the patient. Manual writing tests the pharmacist's on-the-spot reaction to calculations, and there is also the risk of incorrectly diluting the volume and writing the incorrect number of milliliters to take. It's probable that the same family did not convey correctly. If the family is anxious to leave or take care of the child and is not fully aware of the usage, there is a possibility of misuse. Taiwan Food and Drug Administration provides publicly funded oseltamivir phosphate oral suspension powder for uniform fixation dilution of 55 ml volume of water. The drugstore can set the number of ml required to print out the bag and can be stored at room temperature of 25 ° C for 10 days. Easy to carry out, for example to school. Reduce the risk of erroneous marking and preparation of oseltamivir capsules. May 1, 2024-June 24 Cancellation of the expanded condition of public-funded

influenza antivirals (Influenza-like symptoms, and family/colleagues/classmates influenza-like patients). Swallowing difficulties (medical records are recommended). It can also be used without age, increasing the degree of drug cooperation in addition to pediatric patients.

Evaluation of drug use in the treatment of encapsulating peritoneal sclerosis by tamoxifen

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Introduction: Tamoxifen is an empirical treatment for long-term peritoneal dialysis leading to encapsulating peritoneal sclerosis (EPS). Increased inflammatory reactions such as peritoneal infection or other irritant peritoneal cells associated with prolonged uremic toxins, glucose, acidic PH and glucose metabolites as patients with kidney wash undergo peritoneal dialysis, so that the protein fibrous exudate is not easy to break down, causing progressive fibrosis of the peritoneum, thickening of the intestine, peritoneal adhesion, it eventually leads to an EPS. The mortality rate was up to 69%. EPS risk factors include long-term peritoneal dialysis and multiple severe recurrence of peritonitis, with specific drugs such as beta blockers and calcineurin inhibitors.

Method: This study retrospectively evaluated patients with long-term peritoneal dialysis using tamoxifen from July 2023 to August 2024. Assessment of patient dialysis time (years), risk factors for beta blockers and calcineurin inhibitors, tamoxifen dose, combination of steroids, course, age, and adverse effects.

Results: The study included three women, with an average age of 55 years and dialysis time of 10 years or more. No contraindications (no pregnant women), 2 people (67%) used the bisoprolol (beta blockers), no one used calcineurin inhibitors, tamoxifen use a dose of up to 10 mg tid gradual reduction of up to 10 mg qod. With steroid prednisolone up to 20 mg bid gradual reduction minimum 5mg qod. Treatment is available from 4 months to 1 year.

Discussion and Conclusion: The patients were all female and long-term follow-up in the outpatient clinic after their symptom relief dose gradually decreased, no adverse reaction notifications; two people (67%) changed from peritoneal dialysis to hemodialysis. It is recommended that the peritoneal dialysis should be more than 5 years, the close monitoring of the abdomen pelvis computed tomography, if it is found that the peritoneal thickening of the difference, can be removed early dialysis catheter, in exchange for hemodialysis, to reduce the incidence of EPS. Studies indicate that tamoxifen was used alone or combined with steroids at the recommended dose for EPS treatment at 10mg-40 mg/day per day. There is currently no consensus on the type, use or dosage of steroids. It is recommended to adjust the dose according to the patient's condition to methylprednisolone 500 mg-1000 mg/day 2-3 days or prednisolone 0.5mg-1mg/kg/day before decreasing gradually. The treatment is about 1 month to 1 year. More large and rigorous clinical trial data are still needed in the future.

Analysis of rationality of drug prescription of dihydroergotamine

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Introduction: The Taiwan Food and Drug Administration (TFDA) has issued warnings regarding ergot derivatives due to their potential to increase the risk of fibrosis—an excessive formation of connective tissue that may damage organs and bodily structures—and symptoms of ergot poisoning, such as spasms and impaired blood circulation. The TFDA has limited the indications for dihydroergotamine to the treatment of migraines, and for dihydroergotoxine to adjuvant treatment of dementia. Additionally, the TFDA has updated the package insert to warn that concurrent use with strong CYP3A4 inhibitors may cause rare but serious, even life-threatening, cranial and peripheral ischemia. This study explores the rationality and safety of using dihydroergotamine for migraine treatment.

Method: This study retrospectively assessed patients hospitalized and prescribed dihydroergotamine from January 2023 to January 2024. It evaluated the indications for use, the appropriateness of the prescriptions, and monitoring of liver and kidney function (as dysfunction may delay drug metabolism or excretion). It also considered age, contraindications, drug interactions (notably the increased blood concentration and vasoconstrictive effects when combined with CYP3A4 inhibitors), and adverse reactions.

Results: The study included 22 patients, with an average age of 68 years (11 men and 11 women). Among them, only 4 patients (18%) had migraine as an indication; 8 patients (36%) were treated for headache, and 10 patients (46%) had no clear indication. Treatment departments included: Neurology: 5 patients (23%), Infectious Diseases: 2 patients (9%), Gastroenterology: 2 patients (9%), Urology: 2 patients (9%), Respiratory and Thoracic: 2 patients (9%), Orthopedics: 2 patients (9%), Obstetrics and Gynecology, Nephrology, Plastic Surgery, General Surgery, Psychiatry, General Medicine, and Allergy and Immunology: 1 patient each. Renal function monitoring before administration showed 50% of patients had normal function, while 50% had abnormal function. Liver function was normal in 77% and abnormal in 23%.

No patients were prescribed CYP3A4 inhibitors. No adverse reactions were reported. Contraindications included 1 patient with angina and 2 patients with coronary artery disease. These patients were informed of the contraindications, the drug was not administered, and it was not resumed during follow-up.

Discussion and Conclusion: Dihydroergotamine is indicated for the treatment of migraines. Three patients had dementia as an indication; these patients were originally prescribed dihydroergotoxine prior to hospitalization at another facility. However, dihydroergotoxine was not available at the time of hospitalization, and the physician mistakenly prescribed dihydroergotamine instead. The pharmacist identified the medication error, contacted the physician, and recommended correction and withdrawal of dihydroergotamine.

The European Medicines Agency (EMA) Committee for Medicinal Products for Human Use (CHMP) has recommended that drugs containing ergot derivatives should not be used for circulation, memory, or sensory-related issues, or for migraine prevention, due to the high risk of fibrosis and ergot poisoning symptoms such as cramps and impaired circulation.

Additionally, it is important to note that dihydroergotamine must not be used in combination with strong CYP3A4 inhibitors such as ceritinib, cobicistat, protease inhibitors (e.g., ritonavir), antifungal drugs (e.g., itraconazole, posaconazole, voriconazole), and macrolide antibiotics (e.g., erythromycin, clarithromycin).

Local antibiogram development for enhanced diagnosis and treatment of urinary tract infections: A case study from a quaternary hospital in Ghana

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Introduction: Urinary tract infections (UTIs) are a prevalent global health issue, particularly affecting women, and are primarily caused by bacteria like Escherichia coli (E. coli). Rising antibiotic resistance, worsened by limited diagnostics and misuse in Ghana, leads to treatment failures, higher costs, and severe complications like urosepsis. Understanding local pathogen susceptibility through studies can guide facility-specific antibiograms, ensuring effective treatment and better patient outcomes, particularly in newer hospitals like the University of Ghana Medical Centre (UGMC). Aim: To assess the susceptibility patterns of uropathogens among patients to establish an antibiogram for the management of urinary tract infections at UGMC.

Method: A retrospective cross-sectional study was conducted at UGMC between January 1st to December 31st 2023. The list of all patients whose urine sample were collected to be tested due to a suspicion of a UTI within the study period was generated from the Healthpro. Data on bacterial culture and antibiotic susceptibility testing were extracted and entered into a carefully designed data collection tool, anonymized to ensure patient confidentiality. Data were analyzed using descriptive statistics and logistic regression to determine associations between UTI presence, patient demographics, and antibiotic resistance patterns.

Results: Of the 3,426 patient samples analyzed, prevalence of UTIs was 16.4% (95% CI: 5.2-17.7), with 563 out of 3,427 urine samples showing significant bacterial growth (>1.0x10^5 CFU/ml). UTIs were more prevalent in women (70.6%) and individuals aged 20-40 (33.2%). Multivariate analysis, which adjusted for other factors, demonstrated that females had a statistically significant increase in the odds of having a UTI compared to males (Adjusted Odds Ratio [AOR] 1.34, 95% CI;1.09-1.67, p=0.008). Multivariate analysis also confirmed a strong association between age and UTI, with older age groups exhibiting progressively higher odds of UTI compared to the 0-19 age group ($p < 0.05$). E. coli was the most prevalent pathogen, accounting for 52.7% of all isolates. Notably, a significantly higher proportion of E. coli isolates were found in females (76.1%) compared to males (23.9%). The ESKAPE organisms, which are known for their antibiotic resistance, showed the following prevalence: Enterococcus faecalis (0.2%), Staphylococcus aureus (0.8%), Klebsiella pneumoniae (6%), Acinetobacter spp. (2%), Pseudomonas aeruginosa (7.1%), and Enterobacter spp. (6.6%). Escherichia coli was also the most common pathogen across all age groups, with the highest prevalence observed in the 20-40 age group (34.0%) and the 61-80 age group (31.9%). Antibiotic susceptibility testing revealed that Meropenem (n=367/391, 93.4%), Fosfomycin (n=126/140, 90.0%), and Amikacin (n=332/390, 85.1%) exhibited the highest sensitivity rates. Conversely, high resistance rates were observed for Ampicillin (n=218/237, 91.9%), Co-trimoxazole (n=247/321, 76.9%), and Amoxicillin-Clavulanic acid (n=190/281, 67.6%).

Conclusion: High antibiotic resistance, especially to common drugs, and widespread multidrug-resistant organisms present a major clinical challenge. Meropenem, Fosfomycin, and Amikacin showed favorable sensitivity, but resistance trends demand evidence-based empirical therapy guided by local antibiograms. This study offers baseline data for UGMC, supporting effective treatment strategies and urgent antimicrobial stewardship in UTI management.

Assessment of antimicrobial prescribing patterns: A longitudinal point prevalence survey analysis in a quaternary healthcare facility in Ghana

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Introduction: Antimicrobial resistance (AMR) is a growing global health threat. One of the leading causes for the increase in resistance to antimicrobials in medical institutions is irrational use, which is associated with adverse medical, social and economic consequences on a global scale. Antibiotic stewardship programs (ASP) are critical in optimizing prescriptions, reducing resistance, and improving patient outcomes. Point prevalence surveys (PPSs) have established themselves as a convenient, low-cost and valid methodology for monitoring the antibiotic use in clinical settings

Aim: To assess the prescribing patterns and quality indicators of antimicrobial prescriptions in a quaternary healthcare facility using a longitudinal PPS.

Method: Three-point prevalence surveys were conducted in 2021, 2023 and 2024 using the World Health Organization's Global point prevalence survey (GPPS) tool. Medical records of all in-patients on admission at 8am on specific days in the respective years were reviewed for antimicrobial use in the survey. Data on antibiotic use, including indications for use and the presence of quality indicators, were documented using a web-based data collection tool on the GPPS platform. This data was exported and analyzed using the R programming language.

Results: The study revealed a significant decline in overall antibiotic prevalence from 77% to 50% over the study period, with pneumonia and skin/soft tissue infections accounting for 45% of all infections. Cephalosporins constituted 40% of prescriptions, with Ceftriaxone being the most prescribed antibiotic (34.3%). Surgical prophylaxis represented 23% of prescriptions, primarily involving Ceftriaxone and Cefuroxime, though 67% of cases exceeded the recommended one-day duration. In the Adult Medical Ward, Ceftriaxone, Clindamycin, and Meropenem comprised over 50% of prescriptions. WHO AWaRe classification analysis showed that two-thirds of adult prescriptions fell under the WATCH category (decreasing over time), while 52% of pediatric prescriptions were in the ACCESS category. Guideline compliance remained robust at around 90%, with significant improvements in stop/review date documentation (50% to 90%). However, biomarker-based treatment slightly declined, and empirical prescribing increased.

Conclusion: This study underscores the positive impact of sustained antimicrobial stewardship interventions, as evidenced by the significant reduction in antibiotic prevalence and improved documentation practices. However, challenges such as prolonged surgical prophylaxis, increased empirical prescribing, and high use of WATCH category antibiotics highlight the need for targeted stewardship efforts in high-risk areas. Continued focus on optimizing prescribing practices, particularly in surgical settings and adult medical wards, is essential to further mitigate antimicrobial resistance risks and enhance patient outcomes.

The role of the pharmacist in preventing errors at transitions of care

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Background: Transitions of Care (ToC) are often complex and high-risk medication related environments, particularly in the geriatric population. In 2017, the World Health Organisation (WHO) identified medication – related harm during ToC as a global priority. More than 50% of medication errors occur when patients are transferred from one healthcare setting to another. Pharmacists are uniquely positioned to address medication safety challenges, improve therapeutic outcomes and advocate for vulnerable patients, whilst also collaborating with hospital doctors, general practitioners (GPs), patients and their families. In engaging in complex medication review, pharmacists play a critical role in facilitating the patients' safe transition from the hospital to community setting.

Purpose: To retrospectively evaluate the impact of the ToC Pharmacist in improving medication related outcomes for elderly patients discharged from hospital.

Method: Data was collected over a 3-month period from November 2024 to January 2025. Patients eligible were greater than 65 years and lived within the Sutherland Shire catchment area, Sydney. Pharmacist led interventions included medication reconciliation, medication counselling, arrangement of Dose Administration Aids (DAAs), medication lists and liaison with healthcare professionals. Pharmacist recommended interventions included deprescribing or commencing medication when appropriate, and pathology investigations.

Results: A total of 85 patients were referred to and reviewed by the ToC Pharmacist between November 2024 and January 2025. Of these patients, 54 (63.5%) were female, 31 (36.5%) were male, and the median age was 83.25 years. The pharmacist conducted medication reconciliation for 78 patients (91.8%) and provided medication-specific education

to 77 patients (90.6%). Patient-friendly medication lists were created for 17 patients, and DAAs were arranged for 18 patients, ensuring effective and comprehensive medication management. Additionally, the ToC Pharmacist facilitated communication between the hospital and general practitioners (GPs). Communication with the GP, either by phone or consult letter, occurred for 28 patients (32.9%), resulting in 27 patients having known medication changes, of which deprescribing occurred in 92.6% of these patients. Pathology investigations were recommended in 15 patients. The ToC Pharmacist also ensured medication safety, by removal of expired stock or medication no longer used in 40 instances (47%) from the patients' home.

Conclusion: The ToC Pharmacist plays a critical role in advocating for comprehensive patient care, by bridging the gap between hospital and community care. Engagement and communication pathways with GPs are challenging given the demanding environment of community healthcare. Increased education regarding the service, as well as optimising channels for discussion may promote further input between the pharmacist and GP, and therefore, improve patient outcomes. Future interventions should investigate more effective communication pathways with GPs to increase uptake of the service.

Transition from manual dispensing to dose packed medicine: Maximizing time savings and optimizing workflows in nursing homes

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Introduction: Medication administration in nursing homes is a resource-intensive process where staff manu-ally dispense medication to residents. This can lead to errors, increased workload, and ergo-nomic challenges for staff. Transitioning to dose packed medicine can optimize workflows, free up time for care tasks, and improve quality and patient safety. This project examines the effects of implementing dose packed medicine at Ørbygård Nursing Home, Urban area of Copenhagen.

Purpose: The purpose of the project was to reduce nursing staff's time spent on medication dispensing by implementing dose packed medicine for as many residents as possible. We aimed to:
•Free up nursing staff resources for other tasks.
•Increase patient safety.
•Reduce medication waste.
•Develop a generic workflow model for transitioning to dose packed medicine with a clear responsibility allocation.

Method: The project was conducted in collaboration between the Herlev-Gentofte Unit, the Capital Region Pharmacy, Ørbygård Nursing Home, and Familielægerne (doctors) in Rødovre Munic-ipality. The method included:
•Mapping the existing medication management process.
•Identifying suitable residents for dose packed medicine.
•Implementing dose packed medicine with a multidisciplinary team of pharmacists, doctors, dispensing pharmacy, social and health assistants, and nurses.
•Roll out the transition to dose packed medicine gradually.
•Developing flowcharts and clear responsibility allocations for initiation and changes.
•Measuring saved time, workload and numbers of residents transitioned to dose packed medicine.

Results:
•57% of residents were transitioned to dose packed medicine.
•Nursing staff avoided manually dispensing 6,792 tablets and pressing 3,000 tablets out of blister packs over a 14-day period.
•Reducing 2/3 of the nursing staff's time spent on dispensing medicine freed up two full workdays per 14-day period for other care tasks.
•Implemented a structured workflow with clear responsibility distribution among nurs-ing staff, pharmacists, doctors, and dispensing pharmacy.
•Nursing staff experienced reduced physical strain related to medication dispensing.

Conclusion: The transition to dose packed medicine has resulted in a significant reduction in nursing staff's time consumption, freeing up valuable work hours that can now be dedicated to resi-dent care. The project has demonstrated that successful implementation requires clear respon-sibility allocation, continuous dialogue with involved parties, and a gradual rollout to ensure stable operation. The experiences from the project have been shared with other nursing homes and home care services in the municipality, and pharmaceutical follow-up will continue in 2025 to support the workflows.

The role of outpatient pharmacists in tuberculosis treatment tracking: A case report

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Background: In Taiwan, the high patient volume in outpatient clinics limits follow-up opportunities. Compared to inpatients, outpatients have a lower frequency of visits, making it difficult for pharmacists to track patient's medication adherence, adverse drug reactions, and treatment outcomes. Tuberculosis requires long-term treatment. It is crucial and

highly important for outpatient pharmacists to intervene early in the treatment process.

Aim: To explore the role of outpatient pharmacists in managing adverse drug reactions and adherence of tuberculosis treatment in scheduled outpatient appointment time.

Case presentation: A 43-year-old woman was diagnosed with tuberculosis in an outpatient clinic. She developed allergic reactions, including skin rash and eye swelling, after receiving a four-drug treatment with isoniazid, rifampin, ethambutol, and pyrazinamide. Then, she discontinued the four-drug regimen. Considering the convenience of follow-up visits, the physician decided to reintroduce one anti-tuberculosis drug per week as part of the desensitization trial. After reintroducing rifampin, she developed a widespread skin rash, leading to a switch to rifabutin. During rifabutin treatment, she developed fever and headache. A virus infection was ruled out through blood tests, and acetaminophen was administered. The physician planned to treat with isoniazid, rifabutin, and pyrazinamide for two months, with ongoing monitoring for tolerance to rifabutin and overall treatment adherence.

Discussion: During the desensitization trial, the physician scheduled weekly follow-up visits. This weekly follow-up allowed pharmacists to regularly track the patient's medication pick-up times and monitor her treatment more effectively. The team took a proactive approach to assess the patient's medication adherence and monitor potential adverse drug reactions. At each medication dispensing following the clinic visit, the team asked about any new or ongoing side effects, including situation, severity, and impact. The patient reported persistent allergic symptoms after switching to rifabutin. However, the symptoms were relieved with antihistamines and corticosteroids and became tolerable. After the desensitization trial, the number of pills increased from four to eight. Pharmacists asked whether this increase affected the patient’s daily medication routine. The patient stated that she could take the eight pills of medication per time. With a weekly frequency of pharmacist interventions and medication education, these proactive interventions helped identify adverse reactions early and discuss the treatment plan with the physician promptly, and minimize therapy disruptions. Whether the patient experiences further adverse reactions and any changes in adherence will remain key focus points for ongoing follow-up.

Conclusion: This case highlights how pharmacists in outpatient clinic play a key role in identifying and managing adverse drug reactions, improving adherence, and ensuring effective tuberculosis treatment. Continuous monitoring and collaboration with the healthcare team remain crucial for optimal patient outcomes.

Effect of admission medication reconciliation program developed by multidisciplinary team at Rajavithi Hospital

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Background: According to fiscal year 2023 statistics, 35,244 new patients were received. A total of 6,835 patients received admission medication reconciliation, which was 20.68 percent of all first-time patients. This is lower than the target set, which is the process of coordinating the first drug list to receive ≥ 80 percent. To determine problems that affect the process of coordinating the first list of medicines, 55 nurses were interviewed in July 2022. It was found that the most common problem was the process of entering new drug list information into the computer system. The old system is still ineffective in providing workers with access to actual work information. This led to the multidisciplinary team developing and improving the program for medication reconciliation during admission.

Purpose: To evaluate the results of the program for admission medication reconciliation. This is intended to be used for sharing patient drug information with multidisciplinary teams. To investigate the problems, obstacles, and overall satisfaction of a multidisciplinary team. The program is intended to be utilized for medication reconciliation during admission and to be used as a basis for further program development.

Method: Develop a program to coordinate the list of first-time medicines. To simplify the process of searching for information on the original medication list for workers. The patient's previous medication list for the past 6 months will be processed by the program to provide the doctor with information to consider when selecting. Secondly, a clarification process is conducted to determine whether the previous and present medicine are the same. If there are any differences from the list, the pharmacist will notify the doctor. All data was analyzed by the pharmacist regarding the rate of medication errors during admission.

Result: Based on the information provided regarding the coordination of the first drug list received by the program in July 2024 and August 2024, 6036 new patients were received, and admission medication reconciliation was performed on a total of 5,425 patients, which accounted for 89.88 percent of the total number of first-time patients received. The percentage of medication errors decreased from 8.17 percent to 0.58 percent from baseline.

Conclusion: Patient safety against medication errors is enhanced by coordinating drug lists. To achieve maximum results, a team of relevant multidisciplinary teams, including doctors, nurses, and pharmacists, collaborated on medication reconciliation. An admission medication reconciliation

program that was developed by a multidisciplinary team appears to reduce medication errors compared to the old system.

From dispensing to direct patient care: Hospital pharmacists' perspectives on clinical pharmacy transition in Sri Lanka: A study protocol

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Introduction: Pharmacists are integral members of multidisciplinary healthcare teams, contributing significantly to patient care by promoting the responsible and effective use of medications. Clinical pharmacy services optimize the utilization of medications through practice and research to achieve patient-centered and public health goals. State hospital pharmacists in Sri Lanka largely remain within the traditional framework, with limited integration into clinical decision-making processes. In the Sri Lankan state sector hospitals, the role of a clinical pharmacist is not an officially established position. Currently, pharmacists in Sri Lanka are not fully integrated into the multidisciplinary healthcare team. Their role is primarily confined to dispensing medications, compounding, and offering limited information about medications to patients. In comparison to many other countries, the role of hospital pharmacists in Sri Lanka is underutilized, with clinical pharmacy still awaiting recognition as a distinct area of pharmacy practice.

Aim: This study will aim to assess the perceptions of hospital pharmacists in Sri Lanka on their current roles in healthcare delivery and their willingness to transform into clinical pharmacy practice.

Methods: A quantitative, descriptive, cross-sectional study will be conducted among all the state hospital pharmacists in Sri Lanka working across various levels of care (tertiary, secondary, and primary). Pharmacists with at least one year of experience in Sri Lankan hospital settings will be included in the study, and intern pharmacists will be excluded. A validated, pretested, self-administered questionnaire will be utilized for data collection. The questionnaire will be incorporated into a Google Form and shared among pharmacists via email and the WhatsApp platform. The questionnaire will be developed in English and administered in the English language as pharmacists are working in the English language. Informed electronic consent will be obtained from participants before the commencement of data collection. Anonymity and confidentiality will be maintained throughout the study.

Results: Ethics approval for this study was obtained from the Ethics Review Committee of National Hospital, Sri Lanka. Descriptive statistics will be used to summarize demographic and perception data. Chi-square tests will be used to assess associations between demographic factors and perceptions of the current role. Logistic regression analysis will be used to identify predictors of willingness to transition into clinical pharmacy. The study will be completed by June 2025.

Conclusion: This study will provide critical insights into Sri Lankan pharmacists' perceptions of their current role as state hospital pharmacists. Further, this study will determine the readiness of the Sri Lankan state hospital pharmacy workforce for transformation into the role of clinical pharmacists. Findings will serve as a foundation for capacity-building initiatives and promote evidence-based integration of pharmacists into multidisciplinary healthcare teams. This study will provide the groundwork for understanding and enhancing the role of state hospital pharmacists in Sri Lanka, aligning with global trends towards clinical pharmacy.

Impact of clinical pharmacist-led interventions on preventing medication errors in surgical intensive care unit patients

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Introduction: Efforts to reduce medication errors in the hospital setting may be insufficient for critically ill patients, leading to potential harm and increased healthcare costs. Although pharmaceutical care has been shown to improve patient outcomes, evidence on the effectiveness of integrating clinical pharmacist into surgical intensive care teams and the financial benefits remains limited. The aim of this study was to evaluate the impact of clinical pharmacist-led interventions on preventing medication errors in surgical intensive care units (ICUs).

Method: This retrospective study analyzed patients admitted to the surgical ICU between January 2013 and September 2020 in a medical center in Taiwan. During the intervention period (2015-2020), clinical pharmacists reviewed the medication orders to identify potential errors, conducted medication reconciliation and actively provided recommendations during multidisciplinary ward rounds. Identified medication errors were recorded and categorized. The clinical impact was evaluated by comparing the rate of pharmaceutical interventions in preventing medication errors between the intervention and baseline periods. The economic impact was assessed by calculating cost avoidance from preventable adverse events (ADEs) resulting from interventions, expressed in US dollars.

Results: During the intervention period, a total of 1,138 pharmaceutical interventions were implemented to address medication errors, representing a significant increase compared to the baseline period (9.48 vs. 56.67 per 1000 patient hospital-days). The most common category of medication errors involved dosing and frequency (41.21%), while the majority of interventions targeted antimicrobial agents (34.39%). Overall, 91.83% of these interventions were accepted, leading to an estimated annual cost avoidance of $27,976.81 from preventable ADEs.

Conclusion: Clinical pharmacist-led interventions significantly enhanced the detection and prevention of medication errors in the surgical ICU, while also generating substantial cost savings. However, the error rate remained high, highlighting the need for additional quality improvement strategies.

The efficacy and safety of eliminating 5-Fluorouracil Bolus versus keeping 5-Fluorouracil Bolus from FOLFOX and FOLFIRI Regimen: A retrospective study

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Introduction: FOLFOX and FOLFIRI are multidrug chemotherapy regimens that include 5-Fluorouracil (5-FU) and are commonly used to treat various cancers, such as colorectal and gastric cancer. However, the role of the 5-FU bolus in these regimens remains controversial. This study evaluates the differences in efficacy and safety between bolus and non-bolus administration of 5-FU in FOLFOX and FOLFIRI regimens.

Methods: This retrospective study assessed the efficacy and safety of patients treated with FOLFOX or FOLFIRI for six months or 12 cycles at Taipei Tzu Chi Hospital between January 2022 and September 2024. Efficacy was evaluated based on mortality rates and median overall survival, while safety outcomes were determined by analyzing the incidence of 17 common side effects. Continuous variables were compared using the t-test, and categorical variables were analyzed using the Chi-squared test to examine differences between the bolus and non-bolus groups.

Results: A total of 87 patients were included in the study, with 17 in the bolus group and 70 in the non-bolus group. No significant differences were observed in mortality rates (11.8% vs. 7.1%, $p = 0.895$) or median overall survival (20.8 vs. 18.3 months, $p = 0.701$) between the two groups. Similarly, the incidence of non-hematologic side effects was not significantly different ($p > 0.05$ for all comparisons). However, the event rate of grade 2 anemia was significantly higher in the non-bolus group compared to the bolus group (0% vs. 31.4%, $p = 0.018$). Subgroup analysis revealed no significant difference in grade 1 anemia rates (17.6% vs. 35.3%, $p = 0.437$), while the difference in grade 2 anemia rates was borderline significant (0% vs. 29.4%, $p = 0.053$).

Conclusion: The inclusion of a 5-FU bolus in FOLFOX and FOLFIRI does not impact efficacy or non-hematologic toxicity. However, further studies are required to clarify the safety differences, particularly concerning anemia, between the bolus and non-bolus groups in multidrug chemotherapy.

Establishing and evaluating a pharmacist-led program for anticholinergic deprescribing in dementia patients: A pilot study

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Background: Anticholinergic medications are commonly prescribed to elderly patients. However, a high anticholinergic burden may cause cognitive impairment in otherwise cognitively healthy individuals and cause further cognitive decline in those with dementia. Reducing anticholinergic burden through deprescribing interventions may help slow the progression of cognitive decline, particularly in patients with mild dementia. Although deprescribing anticholinergics in patients with dementia is challenging, prior studies have demonstrated that pharmacist-led interventions tend to be the most effective among various approaches.

Purpose: To reduce unnecessary anticholinergic exposure, a pharmacist-led deprescribing program was established and evaluated.

Methods: The pharmacist intervention was implemented in two phases, each lasting three months: Phase I (2023/06-2023/09) targeted inpatients, while Phase II (2023/10-2023/12) focused on outpatients visiting the Neurology department. Dementia patients, especially those receiving acetylcholinesterase inhibitors (AchEi) were enrolled in the program. Clinical pharmacists performed medication reconciliation and collected data on patients' cognitive function using the Mini-Mental State Examination (MMSE) and the Clinical Dementia Rating (CDR). For patients with a CDR score of 0.5 or 1, anticholinergic burden was assessed by using the Anticholinergic Cognitive Burden (ACB) scale. The necessity of anticholinergic medications was determined based on the patients' disease conditions, signs, and symptoms as documented in their medical records. If

anticholinergics were deemed unnecessary or could be substituted with alternative medication without anticholinergic activity, pharmacists utilized the e-message system to consult with physicians and provide tailored recommendations optimizing anticholinergic management strategies. Physicians received these suggestions upon logging in to the hospital information system (HIS) and during the prescription process for their patients.

Results: During phase I, 67 inpatients underwent cognitive function examinations and were enrolled in medication reconciliation. Of these, 18 patients (26.9%) had a CDR score of 0.5 or 1, with 12 exhibiting a higher anticholinergic burden. Pharmacists recommended deprescribing for 6 patients, and all recommendations were accepted by physicians. Pharmacists noticed that most inpatients required anticholinergics to manage acute symptoms, such as delirium, making deprescribing during hospitalization particularly challenging. In phase II, 88 patients with an ACB scale ≥3 who were undergoing AchEi treatment were identified. Among these, 66 patients were enrolled in medication reconciliation. Pharmacists provided recommendations for 31 patients (46.97%), with an acceptance rate of 54.83%. The most common interventions included deprescribing quetiapine (n=17) and imipramine (n=8). Among the accepted strategies, 52.9% involved substitution with alternative agents (n=9), followed by dose reduction (n=4) and discontinuation (n=4).

Conclusion: A pharmacist-led anticholinergic deprescribing program effectively reduced unnecessary anticholinergic burden in patients with dementia. However, in this pilot study, the process was time-consuming as pharmacists needed to retrieve information from multiple systems. To enhance efficiency and broaden the scope of pharmaceutical care, a visual platform that integrates appointment schedules, drug profiles, and cognitive function examination reports is crucial for comprehensive evaluation. Additionally, establishing well-defined deprescribing protocols for common anticholinergics in different clinical scenarios through consensus meetings with specialists is essential.

Improvement of impaired consciousness in a traumatic brain injury patient treated with Cerebrolysin: A case report

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Introduction: Cerebrolysin is a neuropeptide and amino acid mixture derived from porcine brain tissue through enzymatic hydrolysis. It closely mimics endogenous neurotrophic factors, which are essential for neuronal survival and repair. Here, we present a case report demonstrating the improvement of impaired consciousness in a traumatic brain injury (TBI) patient treated with Cerebrolysin.

Case Description: A 19-year-old female sustained a severe TBI in a motor vehicle accident, requiring emergency craniectomy and decompressive surgery. Postoperatively, she remained in a state of impaired consciousness and was admitted to the intensive care unit (ICU) for further management. Despite receiving standard TBI treatments, including high-osmotic diuretics and sedatives, her Glasgow Coma Scale (GCS) score remained at E2VEM1, indicating minimal neurological response. Given the lack of significant improvement, the medical team initiated Cerebrolysin therapy at 2152 mg (10 mL/amp) 3 amp QD for 10 days following multidisciplinary consultation. After treatment, the patient showed marked neurological improvement, and mechanical ventilation was successfully weaned. Her GCS score improved to E4V4M6, and she regained the ability to produce single words in response to family interactions. Continued neurological recovery was observed after her transfer to the general ward.

Discussion: TBI is a major cause of long-term disability, with many survivors experiencing persistent cognitive and motor impairments. Current treatment strategies primarily focus on stabilizing intracranial pressure and preventing secondary injury, but there are limited options to promote direct neuronal recovery. Cerebrolysin has been studied for its neuroprotective properties, including reducing neuroinflammation, oxidative stress, and neuronal apoptosis. While widely used in stroke rehabilitation, its application in TBI remains less established due to differences in injury mechanisms and clinical responses. A systematic review by Jarosz et al. (2023) suggests that Cerebrolysin may improve neurological outcomes in TBI patients; however, optimal dosing and treatment duration remain uncertain. The review highlights variability in clinical trials, with doses ranging from 10 mL to 50 mL daily, leading to inconsistent results. Additionally, differences in injury severity and patient characteristics further complicate treatment efficacy assessments. Our case report contributes to the growing evidence supporting Cerebrolysin's potential in enhancing consciousness recovery in TBI patients. However, further large-scale randomized controlled trials are needed to establish definitive guidelines for its clinical use.

Conclusion: Cerebrolysin demonstrates potential benefits in improving consciousness levels in TBI patients, but further research is necessary to validate its efficacy and safety. Pharmacists play a crucial role in optimizing treatment strategies, ensuring appropriate dosing regimens, and monitoring patient responses to enhance therapeutic outcomes. Future efforts should focus on developing standardized protocols and interdisciplinary collaboration to integrate Cerebrolysin into TBI management effectively. As pharmacological advancements in neuroprotection continue, pharmacists can contribute by guiding evidence-based medication use, minimizing adverse effects, and supporting individualized patient care in neurological rehabilitation.

Innovative standardized medication distribution system in provincial correctional facilities in Alberta, Canada

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Background information: Most correctional facilities in Canada obtain medications in blister packs from community pharmacies or nursing floor stock. They have no or limited pharmacy staff on site for clinical or distribution tasks. There is a paucity of data on best practices for pharmacy in correctional facilities.

Alberta Corrections is made up of eight adult and two youth facilities across the province providing care for 3500 incarcerated individuals at any given time. Historically, pharmacy distribution services were available at varied levels at two sites, and clinical pharmacy services available at four sites. An Electronic Health Record (EHR) was launched, which allowed for unit dose and multidose pouch pack medication distribution system through centralized pharmacy services alongside the electronic chart.

Purpose: To describe the implementation of a centralized pharmacy services model to provide standardized dispensary services to all provincial correctional facilities in Alberta.

Method: A team of pharmacy management, site pharmacists designated as implementation leads (ILs), provincial informatics and technology leads developed processes and workflows to employ the system into the front line. They worked together to create workflows for medication procurement and distribution, barcoding and unit dose supply. The EHR team engaged the ILs and management in the build of the system to ensure the architecture of the software reflected current practice.

Six acute care sites and one centralized production facility were recruited for the provision of week-long multi dose pouch packs to neighboring correctional facilities. Two correctional facilities were designated as distribution centers to provide unit dose week-long medication packages to all ten correctional facilities within the province. Couriers were contracted to ensure timely delivery of unit dose medications and pouch packs.

Results: A standardized medication distribution system was implemented across Alberta Provincial Correctional facilities. These services were centralized at pharmacy departments in two correctional facilities, which then provide distribution services to all ten provincial correctional facilities. These two sites arrange unit dose and bulk medication supply and execute barcoding activities, ensuring closed loop medication management. Acute care sites provide pouch packs to neighboring correctional facilities on a weekly basis for patients who are self-administering medications.

Through the implementation of EHR, Alberta Corrections maintains a shared healthcare record with public healthcare sites around the province. The EHR utilizes Computerized Prescriber Order Entry, where physicians directly enter orders into the system. Every order is assessed for appropriateness and verified by a pharmacist through a single verification queue for all provincial correctional facilities. Order verification pharmacists triage clinical issues to staff and are accessible for drug information questions for all sites.

Conclusion: A single system EHR facilitated the creation of a centralized and standardized closed loop distribution medication system, making it an innovative approach to medication provision in corrections. Collaborating with local acute care sites allowed for creative approaches for patient autonomy with pouch packs. This change resulted in upholding safe and standardized patient care for vulnerable populations across sites with variable pharmacy staffing.

The effectiveness of establishing a guidance for the off-label use of atropine 1% eye drop in patients with clozapine-induced sialorrhea

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Introduction: Clozapine, a second-generation antipsychotic, is often used in treating refractory schizophrenia, but 13-48% of patients experience excessive salivation (clozapine-induced sialorrhea, CIS) which can negatively affect clozapine adherence. Recently, off-label use of sublingual atropine 1% eye drop to manage CIS has increased in our hospital, alongside a rise in concern of adverse effects. Inappropriate use of sublingual atropine 1%, such as applying the drops in the eyes, may led to pupil dilation and blurred vision. Furthermore, sublingual atropine is rapidly absorbed and could increase the risk of systemic side effects, including arrhythmias, hypotension, delirium and even fetal case as ingesting an entire bottle of atropine eye drops.

Aim & Objectives: To reduce potential adverse effects, we developed and evaluated the usefulness of a prescription guidance for off-label use of atropine 1% eye drop in patients with CIS.

Method: This study was conducted in a psychiatric specialized hospital in Northern Taiwan. After a comprehensive literature review, we proposed a prescription guidance which was subsequently approved by our hospital Drug Management Committee and built a warning box in Hospital Information System. The usefulness of this prescription guidance was evaluated by comparing changes in prevalence of inappropriate prescriptions before and after intervention, especially focusing on inappropriate dosing and

administration route. Chi-squared test were used for differences statistics.

Result: In the year of 2024, a prescription guidance that a daily dosing limit of no more than four drops of atropine sublingually for CIS patients was proposed and implanted, as well as a warning box was integrated into the Hospital Information System. A total of 757 prescriptions from 182 patients with median age of 52 (14 to 84) years and 85(46.7%) was male were analyzed. Among them, 156 (85.7%) and 23(12.6%) patients are diagnosed with schizophrenia spectrum and other psychotic disorders (ICD-10-CM: F20-F29) and mood disorders (ICD-10-CM: F30-F39), respectively. After a 5-month guidance implantation period, the prevalence of improper routes (13/535, 2.43% and 0/222, 0.00%, respectively; p-value=0.014) and exceeding the recommended dose (41/535,7.66% and 6/222, 2.70%, respectively; p-value= 0.009) significantly reduced than baseline.

Conclusion: Current evidence regarding the safety and efficacy of off-label atropine 1% eye drops for the management of CIS remains limited. To enhance patient safety, it is beneficial to incorporate evidence-based prescription guidance into the Hospital Information System.

A network meta-analysis of antipsychotic agents in the treatment of delirium in clinical ill patients

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Introduction: Delirium is a common neurological complication among ICU patients, with an incidence reaching up to 50%. It is associated with increased risks of prolonged hospitalization and mortality in critically ill individuals. Haloperidol is frequently used for delirium management in the ICU, while atypical antipsychotics have also been considered as potential treatment options. However, the available evidence remains limited, and current guidelines do not support their routine use. This network meta-analysis systematically evaluates the effectiveness of antipsychotics in treating delirium in critically ill patients.

Method: A comprehensive electronic search was conducted across PubMed, Embase, and the Cochrane Library, with no restrictions on language or publication date. Randomized controlled trials evaluating the efficacy of antipsychotics in the management of delirium among critically ill patients were eligible for inclusion. The primary outcome assessed was the duration of delirium, while secondary outcomes included mortality, hospital length of stay, ICU length of stay, and adverse events. Given the inclusion of multiple treatment strategies, random-effects model was employed for the network meta-analysis. Statistical analyses were conducted using MetaInsight under a frequentist framework.

Results: This network meta-analysis included a total of 10 randomized controlled trials, involving 2,275 critically ill patients. The antipsychotics evaluated in the included studies were haloperidol, quetiapine, ziprasidone, and olanzapine. Among these agents, quetiapine demonstrated a statistically significant reduction in delirium duration compared to placebo (mean difference: -3.33 days; 95% CI: -5.72 to -0.94). In contrast, ziprasidone (mean difference: -0.33 days; 95% CI: -0.99 to 0.33) and haloperidol (mean difference: 0.07 days; 95% CI: -0.52 to 0.67) did not show a significant difference relative to placebo. Furthermore, no statistically significant differences were observed between any antipsychotic and placebo in terms of mortality, hospital length of stay, ICU length of stay, or the incidence of adverse events.

Conclusion: In conclusion, quetiapine demonstrates potential in reducing delirium duration among critically ill patients treated with antipsychotics. However, due to the limitations of the existing evidence, further more randomized controlled trials are warranted to confirm its efficacy and establish definitive clinical recommendations.

The impact of Midodrine on the time to discontinue intravenous Vasopressor use in ICU patients

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Background: Maintaining hemodynamic stability is an important therapeutic goal for patients in the intensive care unit (ICU). Intravenous vasopressors are the primary choice for controlling blood pressure. Persistent hypotension in patients who have otherwise been successfully resuscitated can delay their discharge from the ICU. The administration of oral vasopressors, such as midodrine, may offer a potential strategy to decrease the duration of intravenous vasopressor use and shorten ICU length of stay (LOS). Midodrine is a peripherally acting α-receptor agonist. It causes modest increases in supine and standing blood pressure in a dose-dependent manner. However, the evidence regarding its effectiveness in shortening the duration of intravenous vasopressor requirement remains conflicting.

Purpose: To evaluate impact of midodrine on non-critically ill patients with IV vasopressors.

Method: The retrospective observational study used data drawn from a single hospital. We performed an analysis of patients receiving stable or decreasing doses of intravenous vasopressors in the ICU. The study period was defined as the time between January 1, 2024, to December 31, 2024. We

sequentially excluded individuals with severe organic heart disease, liver failure, pregnancy, midodrine as pre-admission medication, any known allergies to midodrine, ongoing clinical evidence of inadequate tissue oxygenation, and no enteral route available. Eligible patients were divided into two groups based on addition of midodrine. Primary outcome is the time to vasopressor discontinuation, defined as being vasopressor-free for 24 hours. Secondary outcome is length of stay in ICU and 30-day mortality.

Results: Among 246 potentially eligible adults who were admitted to ICU with intravenous vasopressors support during the study period, 186 met the inclusion criteria (mean age 72 years [SD 11]; 102 [55%] male). Among 186 included patients, 19 received IV vasopressor with midodrine and 167 received only IV vasopressor. The baseline characteristics of the two groups only showed a significant difference in initial mean arterial pressure (mean, 62 vs 67.5 mmHg; p<0.05). The median time to discontinuation of intravenous vasopressors was 79.5 (IQR, 62.0–92.5) hours in the midodrine group and 82.6 (IQR, 61.0–95.2) hours in the other group, with no significant difference between groups (difference, 3.1 hour; 95% CI, −10.4 to 12.3 hours; p=0.82). In addition, there were no significant differences between the two groups in terms of ICU length of stay and 30-day mortality.

Conclusion: Although the analysis of the current results indicates that the use of midodrine does not affect the time to discontinuation of intravenous vasopressors, several common limitations inherent to retrospective studies may have influenced the findings. Additionally, the total sample size of the study population did not meet the required number for statistical analysis. Future studies could consider conducting prospective trials or larger-scale retrospective studies.

Improving medication safety: Analysis and outcomes of interventions for medication-related problems in hospitalized patients

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Introduction: Medication-related problems (MRPs) are a concern in healthcare systems, leading to adverse drug events, prolonged hospitalizations, poor outcomes, and higher costs. Identifying and addressing MRPs are essential for minimizing associated risks and improving patient outcomes. Studies have reported that MRPs affect up to 30% of hospitalized patients, leading to preventable harm. Managing MRPs requires systematic approaches, information system improvements, regular medication reviews, and interdisciplinary collaboration.

Aims: To analyze the types and frequency of MRPs identified by pharmacists and evaluate the effectiveness of targeted interventions in reducing MRPs.

Methods: A retrospective study was conducted in a tertiary teaching hospital in Taiwan, analyzing pharmacist-reported MRPs from clinical intervention logs between January 1, 2024, and December 31, 2024. This hospital operates within Taiwan's National Health Insurance (NHI) system, where pharmacists play a crucial role in medication safety and clinical interventions.

Several interventions were implemented to manage MRPs, including interdisciplinary communication and collaboration, along with enhancements to the information system.

A comparative analysis of MRPs was conducted between the pre-intervention (December 2023) and post-intervention (December 2024) periods. Data were analyzed using Microsoft Excel, applying descriptive statistics to evaluate the reduction in MRPs.

Results: Among the 582 MRPs reported by pharmacists, dosage errors (n = 322, 55.3%) were the most common, followed by unnecessary drug therapy (n = 141, 24.2%), inappropriate drug selection (n = 71,12.2%), inappropriate administration time or method (n = 20,3.4%), transition errors (n = 14, 2.4%), drug interactions (n = 10,1.7%), and other issues (n = 4,0.7%).

The most common issue in the 322 dosage error cases was the use of antibiotics prescribed for infection treatment (n = 201,62.4%), followed by surgical prophylactic antibiotics (n = 50,15.5%). Among the 141 cases of unnecessary drug therapy, the most frequent issue was the use of duplicate drugs or drugs with similar pharmacological actions (n = 49,34.8%), followed by combination therapy with proton pump inhibitors (PPI) and H2 blockers (n = 32, 22.7%). Based on these findings, the following interventions were implemented:First, interdisciplinary communication and collaboration were conducted through bimonthly emails sent to physicians that included pharmacists' recommendations, along with bimonthly medical conference reports. Second, the information system was enhanced to include alerts for duplicate medications, such as combinations of the same drugs or those with similar pharmacological actions. After one year of intervention, the results demonstrated a reduction in the number of MRPs across several areas. Specifically, antibiotic-related issues decreased from 11.7 to 7, surgical prophylactic antibiotics from 5.3 to 2, the use of duplicate drugs or drugs with similar pharmacological actions from 4.5 to 1, and the combination therapy of PPIs and H2 blockers from 2.6 to 2.

Conclusion: This study found that interdisciplinary communication and system improvements significantly reduced MRPs. Effective management of MRPs is crucial for improving patient outcomes and minimizing healthcare risks. Moving forward, we will continue to maintain

interdisciplinary collaboration and enhance the information system, including the implementation of automated dose recommendations based on weight or renal function, to ensure medication safety and improve patient care.

Development of a clinical pharmaceutical service promoting active ageing

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Introduction: As life expectancy is increasing worldwide, physical and psychological optimisation of care for older persons is receiving greater attention. Quality of life considerations take particular significance in ageing healthcare best practices. The older population is susceptible to a multitude of co-morbidities due to polypharmacy. Clinical pharmacists' contribution include detection and mitigation of drug-related problems (DRPs) which are more likely to happen in patients with co-morbidities especially due to polypharmacy. The aim of the study was to develop and implement a clinical pharmacy service within a long-term care facility for the elderly supporting active ageing.

Method: Phase I involved identifying standards of practice for geriatric clinical pharmacist service to meet needs of long-term care wards. Two weeks of observation (Phase I) in the long-term care wards were dedicated to identify the gaps by completing a Gap-Finding Tool for Active Ageing by the pharmacist-researcher. Phase II consisted of the development and validation of Patient Medication History on Admission and the Pharmacist Patient Profile tools, to be used in the clinical pharmacy service. Phase III consisted of attending four wards, chosen by convenience sampling, in the long-term care facility over 8 weeks and documenting pharmacist interventions. Patients included in the study were over 65 years of age and without cognitive impairment. Treatment for each patient was reviewed and problems in drugs prescribed were noted. Interventions carried out by the clinical pharmacist and communicated to prescribers and to patients were classified according to the PCNE Classification for Drug-Related Problems V9.1. Phase IV analysed the impact of the geriatric clinical pharmaceutical service among prescribers and nurses by the administration of a post-clinical service questionnaire. Phase V analysed recommendations for improving the service based on the findings from the study.

Results: Twenty-one practice guidelines, out of seventy-eight, were not being carried out at the long-term care wards. The rest of the practice guidelines were being fulfilled by other healthcare staff in the absence of a pharmacist. The Patient Medication History on Admission tool was used twice and the Pharmacist Patient Profile tool was used 40 times over the course of 8 weeks. The study population consisted of 40 patients, with a mean age of 83 years. The mean number of medications per patient was 13, the total number of DRPs identified was 126, with 240 interventions suggested by the pharmacist of which 74% were accepted and fully implemented. Drug selection was the most common cause of DRPs (n=48). Seven out of eight healthcare professionals were very satisfied with the service, while one was satisfied. Frequent medication reconciliation and reviews are recommended to prevent DRPs.

Conclusion: A clinical pharmacist engaged in geriatric long-term care setting can regularly check for interacting drugs and contraindications, assess appropriateness of drugs prescribed and optimise and personalise pharmaceutical care plans. DRPs and adverse reactions are reduced with the participation of a clinical pharmacist. Additional research could include assessing severity of DRPs identified.

Pembrolizumab related Early-Onset Pancytopenia: A case report and literature review

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Background: Pembrolizumab, a PD-1 inhibitor, is approved for treating metastatic melanoma and other malignancies. While immune checkpoint inhibitors (ICIs) are known to cause immune-related adverse events (irAEs), hematologic toxicities such as pancytopenia remain rare. This report presents a suspected case of Pembrolizumab-induced pancytopenia, emphasizing the importance of early recognition and monitoring.

Case Presentation: The patient was a 75-year-old woman with a medical history of diabetes, hypertension, hyperlipidemia, transverse colon and sigmoid cancer, and right lower lung adenocarcinoma. She had completed her third cycle of Pembrolizumab (100 mg every three weeks) on February 7. On February 19, she developed bloody stools and came to the emergency department on February 22. Laboratory tests revealed pancytopenia: hemoglobin (Hb) 4.9 g/dL, platelets (Plt) 4×10^3/μL, white blood cell count (WBC) 1,810/μL, and absolute neutrophil count (ANC) 1,458/μL. In the emergency department, she was treated with empirical antibiotics, pantoprazole, tranexamic acid, and blood transfusions. Upon admission on February 25, her treatment was adjusted due to worsening leukopenia (WBC: 790/μL, ANC: 434/μL), and granulocyte colony-stimulating factor (G-CSF) was initiated at a dose of 300 mcg/day (February 25–March 13).On February 28, the patient developed a fever, leading to blood tests and a bone marrow biopsy, which on March 2 revealed hypocellular marrow. Blood cultures were negative, but on

March 5, cultures grew Enterococcus faecium, and Vancomycin was added. Due to persistent anemia, neutropenia, and thrombocytopenia, the patient received albumin infusions for three days (March 7–March 9), along with packed red blood cells and leukocyte-reduced platelets as needed. Despite intensive supportive care, hematologic parameters failed to recover, and she passed away on March 13. On March 12, the nurse practitioner reported Pembrolizumab-induced pancytopenia. Based on the review of the clinical timeline and related adverse reactions, it is reasonable to suspect that the pancytopenia was caused by Pembrolizumab.

Discussion: A PubMed search using the keywords “Pembrolizumab” and “pancytopenia” revealed three similar case reports with a total of eighteen results. The Naranjo Adverse Drug Reaction Probability Scale score was 5, indicating a probable adverse drug reaction. The outcome was considered severe. While the average onset of pancytopenia or aplastic anemia is typically 21.7 weeks, this case developed 8 weeks after therapy, highlighting the need for early monitoring. According to Micromedex and UpToDate, hematologic irAEs from Pembrolizumab are rare, non–dose-related, and the exact mechanisms are unknown. Further research is needed.

Conclusion: Given the potential for early-onset and severe pancytopenia, routine hematologic monitoring is crucial for patients receiving Pembrolizumab, especially older individuals and those with comorbidities. Regular complete blood count (CBC) assessments should be considered, particularly within the first 8–12 weeks of therapy, to facilitate early detection and intervention. Future research should focus on identifying predictive markers for hematologic irAEs to optimize patient safety in ICI therapy.

Effectiveness and safety of idursulfase enzyme replacement therapy in infants diagnosed with Mucopolysaccharidosis II through newborn screening: A case series

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Introduction: Mucopolysaccharidosis type Ⅱ (MPS Ⅱ, Hunter syndrome) is a rare X-linked recessive lysosomal storage disorder caused by deficiency of iduronate 2-sulfatase (IDS), resulting in accumulation of glycosaminoglycans (GAGs) in multiple organ systems. Heparan sulfate and dermatan sulfate are members of GAG family, which are implicated in a number of biological processes. Enzyme replacement therapy (ERT) with recombinant human iduronate-2-sulfatase (Idursulfase) is currently the mainstay treatment. This study aimed to evaluate real-world effectiveness and safety of Idursulfase enzyme replacement therapy in infants newly diagnosed with MPS Ⅱ through newborn screening.

Method: This case series included three infants diagnosed with MPS Ⅱ via newborn screening. All patients received intravenous Idursulfase at 0.5 mg/kg weekly with premedication to prevent infusion-related reactions. Clinical presentation, urinary heparan sulfate and dermatan sulfate levels, and treatment tolerance were assessed.

Results: Case 1 and 2 were 8-months-old monozygotic twins with a hemizygous IDS gene mutation (c.1181-15C>A, intron 8). Baseline Iduronate 2-sulfatase activity were respective 2.06 and 1.54 μmol/h/L. Two patients had urinary heparan sulfate levels at 16.34 and 19.44 mg/mmol creatinine, and similar dermatan sulfate levels at 18.05 mg/mmol creatinine. Clinical features included macrocephaly, coarse facial features, Mongolian spots, and hepatomegaly. After Idursulfase ERT with pre-medication of intravenous diphenhydramine, urinary heparan sulfate decreased to 14.32 and 15.39 mg/mmol creatinine, and dermatan sulfate to 10.72 and 14.95 mg/mmol creatinine, respectively. The patients remained clinically stable with consistent weight and height gain, exhibited improvement in hepatosplenomegaly, and tolerated the treatment well without any serious adverse reactions.

Case 3 was a 10-months-old boy with a severe phenotype and a hemizygous c.1477C>G (p.Arg493Gly) mutation. Iduronate 2-sulfatase activity was markedly reduced (0.10 nmol/mg protein/4hrs), with elevated urinary GAG (151.88 mg/mmol creatinine). Physical examination revealed multiple generalized Mongolian spots and macrocephaly. ERT with weekly Idursulfase was initiated at 4 months of age, along with premedication using diphenhydramine and hydrocortisone. Following treatment, the Mongolian spots improved, and the patient demonstrated well tolerance without adverse events.

Conclusion: Early initiation of Idursulfase ERT in infants with MPS Ⅱ is effective in reducing heparan sulfate and dermatan sulfate levels, improving clinical features, and is well tolerated without serious infusion-related reactions.

Real-world experience of Avalglucosidase Alfa in infantile-Onset Pompe Disease: A case series study

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Introduction: Pompe disease is a rare, incurable hereditary condition caused by mutations in the GAA gene, which provides the instructions for making the enzyme alpha-glucosidase. Deficiency of alpha-glucosidase can lead to the accumulation of sugar to toxic levels in lysosomes. The buildup of sugar harms organs throughout the body particularly muscle tissue, causing fatal symptoms such as muscle weakness, cardiomegaly and enlarged liver. Pompe disease can be classified based on the age of onset into two types: infantile-onset (IOPD), and late-onset. Primary specific treatment for Pompe disease is enzyme replacement therapy (ERT), which includes first-generation alglucosidase alfa and second-generation avalglucosidase alfa medications. In Taiwan, National Health Insurance supports the use of avalglucosidase alfa from six months of age. Newer potential treatments can be administered early in our clinical setting. This study aimed to evaluate the real-world effectiveness and safety of avalglucosidase in patients with IOPD.

Method: A retrospective chart review was conducted for patients with IOPD who received avalglucosidase alpha at our institution.

Results: Three cases were included in this study. Case 1 involved a 1-year-old boy diagnosed with IOPD through newborn screening, initially presenting with cardiomegaly and elevated serum CPK (>700 IU/L). ERT with alglucosidase alfa commenced at 15 days of age and was transitioned to avalglucosidase alfa (40 mg/kg biweekly) at 6 months. Methotrexate was introduced following the development of anti-drug antibodies. After 6 months, the CPK level declined to 93 IU/L. At the age of 1 year, the patient can stand and walk well with support.

Case 2 was an 8-year-old girl with IOPD who switched to avalglucosidase alfa (40 mg/kg every two weeks) at the age of 7 due to persistent muscle weakness and exercise intolerance. After 14 treatment cycles, serum CPK levels remained stable at 126 IU/L.

Case 3 was a 12-year-old boy previously treated with alglucosidase alfa for 11 years, who became wheelchair-bound due to lower limb weakness. His CPK level was 534 IU/L prior to starting avalglucosidase alfa infusions. After 16 infusions of avalglucosidase alfa, the CPK level was maintained at 516 IU/L. Avalglucosidase alfa was administered diluted in dextrose 5% solution in water for infusion in clinical settings. Although he had a BMI of 26 and was obese, no new-onset diabetes or drug-related hyperglycemia was observed.

Conclusion: Avalglucosidase alfa demonstrated favorable clinical effectiveness and tolerability in stabilizing IOPD progression. Further long-term studies with larger cohorts are warranted to validate these findings.

Prescription patterns and effectiveness of Sacituzumab Govitecan in the real-world treatment of advanced breast cancer among Asian populations

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Introduction: Sacituzumab govitecan (SG) is an antibody-drug conjugate that targets the trophoblast cell surface antigen 2 (Trop-2) and has been approved for the treatment of patients with locally advanced or metastatic triple-negative breast cancer (TNBC) and hormone receptor-positive (HR+) breast cancer who have not responded well to systemic treatments. Despite its promising clinical efficacy, many patients are unable to receive the optimal dosage of sacituzumab govitecan due to its high cost. This issue may lead to suboptimal therapeutic outcomes, especially in certain populations. Therefore, the aim of this study was to conduct a medication use evaluation of sacituzumab govitecan in Asian populations.

Method: We conducted a retrospective analysis by utilizing the electronic medical records database of Asian populations. We included breast cancer patients who newly received SG between July 20, 2023, and May 28, 2024. According to the ASCENT and TROPiCS-02 studies, the current indications for SG include the treatment of TNBC, as well as HR+ and HER2-negative (HER2-) breast cancer. We classified breast cancer patients based on their hormone receptor and HER2 receptor expression into either triple-negative breast cancer (TNBC) or hormone receptor-positive and HER2-negative breast cancer. In dosage evaluation, the standard dosage for SG is 10 mg/kg via intravenous therapy, and dosages lower than 10 mg/kg were defined as suboptimal dosage. We also collected baseline characteristic data, including age and tumor burden (e.g., solid organ of metastases). The effectiveness outcomes included overall survival and severe side effects, such as grade 3 (G3) or grade 4 (G4) neutropenia. Each patient was followed until death, end of December 31 2024, or loss of follow-up, whichever came first.

Results: A total of 57 advanced breast cancer patients with mean age of 55.7 years were included. Of them, 39 (68.4%)

and 16 (28.0%) were TNBC and HR+ breast cancer, respectively. We observed that 32 (56.1%) patients received suboptimal dosages with an overall average dose of approximately 9.09 mg/kg (SD: 2.42). The majority of metastases in these patients were located in lung (40%). The overall survival was non-reach (NR) (95% CI: 7.4 – NR) and 4.0 (0.5 – 5.9) months among TNBC and HR+ patients, respectively. Regarding safety events, only two patients experienced grade 3 or grade 4 neutropenia.

Conclusion: According to our medication use evaluation, all patients met the indications for sacituzumab govitecan. However, it was observed that over half of the patients were receiving suboptimal doses, which may impact the effectiveness of the treatment. Given this, it will be crucial to conduct long-term follow-up studies to assess whether the therapeutic outcomes for these patients align with the results seen in pivotal clinical trials. Such evaluations will provide important insights into the benefits, risks, and limitations associated with suboptimal dosing, helping to refine future treatment strategies.

Comparison of cancer risks associated with JAK inhibitor and TNF inhibitor treatment in patients with Rheumatoid Arthritis: A systematic review and meta-analysis of real-world cohort studies

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Introduction: Concerns have been raised regarding the potential increased cancer risk associated with the use of Janus kinase inhibitors (JAKi) compared to anti-tumor necrosis factor (TNF) inhibitors in patients with rheumatoid arthritis (RA), although findings from published cohort studies remain inconsistent. To address this, we performed a systematic review and meta-analysis to evaluate the relationship between JAKi use and cancer risk.

Methods: We conducted a comprehensive search of PubMed and EMBASE to identify cohort studies published from inception through January 31, 2025. Eligible studies were those reporting on the associations between the use of JAKi versus TNF inhibitors and the incidence of any type of cancer in patients with rheumatoid arthritis (RA). A random-effects model meta-analysis was performed to calculate the pooled hazard ratio (HR) for JAKi use in relation to overall cancer risk and for specific cancer types. Additionally, subgroup analyses were carried out based on patients' baseline cardiovascular risk and the geographic regions of the studies.

Results: We included 5 cohort studies with total of 137,640 patients with RA from the US, Sweden, Korea, Hong Kong, and Japan. The meta-analysis revealed that compared to TNF inhibitors, JAKi did not increase the risk of all cancers (5 studies, pooled HR: 1.15, 95% CI: 0.91 - 1.44), breast cancer (3 studies, pooled HR: 0.87, 95% CI: 0.59 - 1.29), lung cancer (3 studies, pooled HR: 1.23, 95% CI: 0.86 - 1.76) and hematologic cancer (3 studies, pooled HR: 1.84, 95% CI: 0.70 - 4.88), but increase the risk of NMSC (3 studies, pooled HR: 1.21, 95% CI: 1.03 - 1.41). Subgroup analyses suggest no significant increase in the risk of all cancers among JAKi users in geographic regions, or in those eligible for RCTs (HR: 1.24; 95% CI: 0.99, 1.56). Similar results from subgroup analyses were observed in the NMSC risk.

Conclusion: In patients with the use of JAK inhibitors was associated with an increased risk of cancer, particularly non-melanoma skin cancer (NMSC), compared to TNF inhibitors. It is recommended that regular cancer screenings and dermatology consultations be offered to this specific group of RA patients receiving JAK inhibitors.

Enhancing consultant pharmacists-teaching competencies in evidence-based medicine using the PDCA method

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Introduction: As the healthcare environment becomes more complex, the importance of Evidence-Based Medicine (EBM) in pharmacy has grown. Pharmacists, as key members of the clinical pharmacy team, play a crucial role in improving patient outcomes and ensuring medication safety. However, many pharmacists face challenges in applying and teaching EBM. Enhancing the teaching ability of consultant pharmacists in EBM not only supports their professional development but also improves overall healthcare quality. This study aims to assess the feasibility and effectiveness of using the PDCA (Plan-Do-Check-Act) cycle to enhance consultant pharmacists' EBM teaching abilities, providing evidence-based support for pharmacy education and clinical practice.

Method: This study used the PDCA cycle to enhance consultant pharmacists' teaching abilities in EBM. In the "Plan" phase, we designed an EBM training program covering basic concepts, clinical application skills, literature searching,

and evaluation methods, along with indicators to assess learning outcomes. In the "Do" phase, we conducted a three-month series of regular teaching sessions and workshops, using case analysis, discussions, and simulated clinical scenarios for EBM training.

In the "Check" phase, we evaluated learning outcomes through surveys, teaching assessments, and on-site evaluations. We focused on pharmacists' EBM knowledge, practical application, and consultation effectiveness.

In the "Act" phase, we analyzed the results and adjusted teaching methods based on identified issues, including adding individualized guidance, strengthening clinical practice, and improving teaching materials. This cycle will continue to improve the quality of education.

Results: The course focused on the practical application of Evidence-Based Medicine (EBM) and used pre- and post-tests for evaluation. A total of 37 questionnaires were distributed with a 100% response rate. The questionnaire assessed clinical problems, data search, literature review, clinical application, and attitudes towards EBM, using true/false and multiple-choice questions. The pre-test was filled out 5 minutes before the course, with personal information collected for analysis, and the post-test was completed after the course. The data were analyzed using Excel. Participants included 37 healthcare professionals, consisting of 17 medical staff and 20 nurses. Significant differences were found in clinical problems ($p<0.05$) and data search ($p<0.05$).

Conclusion: Adult learning should build on experience, so discussions should replace lectures to effectively teach skills and content. Classroom arrangements should encourage interaction, and abstract symbols should be minimized. Teaching should focus on problems, with an emphasis on immediate application. Role-playing and group dynamics are helpful, and respecting students by encouraging self-assessment and peer evaluation ensures accurate and objective learning feedback. After reviewing the literature and empirical studies, three main points were identified: 1) Workshops and learning camps are highly effective. 2) Access to online resources and group discussions should be incorporated in teaching. 3) Analyzing clinical problems related to students' backgrounds yields significant results. EBM enhances group learning, boosts motivation, and fosters good teacher-student interactions, as well as a strong commitment to solving patient problems.

Fluconazole as an alternative in Cushing's syndrome: A 10-year retrospective cohort

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Introduction: Endogenous Cushing's syndrome (CS) is a rare endocrine disorder defined by prolonged hypercortisolism, affecting 2-8 per million people yearly. It significantly increases morbidity and mortality rates (standardized mortality ratio 3.0, 95% CI 2.3-3.9). CS originates from pituitary tumours (Cushing's disease, 60-70%), adrenal tumours (20-30%), extra-pituitary corticotropin-secreting tumours (ectopic CS, 6–10%), or rarely, adrenocorticotropic hormone (ACTH) independent macronodular adrenal hyperplasia (AIMAH). Whilst surgery is the primary treatment, medicines are crucial when surgery isn't viable. Ketoconazole, EMA-approved for CS treatment, is widely used off-label in the US but unavailable in many countries (including Taiwan) due to hepatotoxicity. Fluconazole, another azole antifungal medication, may be a potentially safer alternative.

This study aims to assess the efficacy and safety of fluconazole in treating Cushing's syndrome.

Method: This retrospective cohort study at Taipei Veterans General Hospital, a medical centre in Taiwan, analysed medical records from 2015-2024 of patients with Cushing's syndrome treated with fluconazole. The study excluded patients who received fluconazole for other conditions, began treatment elsewhere, used concurrent adrenal steroidogenesis inhibitors (e.g., metyrapone, mitotane), or had insufficient follow-up or incomplete records.

The study examined patient demographics, fluconazole dosing and duration, treatment response (measured by serum cortisol and 24-hour urinary free cortisol levels), and safety profiles including liver function and adverse events. Treatment response was categorised as controlled (normalised levels), partially controlled (>50% reduction but still above normal), or no response (<50% reduction).

Results: From a total of 40 patients diagnosed with CS receiving fluconazole, 17 met the inclusion criteria. Twenty-three patients were excluded due to fluconazole use for other conditions (3), concurrent medications (12), or insufficient data (8). The cohort included 5 men and 12 women, with a mean age of 59.9 years. Most patients had Cushing's disease (10), whilst the remainder had ectopic CS (3), adrenal carcinoma (1), or AIMAH (3). The most frequent comorbidities—diabetes mellitus, hypertension, and hyperlipidaemia—each affected 64.7% of patients.

Fourteen patients (82.4%) responded well to fluconazole (75-1,200 mg/day), though two later became unresponsive due to tumour recurrence. Only one patient showed no response.

Regarding hepatotoxicity, seven patients showed elevated liver enzymes without requiring discontinuation of fluconazole. Four patients reported minor side effects including headache, diarrhoea, skin itching, and facial flushing.

Conclusion: Fluconazole shows promise as an effective and relatively safe alternative for managing hypercortisolism in CS patients when surgery is not an option. However, larger clinical studies are needed to confirm these findings and establish optimal dosing protocols. Future research could also focus on identifying which patients are most likely to benefit from fluconazole treatment.

Efficacy of transarterial chemoembolization combined with tyrosine kinase inhibitors for hepatocellular carcinoma: A systematic review and meta-analysis

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Introduction: Transcatheter arterial chemoembolization (TACE) is widely used as first-line therapy for unresectable hepatocellular carcinoma (HCC). Nevertheless, the limited efficacy of TACE is still considered as a challenge due to high reoccurrence rate of HCC after TACE therapy. Multiple tyrosine kinase inhibitors (TKIs) have been showed the promising benefit to decrease HCC progression and mortality. However, the discrepancy in the efficacy of TKIs plus TACE for HCC patients still exists. Therefore, this systematic review and meta-analysis (SR/MA) was conducted to evaluate the effectiveness and safety of TACE combined with different TKIs in patients with HCC.

Method: This SR/MA followed the latest PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The databases including PubMed, Cochrane Library, and Embase (OVID), were used to search for randomized controlled trials (RCTs) comparing TACE plus TKIs with TACE alone in HCC patients. The terms of (“hepatocellular carcinoma”) AND (“transarterial chemoembolization”) AND (“tyrosine kinase inhibitors” OR “sorafenib” OR “lenvatinib” OR “apatinib” OR “anlotinib” OR “orantinib” OR brivanib”OR “sunitinib”) AND (“randomized controlled trial”) were used as search strategy. Non RCT studies, studies with duplicate population such as subgroup analysis, conference abstract, and meeting abstract were excluded. The primary outcomes were overall survival (OS) and progression-free survival (PFS), reported as hazard ratios (HRs) with 95% confidence intervals (CIs). Secondary outcomes included overall response rate (ORR) and disease control rate (DCR), analyzed using risk ratios (RRs). Heterogeneity was assessed with the I^2 statistic.

Results: There were fourteen RCTs included in the SR/MA. Compared to TACE alone, the OS showed a non-significant improvement in TACE plus TKIs (HR = 0.86, 95% CI: 0.72–1.03, p = 0.10, I^2 = 61%). However, a significant benefit in TACE plus TKIs group was observed in PFS (HR = 0.74, 95% CI: 0.61–0.91, p = 0.004, I^2 = 86%). Besides, the combination therapy significantly improved ORR (RR = 1.29, 95% CI: 1.11–1.51, p = 0.001) but not DCR (RR = 1.05, 95% CI: 0.99–1.11, p = 0.08). In subgroup analysis for OS, TACE plus TKIs showed a significant risk reduction in HBV-positive patients but neither in HCV-positive patients nor HBV and HCV status. In PFS analysis, combination therapy decreased the risk in HBV-positive patients, whereas no significant benefit was seen in HCV-positive patients, either in population without HBV and HCV status.

Conclusion: TACE combined with TKIs significantly improves PFS and ORR in HCC patients compared to TACE alone, with a potential benefit in HBV-positive individuals. However, the improvement in OS and DCR was not statistically significant. It needs further research to optimize HCC patient selection and treatment strategies.

Evaluation and analysis of potentially inappropriate medication use among frail older inpatients based on the STOPPFrail criteria: a preliminary report

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Introduction: Frail older patients often have multiple comorbidities, leading to polypharmacy, increased drug interactions, adverse effects, and higher healthcare costs, often with limited long-term benefits. Deprescribing refers to the process of withdrawing potentially inappropriate medications (PIMs) to reduce drug-related problems and improve patient outcomes. The STOPPFrail (Screening Tool of Older Persons' Prescriptions in Frail adults with limited life expectancy) criteria were developed to assist physicians in deprescribing decisions for older patients with limited life expectancy. Despite growing awareness of deprescribing, real-world evidence on the clinical impact of STOPPFrail-PIMs in frail older inpatients remains limited. The objectives of this study were to (i) determine the proportion of frail older inpatients for whom the STOPPFrail criteria are applicable, (ii) measure the prevalence of STOPPFrail-PIMs, (iii) identify risk factors associated with STOPPFrail-PIM use, and (iv) assess whether PIM administration is associated with adverse outcomes among frail older inpatients. Understanding these factors may help optimize medication management and improve healthcare outcomes for this vulnerable population.

Method: This retrospective study was conducted in a regional teaching hospital in southern Taiwan. Severely frail older inpatients with Clinical Frailty Scale(CFS) ≥7 were included in this study. Data collection included demographic characteristics, comorbidities, regular medications, functional status, cognitive ability, frailty status, drug-related problems (DRPs), and STOPPFrail-PIMs, all of which were analyzed by trained pharmacists. Statistical analyses included t-tests, paired t-tests, and chi-square tests to compare differences between groups. Additionally, linear regression was performed to examine the relationship between PIM use and adverse outcomes, including agitation, dizziness, falls, emergency visits, and unplanned hospitalizations. Given the complexities of frailty and medication use, subgroup analyses were also conducted to identify patient-specific factors influencing PIM prevalence.

Results: Among 175 hospitalized patients aged 65 years and older, 59 severely frail older adults were included in the final analysis. At baseline, patients took an average of 8.5 ± 3.9 medications regularly. The STOPPFrail criteria identified at least one PIM in 88.1% of the study population, with a mean of 2.5 ± 1.3 PIMs per patient. The most frequently identified pre-admission PIMs were anti-diabetic drugs prescribed to patients with HbA1c <6.5%, followed by lipid-lowering agents and antihypertensives for patients with long-term BP control <130 mmHg. Together, these accounted for 59.0% of all PIMs. Additionally, 35.6% of patients were prescribed medications unsuitable for those with swallowing difficulties, which required formulation adjustments or alternative therapies. Data collection is ongoing, with a revised target of 400 patients to further evaluate the relationship between PIM use and adverse events.

Conclusion: This study showed that most frail older adults with limited life expectancy had at least one PIM at admission. Most of the PIMs offer limited short-term benefits for patients with limited life expectancy but increase the risk of DRPs. Preliminary result supports the utility of the STOPPFrail criteria in optimizing medication use in severely frail older adults.

Transforming small pharmacies with automated dispensing cabinets: Impact, challenges, and efficiency gains

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Introduction: Automated Dispensing Cabinets (ADCs) have transformed medication management in hospital pharmacies by streamlining workflows and reducing medication errors. In one hospital pharmacy operating on a three-shift system with one to four staff members per shift, achieving operational efficiency is essential.

In small pharmacy settings, managing controlled substances and high-cost medications manually is time-consuming, labour-intensive, and prone to human error. Shift handovers increase the risk of inventory discrepancies due to incomplete records or miscounts, compromising medication safety. Paper-based logs often contain errors, omissions, or miscalculations, leading to stock shortages or surpluses. Recognizing these challenges, ADCs were introduced to improve medication safety and operational efficiency. Through real-time inventory tracking and automated record-keeping, ADCs enhance accuracy, reduce errors, and strengthen inventory control.

Method: Before ADC implementation, 31 medications required inventory counts three times daily. To assess efficiency, a one-week pre-implementation study was conducted, measuring inventory count duration per shift and time spent on log entries per prescription. In September 2024, ADCs were installed to improve stock security, automate documentation, and enable real-time tracking. Data on inventory time and prescription processing were collected from September 2024 to February 2025, alongside a user survey evaluating ADC implementation. This approach enabled direct comparison between manual and automated processes.

Results: ADCs markedly improved inventory management, reducing the number of medications requiring counts from 31 to 11 and decreasing inventory time from 15.24 minutes to 1.61 minutes per session, saving an average of 40.87 minutes daily. Additionally, ADCs eliminated the need for manual log entries, which previously took approximately one minute per prescription. This resulted in a cumulative time saving of 30 hours and 47 minutes for 1,847 prescriptions processed during the study period. Most users rated their experience as satisfactory, although some indicated a need for further pharmacy dispensing training. Overall, ADCs streamlined workflows and reduced workload, leading to improved operational efficiency.

Conclusion: The implementation of ADCs significantly enhanced inventory control, reduced manual workload, and improved workflow efficiency. Automation reduced errors, improved accuracy, and optimised stock levels, contributing to long-term cost savings and reduced medication waste.

Nevertheless, challenges remain, including high initial costs, ongoing maintenance, potential technical issues, and the need for additional training to adapt to new workflows. Although adaptation required time, user satisfaction increased as efficiency gains became evident.

Despite these challenges, ADCs represent a valuable advancement in hospital pharmacy practice, delivering substantial improvements in time savings and inventory accuracy. Given these positive outcomes, further expansion of ADC implementation is planned, along with ongoing training and exploration of integration with other digital healthcare technologies to enhance efficiency and patient safety.

The benefit of pharmacist clinic intervention for diabetic patients

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Introduction: The pharmacist clinic has been set up in developed countries for several years. However, the related systematic training and accreditation systems are still not established yet in Taiwan.

Method: The data was collected receiving after the intervention of the pharmacist outpatient clinic from January 2023 to December 2024. In the execution method: 1.People Force: Allocate two pharmacists who have completed the training of diabetes health teachers and obtained the qualification of diabetes co-care network; 2. Hardware: The setting can provide one-to-one health education and consultation rooms, and the configuration can be read Access to cloud medicine calendar equipment; 3. Software: Design drug health education materials for patients and medical team members for diabetes medication in the hospital, and provide goodwill drug collection services in the pharmacist outpatient clinic.

Results: For pharmacists to take care of patients in outpatient care, transfer patients with HbA1C > 8.0 were analyzed .and found to be receiving after the intervention of the pharmacist outpatient clinic, the HbA1C of 42.4% of the patients decreased below 7.0%, 36.4% of patients had HbA1C reduced to 7.0-8.0%, showing significant results.

Conclusion: The integrated pharmacist clinic promotes the quality of pharmaceutical practices including clinical services, training, teaching and other multi-dimensional benefits.

Enhancing patient experience and satisfaction through pharmacist-led discharge medication counseling at a tertiary hospital in Indonesia

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Introduction: Patient experience is a key component of patient-centered care and an indicator of healthcare service quality. In pharmaceutical care, particularly during the transition from hospital to home, effective communication and patient engagement are essential in ensuring medication adherence and minimizing medication-related problems. Pharmacist-led discharge medication counseling enhances patient understanding of their prescribed medications, fosters adherence, and empowers patients to manage their medication therapy effectively. Measuring patient experience and satisfaction with this counseling process provides valuable insights into the quality of pharmaceutical services and identifies areas for improvement. The objective of this study was to evaluate patient experience and satisfaction with pharmacist-led discharge medication counseling at a tertiary hospital in Indonesia.

Method: A cross-sectional study was conducted using an online survey with structured questionnaires distributed to patients who had received discharge medication counseling from hospital pharmacists. The questionnaire covered a range of patient experience, including: pharmacist greets patient in a friendly manner, pharmacist explains the purpose of providing information and education, pharmacist provides clear information about medications, pharmacist engagement in facilitating patient understanding, patient confidence in medication use post-discharge, and overall satisfaction with the counseling service. Patients were also asked to provide narrative feedback to improve the service. Data were analyzed to determine the percentage of patients who had positive experiences and high satisfaction levels with pharmacist-led discharge medication counseling.

Results: A total of 285 patients participated in the survey and 94% reported a positive experience. They found the information provided to be clear and helpful in understanding their medications. Additionally, 89% of respondents expressed a high level of satisfaction with the counseling services, indicating that the medication counseling improved their confidence in managing their medications post-discharge. This also demonstrated a high level of confidence in the pharmacists' performance. Patient feedback for service improvement included a need for more detailed information regarding indication, and no delay in providing the service.

Conclusion: The study demonstrates that pharmacist-led discharge medication counseling has a substantial impact on patient experience and satisfaction. The high percentage of positive experiences correlates with increased patient satisfaction, reinforcing the importance of effective communication and patient engagement in pharmaceutical care. These findings highlight the need for continuous improvements in discharge counseling strategies to further enhance patient-centered care and ensure optimal medication adherence post-discharge. Hospitals should consider integrating standardized patient experience measurements into their quality improvement programs.

Utilizing clinical decision support system for outpatient prescription review: Clinical pharmacist's experience at a medical center in Southern Taiwan

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Introduction: Outpatient prescription review is a critical component of ensuring medication safety, particularly in high-volume medical centers. With increasing prescription volumes, integrating automated tools like Medi-Span and custom alert systems can aid pharmacists in identifying and addressing questionable prescriptions more efficiently. Starting in the second half of 2024, the Medi-Span software was introduced for outpatient prescription review to assist pharmacists in verifying prescriptions and enhancing review efficiency. This study aimed to evaluate the effectiveness of implementing Medi-Span software in outpatient prescription review.

Method: As the first half of 2024 served as the preparation period for Medi-Span implementation, this observational study compared pharmacist interventions in the second half of 2024 with those in the second half of 2023 to assess the benefits of Medi-Span. Key outcomes included the number of pharmacist intervention prescriptions, primary types of prescription issues, intervention acceptance rates, and estimated cost avoidance from prevented adverse drug events (ADEs).

Results: Pharmacist intervention prescriptions increased from 273 to 624 in the second half of 2024, with a chi-square test confirming a significant difference ($p < 0.05$). Common prescription issues included dosage, duration, and concomitant therapy concerns. The intervention acceptance rate remained stable (83.03% in 2023 vs. 82.36% in 2024), suggesting that while efficiency improved, the quality of pharmacist interventions was maintained. Estimated cost avoidance due to prevented ADEs was USD $14,350 in the second half of 2023 and USD $37,417 in the second half of 2024, with a Student's t-test showing a significant difference ($p < 0.05$). However, outpatient ADE costs may not directly correspond to hospitalization costs, and these figures should be interpreted as reference estimates.

Conclusion: The integration of Medi-Span and a custom alert system significantly improved prescription review efficiency, increased the identification of questionable prescriptions, and contributed to substantial cost avoidance. Expanding pharmacist resources in outpatient settings is essential to further enhance medication safety and quality.

An analysis of relation between vancomycin area under the curve and trough concentrations in specific populations in Taiwan

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Introduction: Vancomycin, an antibiotic, can cause nephrotoxicity. The Infectious Diseases Society of America recommends targeting an area under the curve/minimum inhibitory concentration (AUC/MIC) ratio of 400 to 600 mg*h/L to maximize clinical efficacy and minimize the risk of nephrotoxicity. When the target vancomycin trough level is between 15 to 20 mg/L, it may correspond to an AUC of 400 to 600 mg*h/L. However, trough levels within the 15 to 20 mg/L range may have an AUC greater than 600 mg*h/L which increases the risk of nephrotoxicity. Understanding the relationship between vancomycin AUC and trough levels is vital, especially for populations at high risk of nephrotoxicity. However, previous studies often excluded such groups (e.g., those with obesity, renal impairment, critical illness, or advanced age). The aim of this study is to analyze the discordance between vancomycin AUC and trough level in specific populations in Taiwan.

Method: This retrospective observational study used electronic medical records from a regional hospital in southern Taiwan. It included patients aged ≥65 years, obesity (body mass index ≥30), renal impairment (glomerular filtration rate <45 mL/min/1.73 m^2) or critical illness. Patients had to receive intravenous vancomycin with at least one steady-state trough level between August 1, 2023 and January 31, 2025. Bayesian pharmacokinetic modeling was applied to calculate AUC from a single trough level. In this model, the volume of distribution was estimated using the most appropriate published pharmacokinetic model for each patient, including general hospitalized patients, extreme obesity, critical ill patients, and critical ill patients with obesity. The outcome was to analyze the discordance between vancomycin AUC and trough levels.

Results: This study included 53 patients with 119 vancomycin minimum concentration (Cmin)/AUC pairs. Discordance was observed in 31 out of 119 (26 %) Cmin/AUC pairs. Of the 46 Cmin levels below 15 mg/L, 25 (54%) were associated with an AUC >400 mg*h/L; of the 35 Cmin levels within the 15 to 20 mg/L range, 6 (17%) had an AUC >600 mg*h/L. In patients with one nephrotoxicity risk, of the 32 Cmin levels below 15 mg/L, 16 (50%) were associated with an AUC >400 mg*h/L; of the 24 Cmin levels within the 15 to 20 mg/L range, 5 (21%) had an AUC >600 mg*h/L. In patients with two nephrotoxicity risks, of the 10 Cmin levels below 15 mg/L, 6 (60%) were associated with an AUC >400 mg*h/L; of the 11 Cmin levels

within the 15 to 20 mg/L range, 1 (9%) had an AUC >600 mg*h/L. In patients with three nephrotoxicity risks, of the 4 Cmin levels below 15 mg/L, 3 (75%) were associated with an AUC >400 mg*h/L; no Cmin levels were within the 15 to 20 mg/L range.

Conclusion: The results showed that patients with more nephrotoxicity risks may have higher degrees of discordance between vancomycin Cmin and AUC. These findings suggest that patients with a high risk of nephrotoxicity may benefit more from monitoring vancomycin AUC rather than relying on trough levels alone.

Retrospective analysis of emergency department cases with metformin-related lactic acidosis

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Introduction: Metformin-associated lactic acidosis (MALA) is a rare but serious condition that primarily affects patients with renal impairment or acute illness. This study aims to analyse emergency department cases of MALA, focusing on clinical presentations, risk factors, and outcomes. Pharmacists play a critical role in preventing and managing MALA through medication counselling, renal function monitoring, and identifying at-risk patients. With the increasing use of metformin in combination therapies, clinicians and pharmacists must stay vigilant regarding dosage adjustments and monitoring. This study contributes to understanding MALA in an emergency setting.

Method: A retrospective study was conducted in an Emergency Department in northern Taiwan from September 2012 to December 2025, reviewing cases of MALA. MALA was defined as altered lactate and hydrogen metabolism with pH < 7.35 and lactate > 5.0 mmol/L(45mg/dL). Data collected included patient demographics, clinical characteristics, and treatment outcomes. Key variables such as age, gender, severity classification, and interventions like vasopressors, renal replacement therapy, and mechanical ventilation were analysed. The primary outcome was patient prognosis and intensive care unit (ICU) length of stay. Multivariate logistic regression was used to identify factors linked to severe outcomes.

Results: Fourteen patients (mean age 70.5 years) were included, with a median APACHE II score of 24. Laboratory findings showed a median glucose of 183.5 mg/dL, pH of 6.95, bicarbonate of 3.85 mmol/L, creatinine of 1.51 mg/dL, and lactate of 83.0 mg/dL. Interventions included mechanical ventilation (100%), CVVH (57.1%), and haemodialysis (35.7%). Vasopressors were used in 78% of patients. The median ICU stay was 6.5 days, and the survival rate was 64.3%. Pharmacists played a role in identifying at-risk patients, adjusting metformin doses, and educating patients.

Conclusion: MALA requires prompt recognition and intensive management. This study emphasises the importance of mechanical ventilation, renal replacement therapy, and vasopressors. Despite aggressive treatment, the survival rate was 64.3%. Early identification of at-risk patients, particularly those with renal impairment, is crucial. As metformin is often used in combination therapies, pharmacists must monitor renal function, adjust dosages, and educate patients. Their involvement can reduce MALA incidence and improve outcomes. Collaboration between clinicians and pharmacists is essential for better care and outcomes. Further research is needed to refine risk stratification and optimise MALA treatment.

The impact of Nintedanib related adverse effects on clinical outcomes in patients with idiopathic pulmonary fibrosis: An analysis of preliminary

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Purpose: Nintedanib is an intracellular inhibitor of tyrosine kinases that inhibits the progression of pulmonary fibrosis. However, treatment discontinuation due to nintedanib related adverse drug reaction (ADR) is common. The aim of this study was to explord real-world tolerability of nintedanib with 12- month follow up in Taiwan.

Methods: This is a single-centre retrospective observation study included patients diagnosed with Idiopathic pulmonary fibrosis who received nintedanib between January 2016 and December 2023. ADRs were defined for which a causal relationship with nintedanib could not be excluded. Outcomes were analyzed in patients who discontinued subgroup and continued subgroup after 180 days.

Results: 78 patients in the safety analysis, 33(42.3%) discontinued nintedanib within 180 days since initiation of management. Overall, 63 (80.7%) patients had ADRs. Among patients in the continued subgroup (n=45), 33(73.3%) and 30 (66.7%) who required additional medications for management of nausea, vomit and diarrhea, with significant difference from discontinued subgroup (vs. 36.4%, p=0.0013 and vs. 30.3%, p=0.00265), respectively. Moreover, the discontinued subgroup mortality was significantly higher than

continued subgroup (51.5% vs. 26.7%, P=0.0291) during the study period.

Conclusion: Aggressive management using symptomatic therapy of ADRs is important to minimize the impact of ADRs and maximize clinical benefit and treatment persistence.

Optimizing processes of returning unused medications of inpatients to pharmacy

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Introduction: Returning unused medications from inpatients to the pharmacy is a necessary task in the hospital. However, it requires significant time and human resources, involving multiple departments such as the pharmacy, nursing stations, and clerks. The reasons for returning medications are varied, including changes in orders due to the patient's condition, transfers from the intensive care unit (ICU) to the ward, and patient discharge after medication administration. All unused medications must be returned to the pharmacy through a step-by-step process. First, nurses place the medications back into the medication box. Second, clerks create a list of the returned medications. Finally, pharmacists review and restock the unused, uncontaminated medications on the shelves based on the list created by the clerks. The complicated processes have the potential to cause mistakes, such as an increased risk of medication contamination, a higher likelihood of medication identification errors, and delays in administration due to mistakenly returned medications. These factors not only compromise patient medication safety but also add to the workload of healthcare professionals. To enhance patient medication safety and reduce the burden on healthcare professionals, we implemented action plans aimed at optimizing the process. We anticipate that these improvements will enhance work efficiency and overall operational effectiveness.

Methods: This retrospective study aims to drive improvement through lean thinking and quality control circle tools, focusing on optimizing the process of returning unused medications and evaluating its effectiveness in enhancing work efficiency and patient medication safety. The study period spans from April 2023 to September 2024. To gain a comprehensive understanding of the processes in each department, we developed an ideal value stream map. Based on this map, we identified potential issues and constructed a Cause-and-Effect Diagram (Fishbone Diagram). Finally, we implemented action plans to simplify workflows and enhance patient medication safety. To assess the effectiveness of these improvements, we compared the time required to return medications to the pharmacy before and after the study.

Results: After this improvement, we streamlined and optimized the processes across departments. First, based on value stream map, we reduced the workflow from 55 steps to 38 steps by eliminating non-essential processes that do not impact patient medication safety. Additionally, the number of decision points was reduced from 16 to 9. Second, with the assistance of IT department, clerks can now scan barcodes directly on the bags of unused medications, allowing the system to automatically generate the lists of unused medication. As a result, the total number of returned medications decreased by 14.2%. Furthermore, the time required for clerks to process medication returns was reduced by 75%, while pharmacists experienced a 60.6% reduction in processing time.

Conclusion: Through process improvements, we successfully streamlined the medication return workflow, significantly reducing medication waste and the workload of healthcare professionals. As a result, we enhanced work efficiency, improved healthcare quality and strengthened overall patient medication safety.

The effectiveness of computerized physician order entry and clinical decision support systems in mitigating inpatient intravenous medication flow rate errors: A five-year study

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Introduction: Intravenously administered drugs are associated with the highest frequency of medication errors and more serious consequences for patients compared to other administration routes. Literature suggests that the probability of making at least one medication administration error (MAE) with intravenous doses is 73%, and these doses are five times more likely to be associated with an MAE than non-intravenous doses (Keers RN, et al., 2015). A study found the rate of MAE to be 46.1%, with missed doses (95.8%) being the most common error (Fekadu T, et al., 2017). Of intravenous medication errors, 32.1% were administration errors, and 'wrong rate' errors accounted for 57.9% of these (Sutherland A, et al., 2020). The 2023 Annual Report of the Taiwan Patient-safety Reporting System in hospitals reported that medication errors occurred in approximately 33.4% of cases, with prescribing errors accounting for about 41.9% of these. Within Taiwan hospitals, medication administration errors involving flow rates constitute about 3.5% of all medication errors. Intravenous medication errors are

prevalent, costly, and potentially harmful in hospitals. Computerized provider order entry (CPOE) systems with clinical decision support system (CDSS) functionality have demonstrated effectiveness in reducing prescribing errors. This study aimed to evaluate whether implementing a modified CPOE system with CDSS reduced intravenous medication prescribing errors related to flow rates at a Taiwan academic medical center between 2019 and 2023.

Method: This study was conducted at a 2,202-bed academic medical center in central Taiwan, which was implementing an optimized CPOE with CDSS system to improve physicians' intravenous medication flow rate prescriptions. We assessed the error rates in prescribing intravenous medication flow rates before and after implementing the modified CPOE with CDSS system, using all inpatient prescriptions from January 2019 to December 2023.

Results: In the pre-implementation period (2019-2020), the error rate of medication flow rate errors in prescribing intravenous medications increased from 19.7% (374/1896 in 2019) to 19.8% (221/1118 in 2020). This rise may have been due to deficiencies in the CPOE software, lack of customization, poor implementation plans, inadequate interface design, or an overreliance on CDSS in our hospital. In the post-implementation period (2021-2023), the error rate decreased from 10.2% (23/225 in 2021) to 9.0% (13/145 in 2022), and finally to 7.9% (10/126 in 2023). Overall, the error rate of prescribing intravenous medications with flow rates was significantly reduced by approximately 59.9% between 2019 and 2023. Furthermore, the total number of medication errors was reduced by approximately 93.4%, from 1896 in 2019 to 126 in 2023.

Conclusion: The modified CPOE with CDSS system can reduce both overall medication errors and intravenous medication flow rate errors in the prescription process. However, the implementation of CPOE can also introduce new errors, such as those stemming from poor implementation plans, inadequate interface design, and overreliance on the system. Thus, the modified CPOE system presents both benefits and disadvantages. While it has been shown to reduce medication errors in hospitalized patients, it can also increase the time required for some physician workflow tasks.

A 5-year analysis of high-alert medication error harm frequency and severity in a Taiwan university hospital

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Introduction: High-alert medications (HAMs) are drugs that carry a significantly higher risk of causing serious patient harm if used incorrectly. International medication safety organizations identify HAMs and related safety risks using reports from healthcare organizations, literature on harmful errors, studies on drugs frequently involved in harmful errors, and input from healthcare professionals. While all medications pose some risk if misused, a specific group of drugs, known as HAMs, presents a greater potential for serious patient injury. These medications are associated with a wide range of error rates, from 0.24 to 89.6 per 100 prescriptions (Aradhya PJ, et al, 2023). The prevalence of harm from errors involving HAMs varied significantly, from 3.8% to 100%, with a pooled prevalence of 16.3%. Overall, 0.01% of harm from HAM-related errors resulted in death. The severity of these errors ranged from 0.1% to 19.2% for moderate, 0.2% to 15.4% for serious, and 1.9% resulting in patient death (Sodré Alves BMC, et al., 2021). This study aimed to determine the prevalence and characteristics of medication errors involving high-alert medications and to evaluate the potential for HAMs to cause severe patient harm.

Method: This study was conducted at a 2,202-bed academic medical center located in central Taiwan. Medication errors were defined according to the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP). High-alert medication errors rates were analyzed from January 1, 2017, to December 31, 2023, using data from the China Medical University Hospital Patient Safety Database (CMUH PSD). Errors were evaluated based on error type and severity of harm.

Results: The number of high-alert medication errors significantly decreased by about 77.3%, from 427 in 2019 to 346 in 2020, 178 in 2021, 148 in 2022, finally to 97 in 2023. The error rates of high-alert medication significantly decreased by about 79.0%, from 0.00219% in 2019 to 0.00187% in 2020, 0.00095% in 2021, 0.00073% in 2022, finally to 0.00046% in 2023. Furthermore, the total number of medication errors was reduced by approximately 78.7%, from 4511 in 2019 to 961 in 2023. The majority of harm severities were categorized as "A" (no error) (97.0%-98.8%) and "B-D" (error, no harm) (1.2%-3.0%) according to the NCC MERP classification during 2019 to 2023.

Conclusion: Current high-alert medication systems are still vulnerable and can lead to patient harm. Our findings

highlight the need for greater focus on medication safety practices related to the administration, prescribing, and preparation of high-alert medications. While this study provides initial insights into the systemic causes of these errors, more robust evidence is required. Further research is needed to identify the root causes of high-alert medication errors and evaluate the effectiveness of safety measures.

Impact of optimized computerized physician order entry on reducing physician prescription wrong dose errors: A five-year analysis

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Introduction: Medication errors can occur at any point in the prescription process, from the prescriber's medication choice to the patient receiving treatment. Prescribing deficiencies are a leading cause of adverse drug events, with most medication errors occurring during the prescribing stage. Studies have shown that wrong dose errors happen across all inpatient settings, and this was the most common error in the prescribing phase (Cottell M et al., 2020). While wrong dose errors of all magnitudes are possible, twofold and 10-fold errors are the most frequent (Cavell GF and Mandaliya D., 2021). The 2023 Annual Report of the Taiwan Patient-safety Reporting System in hospitals indicated that medication errors occurred in approximately 33.4% of cases, with prescribing errors accounting for about 41.9% of these. Within Taiwan hospitals, wrong dose prescribing errors represent about 23.7% of all medication errors. The implementation of computerized physician order entry (CPOE) has been shown to reduce overall errors at the prescription stage and decrease most types of prescription errors. This study aimed to evaluate whether implementing a modified CPOE system reduced medication prescribing errors related to drug dose at a Taiwan academic medical center between 2019 and 2023.

Method: This study was conducted at a 2,202-bed academic medical center in central Taiwan, which was implementing an optimized CPOE system to reduce prescription wrong doses by physicians. We assessed the number of prescribing medication wrong doses before and after implementing the modified CPOE, using all inpatient prescriptions from January 2019 to December 2023.

Results: In the pre-implementation period (2019), there were 648 medication wrong dose orders. Following implementation (2020-2023), the number of medication wrong dose orders decreased from 234 in 2020 to 76 in 2021, 49 in 2022, and finally to 40 in 2023. Overall, the total number of wrong dose prescriptions was significantly reduced by approximately 93.8%, from 648 in 2019 to 40 in 2023. Furthermore, the total number of medication errors decreased by approximately 93.4%, from 1896 in 2019 to 126 in 2023.

Conclusion: The modified CPOE system has the potential to decrease both overall medication errors and wrong dose errors during the prescription process. However, the implementation of CPOE systems can also lead to new types of errors. Therefore, continued reporting of prescription errors is crucial, as weaknesses in CPOE systems are potential sources of error. Analyzing the mechanisms behind CPOE errors can identify areas for improvement. The positive impact of optimized CPOE systems on prescription safety must be balanced with the recognition that certain types of medication prescription errors persist.

Risk of ocular adverse events with Trastuzumab: A case report

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Background: Trastuzumab is a monoclonal antibody targeting the HER-2/neu antigen. It inhibits cancer cells that overexpress HER-2/neu. Approximately 25–30% of breast cancer patients exhibit HER-2 overexpression. Studies indicate that these patients generally have a poorer prognosis compared to those without HER-2 overexpression. Common adverse effects of trastuzumab include chills, fever, pain, fatigue, vomiting, and headache. In addition to these well-documented adverse effects, previous studies have reported potential ocular complications, including dry eye, excessive lacrimation, conjunctivitis, and visual impairment.

Case Presentation: This article presents the case of a 57-year-old female patient diagnosed with breast cancer. The TNM stage was T1cN0Mx, with ER-negative, PR-negative, and HER2-positive findings. Following a partial mastectomy, the patient underwent chemotherapy with docetaxel and trastuzumab. After four cycles of treatment, she reported visual disturbances and stated that, prior to therapy, she had no history of ocular disease other than bilateral myopia of -5.50 diopters. Upon evaluating the patient's condition, the physician recommended discontinuation of docetaxel and trastuzumab and referred her to an ophthalmologist for further assessment. However, the patient chose to continue trastuzumab monotherapy.

Subsequent ophthalmologic evaluation revealed a worsening of the refractive error in the right eye to -14.50 diopters. Further examination confirmed a diagnosis of cataract, for which surgical intervention was planned.

Discussion: Reports of trastuzumab-induced ocular adverse effects are limited. A case report described a patient who

developed optic neuritis following trastuzumab therapy. The patient experienced acute vision loss three days after completing the second cycle of adjuvant trastuzumab therapy. An examination revealed optic nerve edema and spindle hemorrhages in the left eye; however, optic neuritis was not initially diagnosed. The patient continued trastuzumab therapy. However, six days after receiving the sixth dose, she experienced near-total vision loss and was ultimately diagnosed with optic neuritis.

Another case report documented three female patients receiving trastuzumab who developed persistent bilateral corneal erosions, which subsequently progressed to corneal ulceration. The authors suggested that trastuzumab may contribute to corneal damage due to the presence of epidermal growth factor receptors in the human cornea, limbus, and conjunctival epithelium.

A review article published in 2022 indicated that, although rare, trastuzumab may cause macular edema and ischemic maculopathy, potentially leading to severe visual impairment. To our knowledge, cataract formation was reported in a phase I study of trastuzumab emtansine; however, no cases of cataract occurring following trastuzumab therapy have been documented to date.

Conclusion: This case suggests that visual impairment is a potential adverse effect of trastuzumab. Therefore, oncologists and ophthalmologists should remain vigilant for ocular adverse events associated with trastuzumab. Patients who experience visual disturbances during trastuzumab therapy should undergo a comprehensive ophthalmologic evaluation to determine whether these symptoms are drug-related. Early detection of such adverse events may help prevent long-term complications and improve clinical outcomes and quality of life. Further studies are warranted to validate these findings.

Substandard and falsified antimicrobial medicines: assessment of quality of various antibiotics procured in four hospitals in South East Nigeria

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Introduction: Globally, a lot of focus has been on substandard and falsified medicines (SFMs). Substandard medicines are genuinely manufactured and authorised medications which fail to meet quality standards or specifications or both. Falsified medicines are deliberately and fraudulently mislabelled with respect to identity, composition and source. In the low and middle income countries, it has been a challenge to ensure that patients have access to medications of high quality. This is especially important in antimicrobial medications in view of the global rise in antimicrobial resistance. Antimicrobial resistance is exacerbated by improper use of antibiotics and seemingly proper use of substandard and falsified antimicrobial medicines. SFMs contribute to antimicrobial resistance and drug-resistant infections by reducing the rate of clearance of pathogens, increasing the amount of onward transmission of potentially resistant organisms and causing treatment failure, negation of synergistic effects or inadvertent monotherapy. Prevalence of substandard medicines in Nigeria have been detected by quality control methods and reported in literature. Quality control is a planned system of activities whose aim is to assess potency of drugs using various methods against established official specifications. This work focused on evaluation of quality of antibiotics procured in four hospitals situated in South East Nigeria.

Methods: As part of the Commonwealth Partnerships for Antimicrobial Stewardship (CWPAMS) 2.0 Project, the assessment of quality of antibiotics procured in three tertiary and one secondary hospital was carried out in the Quality Control unit of Pharmacy Department of University of Nigeria Teaching Hospital Ituku ozalla from January to December 2024. The following brands were assayed: Levofloxacin 500mg (7), Ciprofloxacin 500mg (11), Amoxicillin Clavulanate (13), Ofloxacin 200mg (4) , Cefixime 200mg (10), Clarithromycin(5), Cefpodixime (3), Cefuroxime (10), Amoxicillin Clavulanate 1.2g (3), 3 brands each of Cefixime, Amoxicillin Clavulanate 228.5mg, and cefuroxime suspensions, Azithromycin 500mg (7) , Ceftriaxone injection (4) , Inj cefuroxime (1),and Levofloxacin infusion(1) were received from various hospitals. Physico-chemical analysis including physical examination, Chemical identification tests, weight uniformity, pH value determination, disintegration time test, drug content using ultraviolet spectrophotometer were carried out. Their percentage drug content were assayed using agar-cup diffusion method of microbiology assay.

Results: All the brands of Cefixime, Ciprofloxacin, Amoxicillin clavulanate, Levofloxacin, Ofloxacin, Cefuroxime, Clarithromycin Tablets and Ceftriaxone passed physical examination, weight uniformity test as well as disintegration time tests. All brands of suspension and injections also passed physicochemical tests. Drug content assay showed that with exception of Tab Clarithromycin , Azithromycin and Cefixime which met quality standards, all other antibiotics had substandard brands at percentages ranging from 10 to 40% . Tab Cefuroxime, Cefpodoxime and Ofloxacin had 40, 33 and 25 % substandard brands respectively (Drug content out of range of British pharmacopeial specification 90 -110% compared with standard). All suspensions passed microbiology assay, while one brand of cefuroxime injection failed microbiology assay.

Conclusion: Implementing robust post-marketing surveillance and quality testing of antimicrobials in circulation will help ensure patients' access to quality antimicrobials and prevent the use of SFMs to treat infections.

One system, one team: Enhancing medication safety and efficiency through hospital-wide integration of smart dispensing and infusion technologies

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Background: To address increasing concerns around medication safety and healthcare workforce shortages, our hospital initiated a digital transformation project integrating Automated Dispensing Cabinets (ADC) and Smart IV Pumps. The aim was to optimize the management and administration of high-alert and intravenous medications through cross-disciplinary collaboration among pharmacy, nursing, IT, and medical departments.

Purpose: To establish an integrated, intelligent medication delivery system that ensures accuracy, timeliness, and traceability for high-risk drugs, while reducing human errors and clinical workload.

Methods: ADC implementation began in 2024, with full deployment across 14 hospital units by April 2025, including six 2-drawer units, eight 10-drawer units, one auxiliary cabinet, and one smart-guided vaccine refrigerator. Smart IV Pump integration followed a two-phase approach: digitalization of drug orders and infusion parameters from June to December 2024, and system interfacing/testing from March to June 2025. A total of 211 pumps were deployed for inpatient high-alert and chemotherapy drugs. Standardized order templates (e.g., fixed rate, titration, multi-phase infusion) were introduced for system audit and automation.

Results: Challenges encountered included ADC night-shift access to controlled drugs, last-minute medication cancellations, and refill workloads. Smart Pump issues included unstable connectivity, delayed data synchronization with the NIS, and lack of real-time verification on the nursing end. Solutions involved system optimization, workflow redesign, and user interface enhancement. Ultimately, we achieved automatic concentration/flow rate verification, pump-to-order matching, and auto-documentation into nursing records, significantly reducing workload and errors.

Conclusion: This project demonstrated that integrating ADCs and Smart Pumps in a regional teaching hospital enhances both medication safety and clinical efficiency. Key success factors included early order digitalization, cross-department coordination, and robust system integration. Continued improvements will focus on decision support tools and expanded smart infrastructure to address ongoing workforce limitations.

The physical compatibility of the central nervous system drug Ginkgo biloba extract with frequently drugs used in the neurological intensive care unit

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Objective: A traditional Chinese medicine extracted from the Ginkgophyta, Ginkgo biloba extract (EGB) was used to regulate various neurological disorders (NDs). Neurocritical patients are expected to receive several intravenous agents at the time of admission. Limited compatibility data exist on EGB after marketing with other drugs administered simultaneously through the Y-site. This study aimed to determine the compatibility of EGB during simulated Y-site administration with 33 continuous-infusion drugs that are commonly administered in neurological intensive care units (NICUs).

Methods: The physical compatibility of EGB with these drugs was determined using a well-established experimental model to simulate Y-site administration. EGB 35 mg/ml was mixed in a volume ratio of 1:1 with the secondary drug solution to simulate Y-site co-administration procedures in NICUs. All other drugs were prepared at maximum concentrations commonly administered in the clinical setting. Physical compatibility was assessed by visual inspection (observations of haziness, color change, or precipitate formation), Tyndall beam, chromacity value, osmolality, pH, turbidity, insoluble

particles, and UV absorption at 0, 1, 2, and 4 hours post-mixing.

Results: EGB was compatible with 27 (82%) of the 33 drugs tested within four hours, while it remained incompatible with 6 (18%) drugs. Combinations of EGB + Aciclovir and EGB + Ganciclovir displayed Visual changes and A420nm changes > 0.0400. Binary combination of EGB + Amiodarone, EGB + Fosfomycin, EGB + Ganciclovir, EGB + Mannitol and EGB + Omeprazole had particles grew over the limitation of the Chinese Pharmacopoeia specification.

Conclusion: EGB 35 mg/ml should not be simultaneously co–administered with Aciclovir sodium, Amiodarone, Ganciclovir sodium, Fosfomycin sodium, Mannitol and Omeprazole sodium during simulated Y–site. If co administration is inevitable, a larger volume of saline (NS) or dextrose 5% in water (D5W) should be used to flush the port catheter before and after the EGB infusion to clean the lumen of the port catheter.

Opportunities for improving antibiotic use: Assessment of the management of pyelonephritis in adult women and concordance with Infectious Disease Society of America (IDSA) Guidelines

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Introduction: Acute uncomplicated pyelonephritis (AUP) is a kidney infection most commonly caused by bacterial pathogens ascending from the bladder to the kidneys. AUP is diagnosed in more than 250,000 individuals each year in the United States and results in more than 100,000 hospitalizations. Patient factors that define pyelonephritis as "uncomplicated", according to the 2010 Infectious Diseases Society of America (IDSA) guidelines, include premenopausal and nonpregnant adult women between the ages of 18-65 without urological abnormalities or comorbidities. Current literature on the application of AUP guidelines to clinical practice and related patient outcomes is sparse; it is not known whether clinicians are appropriately applying IDSA guidelines regarding selection of appropriate antibiotic therapy and duration of use. Characterizing antibiotic use for AUP is important for assessing treatment practices and may provide significant antimicrobial stewardship opportunities for improving overall antibiotic use.

Purpose: The purpose of this study was to describe antibiotic prescribing within a single health system in the United States and evaluate appropriateness of antibiotic use according to the 2010 IDSA guidelines for the management of AUP.

Methods: This retrospective study included all women aged 18-65 years of age with a diagnosis of pyelonephritis who were treated at a University of Colorado Health (UCHealth) facility from September 1, 2011 through December 31, 2022. Patients with comorbidities that classified them as "complicated pyelonephritis" (e.g. indwelling catheters, current bladder catheterization, instrumentation of the urinary tract, functional or anatomical abnormality of the urinary tract, pregnancy, or immunocompromised) were excluded from analysis based on the IDSA guidelines. Collection of data from electronic health records was accomplished using Health Data Compass (HDC), a UCHealth database. This study was reviewed and granted Exempt status by the local Institutional Review Board prior to data collection.

Results: A total of 8,457 unique women aged 18-65 years had a total of 10,352 episodes of AUP; 7,686 episodes (74%) were inpatient hospitalizations with a mean hospital stay of one day. Escherichia coli was the causative pathogen in 96% of patients with a positive culture; susceptibilities were 94% to ceftriaxone, 84% to fluoroquinolones, and 89% to gentamicin. A total of 5,667 inpatients (74%) were initially treated with intravenous therapy according to guideline recommendations; 90% received ceftriaxone and 10% a fluoroquinolone. A total of 3,547 women (62% of those receiving intravenous therapy) were then switched to an oral fluoroquinolone before discharge; the remainder received less-preferred antibiotics (e.g. oral beta-lactams). When considering both antibiotic selection and dosing, only 67% of hospitalized patients overall were treated appropriately according to IDSA guidelines; only 34% of patients received the appropriate guideline-recommended duration of therapy according to the specific antibiotics used.

Conclusion: In this large retrospective cohort of women hospitalized for treatment of AUP, antibiotic selection/dosing and duration of therapy were appropriate according to IDSA guidelines in only 67% and 34% of women, respectively. Significant antimicrobial stewardship opportunities exist for improving overall antibiotic management of AUP within our health system as well as potentially improving patient outcomes in this common infection.

Pharmacists' contributions towards antimicrobial therapy in an intensive care setting

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Introduction: ntimicrobials are among the most commonly used medications in intensive care where infections are frequently prevalent among critically ill patients.

Management of antimicrobials in critically ill patients with sepsis or septic shock can be challenging due to physiological changes that affect drug pharmacokinetics, as well as interpatient variability.
The importance of optimising antimicrobial therapy is underscored by variations in both efficacy and toxicity of these medications in critically ill patients. Pharmacists, being part of the multidisciplinary team, can contribute significantly in optimising antimicrobial therapy by selecting the most appropriate drug dosage, frequency, and method of administration to match patient clinical needs and monitor for risk of adverse drug events (ADEs) associated with these medications.
This study aimed to explore clinical interventions related to antimicrobial therapy carried out by pharmacists in an intensive care unit (ICU) and assess the significance of such interventions in preventing potential ADEs.

Method: The study was conducted over three months in the ICU of a general hospital, with pharmacists participating in daily ward rounds as part of the multidisciplinary team. Data was collected on pharmacist interventions related to antimicrobials. In collaboration with ICU physicians, the pharmacists provided suggestions based on clinical indication and condition of the patient, pharmacokinetics of antimicrobials involved, altered physiology associated with sepsis, associated renal replacement therapies and drug interactions. Data was categorised into types of pharmaceutical interventions. Interventions were evaluated for potential prevention of an ADE by an expert panel of healthcare professionals.

Results: Out of 164 patients admitted to the ICU over three months, 74 patients required at least one intervention related to their systemic antimicrobial therapy by pharmacists. Causes for antimicrobial therapy requirement involved empirical treatment, urosepsis, pneumonia, abdominal sepsis and bloodstream infections, amongst other indications. A total of 206 pharmaceutical interventions were carried out. The most frequent interventions comprised decrease in dose or increase in dosing interval (n=61) often due to organ dysfunction, increase in dose or decrease in dosing interval (n=52) most commonly due to severity of infection or sepsis, need for patient monitoring or therapeutic drug monitoring (n=44) and change in instructions for drug administration (n=29). The expert panel found these interventions had a medium probability (30%), low probability (68%), or very low probability (2%) of preventing a potential ADE. Interventions with a medium probability of preventing an ADE included advising to stop vancomycin infusion in an anuric patient whose continuous renal replacement therapy had been stopped; suggesting an alternative to clarithromycin for a patient with a prolonged QTc interval needing treatment for atypical bacteria; increasing dosing interval of aminoglycosides in patients with acute kidney injury and recommending the prescription of prophylactic co-trimoxazole for an immunosuppressed patient, thereby reducing the risk of opportunistic infections.

Conclusion: The study demonstrated that pharmacists play an important part in optimising antimicrobial therapy, significantly reducing the risk of ADEs associated with antimicrobials while optimising treatment efficacy in severe infections and sepsis. Effective collaboration between pharmacists and the multidisciplinary team in the ICU can lead to improved patient outcomes.

Improving pharmacy workflow to reduce medication wait times and enhance patient experience: A quality initiative from Taiwan

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Introduction: Since June 2023, pharmacist shortages at a regional hospital in southern Taiwan have resulted in prolonged medication wait times and growing patient dissatisfaction, adversely affecting the hospital's reputation. Media reports in June 2024 indicated that medication wait times had exceeded two hours, raising concerns among patients and healthcare professionals. To address these challenges, the pharmacy department implemented the PDCA (Plan-Do-Check-Act) cycle, a quality improvement methodology, to streamline pharmacy workflow, reduce medication wait times for both outpatient prescriptions and Chronic Disease Refill Prescriptions, and enhance patient satisfaction.

Methods: Challenges Identified. Key issues included an unsegregated dispensing workflow that reduced efficiency, a disorganized pickup process that frustrated patients, and insufficient staffing and medication preparation, leading to delays, especially during peak hours. Additionally, high pharmacist workloads—such as prescription verification, patient identification, and medication counseling—further prolonged processing times.
Interventions (PDCA Cycle Implementation)
Phase 1 (June 2024): Workflow and Pickup Optimization
A color-coded prescription basket system was implemented to streamline processing, with yellow for outpatient prescriptions, green for chronic prescriptions, and blue for pediatric prescriptions. Additionally, Pickup windows were designated specifically for outpatient (Counters 1 and 2) and chronic prescriptions (Counters 3 and 4) to reduce queue confusion and improve efficiency.

Phase 2 (October 2024): Staffing Optimization
To further improve workflow efficiency, pharmacists and assistants initiated medication preparation and pre-dispensing procedures 30 minutes before the start of the outpatient clinic to mitigate morning congestion. During peak hours, additional pharmacists were deployed to provide real-

time support for dispensing operations. Additionally, in November 2024, a dedicated medication consultation room was established to manage complex inquiries separately, thereby reducing bottlenecks at dispensing counters and enhancing overall efficiency.

Results: Following the implementation of Phase 1, outpatient medication wait times were significantly reduced from 131 minutes to 20.7 minutes (84% reduction). Meanwhile, wait times for Chronic Disease Refill Prescriptions decreased by 87%, from 170.6 minutes to 20.7 minutes. After Phase 2, average wait times were further reduced to 17.1 minutes, a 17.4% decrease compared to June and September. Additionally, no complaints were recorded in December 2024, a notable improvement from the previous monthly average of 4.5 complaints before implementation.

Conclusion: This improvement project demonstrated that workflow optimization and strategic staffing adjustments significantly reduced medication wait times and enhanced pharmacy operational efficiency. The implementation of the PDCA cycle effectively resolved dispensing bottlenecks and minimized patient dissatisfaction. Moving forward, these improvements will be incorporated into standard operating procedures (SOPs) to ensure consistent staff training and the long-term sustainability of high-quality pharmacy services.

Evaluation of Oxytocin use during labour

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Introduction: Globally, there is a general lack of uniformity in oxytocin use with variation in the concentrations adopted, administration patterns (doses, rate, duration of infusion) for the induction and augmentation of labour. This study aimed to develop a Best Practice Implementation Strategy for OT use during labour in a local hospital.

Method: The study was carried out at the Department of Obstetrics and Gynaecology, Mater Dei Hospital (MDH) and at the Directorate of Pharmacy, MDH in 2024. A suitable quality metric tool for the safe use of OT was identified to carry out a gap analysis exercise. A google search was undertaken to identify tools that can be used in clinical practice. The keywords used were 'Oxytocin' and 'Toolkit'. Two relevant toolkits were found; 'Safe Medication Administration: Oxytocin' by the Agency for Healthcare Research and Quality Safety Program for Perinatal Care, 2017 and 'Safe Administration of Oxytocin Implementation Toolkit' by the PCMCH, 2022. After carrying out the gap analysis, a Best Practice Strategy was developed and validated by an expert panel consisting of four obstetricians, two senior midwives and two pharmacists.

Results: The PCMCH toolkit was deemed the most suitable to use in performing the local gap analysis as it was developed in 2019, updated in January 2022 and evaluated in March 2023, making it the most recent. Risk minimisation strategies already in place pertaining to OT use were appraised. From the 27 criteria listed in the PCMCH toolkit, 5 were unmet, 8 were partially met and 14 were met. The strategy developed focused on optimising practice through the development of checklists to support documentation to reduce risk of errors particularly between shift changes. The expert panel confirmed the practicality and applicability of the proposed strategy. Subsequently sessions were carried out with midwives working at labour ward to disseminate the strategy, create awareness on safe use of OT practices and facilitate the implementation of the identified checklists to enhance documentation practices.

Conclusion: This study provided an evaluation of current practices of OT use in the labour ward with a focus on patient safety and risk minimisation. The developed Best Practice Implementation Strategy addresses the gaps identified and strengthens good practices in ensuring standardised patient safety practices. The approach adopted in this study could be repeated in future practice research to evaluate practice and identify updates required in the strategy and health professionals re-training. Moreover the adoption of the use of Artificial intelligence could be considered in the future to aid in predicting patients at risk for example of the occurrence of foetal hypoxia, so that preventive clinical decisions can be made to reduce risk for both mother and baby.

Pharmacotherapy for hospitalized patients with Covid-19: A drug utilization study in a Covid-19 dedicated unit of a tertiary hospital in Ghana

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Introduction: The coronavirus disease 2019 (COVID-19) pandemic caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has also presented an unprecedented challenge to identify effective drugs for prevention and treatment. And in view of that, it is important to understand the determinants and patterns of

pharmacological treatment over time as such knowledge helps to contextualize and understand the drivers of treatment in the management of COVID 19 patient.

Method: This was a retrospective study conducted in a COVID-19-confirmed positive hospitalized patients at a dedicated unit of a tertiary hospital

Results: A total 88.6% (47/53) had comorbidity (s). The mean age of the study participants was 47.1 ± 17.9 years. Women accounted for 58.5%, (31/53) positivity of the patients A total of 493 drugs were prescribed to treat the various COVID-19 symptoms and co-existent comorbidity(s) captured in the study.

The mean medication per patient was 9.3±4.3. Per the various dosage forms, the mean per injection per patient was 2.6±1.7 whilst that of oral dosage form the median was 6±2.3 The most commonly prescribed class of drugs were Multivitamins/supplements (108, 27.1%), followed by anticoagulants (65, 16.3%), antihypertensive (64, 15.8%), antibiotics (64, 15.8%) and others

Conclusion: For the management of COVID 19 symptoms, high doses of vitamin C, Zinc and doxycycline (antimicrobial) were most prescribed whilst losartan and insulin mixtard were most frequently prescribed class of drugs for the management of COVID 19 comorbidities of hypertension and diabetes respectively.

Relationship between genotype and/or phage ORF type of ESBL-producing Escherichia coli and fluoroquinolones resistance in hospitals at big city area and regional city

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Introduction: Extended-spectrum β-lactamase (ESBL)-producing bacteria are one type of resistant bacteria, and their number has been increasing worldwide in recent years. Escherichia coli is the most common ESBL-producing bacteria, and in previous reports, more than 90% of ESBL-producing bacteria detected in hospitals were E. coli. In addition, the isolation rate of third-generation cephalosporin-resistant E. coli, including ESBL, varied by region in reports from the Japan Nosocomial Infections Surveillance (JANIS). In this study, we analyzed the genotypes and POT types of ESBL-producing E. coli in hospitals at metropolitan and regional areas. Additionally, we aimed to clarify the relationship with drug resistance.

Method: The subjects were ESBL-producing E. coli samples detected at Takagi Hospital in a big city area and Shimane University Hospital in a regional city from 2013 and 2017-2022. ESBL-producing E. coli were subjected to genotyping and molecular epidemiological analysis (POT type). In addition, the relationship between the amount of injectable antibiotics used at each hospital and the genotype and POT type of ESBL-producing E. coli was examined.

Results and Discussion: In terms of genotypes of ESBL-producing E. coli, the CTX-M9 group was frequently detected in both years, but in 2013, 100% of them were fluoroquinolone-resistant, whereas in 2017, this figure had decreased to 30%. In 2018, previously undetected CTX-M2 and CTX-M8 groups were detected. On the other hand, molecular epidemiological analysis of ESBL-producing E. coli was performed using the POT method, and in 2013, 75.0% of the strains were ST131-resistant, which is spreading worldwide, but this proportion has halved since 2017, and the number of fluoroquinolone-susceptible POT types has increased. On the other hand, the proportion of fluoroquinolones used among broad-spectrum antibiotics was 14.2% in 2013, but has decreased to less than 10% since 2017, which is thought to be one of the reasons for this. In addition, although the genotypes of ESBL-producing E. coli in hospitals in metropolitan areas and regional cities tended to have a higher proportion of CTX-M9 group, the POT types appeared to differ between the two facilities, suggesting that ESBL-producing E. coli of various POT types are widespread within Japan.

Conclusion: It was suggested that ESBL-producing E. coli changed from ST131 to a different POT type from 2013 to 2017-202, which has a significant impact on fluoroquinolone susceptibility. It was also revealed that the POT types of ESBL-producing E. coli detected in metropolitan areas and regional cities are different, and it is considered necessary to continue to closely monitor the spread of this disease within Japan.

Evaluation of steady-state exposure and early cardiotoxicity in Asian patients with HER2-positive breast cancer treated with trastuzumab

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Background: Breast cancer is one of the most common malignant tumors among women worldwide. HER2-positive breast cancer, in particular, is a highly aggressive subtype, with patients facing a higher risk of recurrence and metastasis, as well as relatively poor prognosis. Currently, trastuzumab has been approved for the targeted therapy of patients with HER2-positive early-stage and metastatic breast cancer. Due to the interindividual variability in the pharmacokinetics of trastuzumab, monitoring the drug exposure levels at steady state holds important clinical significance and can provide valuable guidance for individualized treatment in patients. Moreover, the cardiotoxicity induced by trastuzumab during treatment is a major concern for clinicians and requires further investigation.

Methods: Blood samples were collected from 166 HER2-positive breast cancer patients receiving trastuzumab (8 + 6 mg/kg Q3W) as monotherapy or in combination with chemotherapy. The samples were taken 30 minutes before administration in the next cycle, following the completion of the fifth treatment cycle. We optimized an indirect ELISA method to measure the steady-state trough concentration of trastuzumab, serving as an indicator of steady-state drug exposure levels during patient treatment. This study investigated the factors influencing steady-state drug exposure levels and their correlation with common adverse reactions. Additionally, we collected patients' imaging results and laboratory data to assess early cardiotoxicity during treatment.

Results: We found that Mg and GGT were independent factors that significantly influenced the steady-state exposure levels of trastuzumab ($P < 0.05$). Higher steady-state exposure levels may make patients more susceptible to gastrointestinal adverse reactions. Elevated ALT levels (> 40 U/L) at steady state, high Ki-67 expression (≥ 15%), and a history of anthracycline use were identified as independent risk factors for early cardiotoxicity in HER2-positive breast cancer patients receiving trastuzumab treatment ($P < 0.05$). However, the steady-state exposure levels of trastuzumab were not associated with the occurrence of early cardiotoxicity.

Conclusion: Elevated Mg levels or decreased GGT levels can lead to an increase in the steady-state exposure of trastuzumab, although the extent of the impact is limited. Elevated ALT levels (> 40 U/L) at steady state, high Ki-67 expression (≥ 15%), and prior use of anthracyclines increase the risk of early cardiotoxicity during treatment. It is recommended to implement appropriate protective interventions at an early stage for patients with high-risk factors.

Monitoring and analysis of serum voriconazole concentration in adults with pulmonary aspergillosis

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Introduction: Voriconazole (VRC), a broad-spectrum triazole antifungal agent, is clinically used for treating invasive pulmonary aspergillosis. VRC is mainly metabolized by the cytochrome P450 enzyme system in the liver, showing nonlinear pharmacokinetic characteristics in vivo. The metabolic process is affected by various factors such as patient age, gender, gene polymorphism and drug-drug interactions, and the serum concentration varies greatly between and within individuals. Numerous studies have shown that the clinical efficacy of VRC is correlated with its serum concentration. Concentrations that are too low may lead to poor or failed treatment outcomes, while concentrations that are too high is prone to induce adverse reactions. Consequently, therapeutic drug monitoring of VRC is essential to optimize efficacy while minimizing adverse effects like hepatotoxicity and neurotoxicity. This study aims to establish a high-performance liquid chromatography (HPLC) method characterized by rapidity, accuracy, stability, and operational simplicity for determining the Cmin of VRC. Additionally, it seeks to investigate clinical characteristics of pulmonary aspergillosis patients, concomitant medication profiles, and hepatic function variations, thereby providing evidence-based guidance for safe and rational clinical use of this antifungal agent.

Method: An HPLC-UV method was developed using a waters symmetry C18 column (4.6 mm×250 mm, 5 μm) with a mobile phase of acetonitrile/water (V/V=41:59) at a flow rate of 1.0 mL/min. Detection wavelength was set to 256 nm, column temperature to 30℃, and injection volume to 80 μL. Serum samples from 545 adults with pulmonary aspergillosis were analyzed to evaluate the relationship between the VRC Cmin and clinical efficacy, as well as the the influencing factors.

Results: The chromatographic peaks of VRC were well separated. A good linear range of VRC concentration was between 0.25 mg/L and 15.12 mg/L, and the regression equation was S=1472.17+27807.69C (r=1.000). Relative recoveries for low, medium, and high concentrations ranged from 97.25% to 104.31%, with an average extraction recovery of (102.54±5.46)%. Intra-day and inter-day RSD were less than 5%. In the monitored 545 adults, the Cmin of VRC was significant different among individuals, and the average Cmin

was 3.59±2.10 mg/L. Among them, 416 cases (76.3%) were in the effective range (0.5~5.0 mg/L). Univariate linear regression analysis showed that CRP, albumin, direct bilirubin, and serum creatinine were related to the VRC Cmin. Multivariate regression linear analysis showed that CRP, albumin, and the use of proton pump inhibitors (PPIs) were significantly correlated with the VRC Cmin.

Conclusion: The developed HPLC-UV method demonstrates specificity, simplicity, accuracy and cost-effectiveness, making it suitable for routine determination of the VRC Cmin in clinical practice. The Cmin of VRC in adults with pulmonary aspergillosis is susceptible to a variety of factors, such as CRP and albumin. To sum up, individualized therapeutic drug monitoring of VRC is essential to optimize efficacy and safety.

Study on the development of chronic disease drug management system during the COVID-19 situation by multidisciplinary professionals, Yang Chum Noi District Health Service Network

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Introduction: Currently, the chronic disease medication management system at Yang Chum Noi Hospital operates through integrated services across various departments. The process begins with ordering medications from the Non-Communicable Diseases (NCDs) Unit and transmitting data via the hospital's Himpro system to the pharmacy service unit. The pharmacy service unit then carries out processes in accordance with pharmaceutical professional standards to ensure the utmost safety and suitability for each patient. Once verified for accuracy, medications are dispatched to sub-district health promotion hospitals for distribution to patients in their respective areas.

During the COVID-19 pandemic, weaknesses in the chronic disease medication management system were identified, particularly in the connection points within the healthcare service network. When medication errors occurred, there was a lack of information transmission regarding these errors, as well as an absence of a systematic approach to medication risk management. Additionally, drug management at the healthcare network level and various administrative processes lacked integration with multidisciplinary professionals, affecting the overall continuity and efficiency of treatment.

Method: To enhance the effectiveness and continuity of medication management, this research was conducted using an action research approach. The Chemist and Measurer Guard Process was applied, consisting of four key steps:

Planning
Action
Observation
Reflection

This process was implemented over two cycles between 1st October 2020 and 30th June 2021.

Research Findings: The research findings from both cycles revealed the following key outcomes:

A three-step verification system for dispensing accuracy was developed, effectively preventing medication errors in alignment with established standards.

A chronic disease medication management system specifically designed for the COVID-19 situation was established.

Labelling stickers were introduced to indicate when a medication's manufacturer had changed, ensuring clarity for both pharmacists and patients. A guideline for forwarding drug information and risk management was implemented, creating a link between hospitals and sub-district hospitals via a Line Risk Notify System. This system enabled real-time online reporting of all identified risks from sub-district hospitals. Additionally, significant improvements were observed:

The incidence of patients receiving duplicate medications decreased from 263 cases to 56 cases. The occurrence of patients receiving the wrong type of medication decreased from 5 cases to 1 case.

Conclusion: The study demonstrated that the chronic disease medication management system and data integration system for both medication management and medication risk management were successfully established within the Yang Chum Noi healthcare service network. This system was developed through the collaboration of the Pharmacy and Treatment Committee, Risk Management Committee, and the Yang Chum Noi District Health Service Network.

As a result, medication errors were significantly reduced, ensuring that patients received the correct, complete, and high-quality medication. Patients were also able to use their medication correctly, receive their prescriptions continuously, avoid missed doses, and benefit from an improved medication delivery system. These improvements maximised the overall benefits for service recipients and strengthened the efficiency of the hospital's medication management framework.

Utilization of AI in providing real-time alerts for pharmacists' interventions to improve patient safety and outcomes related to patient hospital falls and related harms

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Introduction: A patient fall is defined as an unintended descent to the floor with or without injury to the patient. Falls in the hospital may result in patient harm, leading to increased healthcare costs, length of stay, and potential lack of reimbursement from The Centers for Medicare and Medicaid Services. Our interdisciplinary team consisting of three pharmacists at Houston Methodist Hospital (HMH) and a pharmacy product specialist at Vigilanz (now Inovalon) collaborated to develop real-time alerts aimed at enabling clinical pharmacists to identify patients at the highest risk for falls and intervene proactively before a fall occurs.

Methods: HMH utilizes the Hester Davis score for fall risk assessment. Per standard practice, nurses may consult the clinical pharmacist to review medications and identify potential adverse effects that could increase fall risk. Based on previous experiences and fall events, this practice does not alert pharmacists in real time, which limits prospective and timely interventions.
Our team partnered with a Vigilanz pharmacy product specialist to develop real-time alerts driven by surveillance rules that identify high-risk factors, including fall risk, medications, and clinical conditions. We utilized a range of strategies to build these rules to alert the pharmacist of patients at the highest risk for falls from medications and certain clinical factors while also minimizing alert fatigue.

Results: We used a high fall risk score from the Hester-Davis fall risk assessment as a starting point to narrow potential patients. For medication classes, we focused on those involving at least two medications from CNS-affecting agents: anticonvulsants, antidepressants, opioids, benzodiazepines, muscle relaxants, hypnotics, and neuroleptics. Clinical factors were also considered, including hypoglycemia (defined as blood glucose < 70 mg/dL), hypotension (defined as a systolic blood pressure < 90 mm Hg), hyponatremia (defined as serum sodium < 134 mEq/L), and acute kidney injury (defined as a change in serum creatinine > 0.3 mg/dL in 24 hours). Our team has successfully developed and implemented the fall prevention Vigilanz alert. Following a successful pilot phase, we are now utilizing this tool in our practice to proactively identify patients with fall risk, intervene through pharmacotherapy modification, provide patient education, and offer support to nurses in acute care units. The rule triggers an average of 8 times per day across 6 units, which is manageable within the current pharmacist workload. It has been successfully implemented hospital-wide. Our team is evaluating alerts, making real-time interventions in collaboration with nursing staff and physicians, and documenting accepted interventions. Our ultimate goal is the prevention of patient falls and falls-related harm.

Conclusion: Reducing patient falls in the hospital will reduce suffering, morbidity and mortality, and overall medical costs. Clinical pharmacists have an important role in improving patient outcomes related to falls by identifying polypharmacy and clinical factors that place patients at the highest risk for falls. However, previous standard hospital workflow was not providing real-time alerts for clinical pharmacists. The recent development of a real-time alerts enhanced our opportunity to intervene in high-risk patients to reduce falls and related harms

Medication changes after palliative care transition in elderly end-stage cancer patients: Focus on palliative care essential medicines and potentially inappropriate medicines

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Introduction: As polypharmacy emerges as a significant issue among the elderly, the frequency of polypharmacy is higher in elderly cancer patients due to the use of anticancer drugs, adjuvant medications for managing side effects from chemotherapy and medications for comorbid conditions. In hospice patients with a limited life expectancy, the focus is on avoiding unnecessary medications and improving quality of life by managing pain with appropriate drugs. Therefore, this study aims to analyze the changes in prescriptions following the transition to palliative care in elderly cancer patients.

Methods: A retrospective review was conducted on 123 terminal cancer patients aged 65 and older who were transferred to and passed away in the palliative care unit of the Veterans Health Service Medical Center. Four time points were selected for analysis: the day of request for hospice transfer, the day of transfer, one week before death, and the day of death. Prescriptions at each time point were analyzed based on the International Association for Hospice and Palliative Care (IAHPC) list of essential palliative care medicines and the Screening Tool of Older Persons Prescriptions in Frail Older Adults with limited life expectancy (STOPPFrail) Version 2 guidelines.

Results: Polypharmacy, defined as the use of five or more medications, was observed in 95 patients (77.2%) at the time of hospice referral, in 112 patients (91.1%) on the day of transfer, in 112 patients (91.1%) one week before death, and in 88 patients (71.5%) on the day of death. Essential palliative care medications were prescribed at an average of 1.8 on the day of hospice referral, 2.1 on the day of transfer, 2.7 one

week before death, and 2.0 on the day of death, showing an increase in the number of medications followed by a decrease on the day of death. Potentially inappropriate medications decreased steadily, with an average of 1.4 on the day of hospice referral, 1.2 on the day of transfer, 0.4 one week before death, and 0.1 on the day of death. The total number of medications showed a decreasing trend after the transition to palliative care, with an average of 12.2, 14.4, 13.6, and 10.5 at each time point.

Conclusion: In elderly terminal cancer patients, polypharmacy was frequent after transitioning to palliative care. However, after the initiation of hospice care, the total number of medications decreased, while the use of essential palliative care medications increased, and potentially inappropriate medications decreased.

Global patterns in antimicrobial stewardship implementation, antibiotic resistance, and health expenditure

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Introduction: Antimicrobial stewardship (AMS) has been recognized as a key component of addressing the global threat of antimicrobial resistance. However, the potential for economic vulnerabilities to undermine the efficacy and implementation of AMS programs in various settings remains a critical knowledge gap. Identifying these influences and how they impact different global contexts is crucial to understanding the potential barriers to AMS implementation.

Purpose: To identify how national-level factors may influence the status of AMS implementation and its effectiveness by connecting results from the FIP Global AMS Survey with national-level data: economic indicators and estimated antibiotic resistance data.

Method: A secondary data analysis was conducted by connecting results from the FIP Global AMS Survey with 1) published World Bank economic datasets (domestic health expenditure [a percentage of government spending] and Gross Domestic Product [GDP] per capita) and 2) national-level antibiotic resistance data (the last updated estimated E. coli antibiotic resistance ranges per country/territory for fluoroquinolones and third-generation cephalosporins [Lancet, 2019]). Data were aggregated by United Nations regions.

Results: The secondary analysis focused on the hospital pharmacy responses representing 63 countries (N = 284 participating hospital pharmacists). In most regions, there was no statistically significant relationship between AMS implementation status and antibiotic resistance. However, in the Northern Africa and Western Asia region, increased AMS implementation was associated with lower antibiotic resistance. Some countries demonstrated a relationship of a high AMS presence and lower resistance. For example in the United States, 97.6% of pharmacists reported an established AMS program and resistance rates are 20 to <30% to fluoroquinolones and 10 to <20% for cephalosporins. An opposing relationship was also observed Pakistan (51.22% reported an established AMS and ≥80% resistance for cephalosporins and 70 to ≥80% for fluoroquinolones). A strong relationship was identified between domestic health expenditure and GDP (Pearson r = .54, p = 4.4e-05), with increased GDP indicating greater health expenditure. Uniquely, Latin America and the Caribbean had greater domestic health expenditure as a proportion of GDP with a lower average GDP. Linear regression analysis within each region of the domestic health expenditure, GDP, and AMS implementation confirmed a consistent upwards trend. The majority of countries with high proportions of respondents indicating AMS as established also had a high proportion GDP spent on health and a corresponding lower range of resistance to both antibiotics. There were significant outliers; Pakistan had a strong AMS presence, very low health expenditure (4.9%), yet high resistance rates.

Conclusion: The results identified the relationship between regional and country economic, AMS status and resistance levels, informing strategic approaches to strengthen AMS efforts. Results indicate countries with lower resistance ranges have greater domestic health expenditure, regardless of GDP, and generally more established AMS programs. Further research is necessary to determine the impact of AMS efforts, but there is a relationship that can be identified between higher health expenditure and lower resistance ranges. Global collaboration to provide more timely resistance data is also necessary to evaluate current AMS programs. Overall, government economic support appears to improve AMS program efficacy.

Evaluation of the applicability of open access vancomycin web calculators in critically ill patients: A comparison of predicted and measured values

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Introduction: Vancomycin is a glycopeptide antibiotic widely used to treat severe Gram-positive bacterial infections, including Methicillin-Resistant Staphylococcus Aureus (MRSA). To avoid potential toxicity and increased the clinical efficacy, therapeutic drug monitoring (TDM) is required for

optimizing efficacy and minimizing adverse effects. Traditional trough concentration monitoring is gradually being replaced by dose adjustment strategies based on the area under the concentration-time curve (AUC). To estimate AUC quickly and optimize individualized dosing regimens, various open-access vancomycin dosing calculators are commonly used in clinical practice, relying on single-point trough concentrations to predict AUC. However, current comparison regarding the accuracy of these calculators in critically ill patients is still limited. This study aimed to evaluate the correlation between vancomycin trough concentrations predicted by two open-access calculators and actual measured concentrations in critically ill patients.

Methods: A retrospective study was conducted to analyze adult ICU patients who received vancomycin between January 2020 and August 2024 at a single district hospital in northern Taiwan. Patient characteristics and clinical data were extracted from medical records, and the relevant data were input into both VancoPK (vancopk.com) and ClinCalc (clincalc.com) vancomcyin calculator to predict trough concentrations, which were then compared with the actual measured concentrations. Data distribution was assessed using the Shapiro-Wilk test, and Spearman's rho correlation coefficient was used to evaluate the correlation between actual and predicted concentrations. The Wilcoxon signed-rank test was applied to compare predicted values with actual measurements, and bias and precision were visualized using Bland-Altman plots.

Results: After excluding cases that did not meet the inclusion criteria, a total of 81 critically ill patients were included in the final analysis. The average age of the patients was 62 years old, and 52.5% had an eGFR < 90 mL/min/1.72m². Both VancoPK and ClinCalc predictions showed a positive correlation with actual measured values, but the correlation for ClinCalc was weaker. Additionally, ClinCalc predictions exhibited greater discrepancies from actual measurements (Wilcoxon Signed-Rank Test, $p < 0.001$), with a positive average error, suggesting potential systematic bias. Bland-Altman analysis revealed that VancoPK demonstrated lower variability and better consistency, with smaller error ranges compared to ClinCalc.

Conclusions: This study found that VancoPK provided more accurate predictions of vancomycin concentrations than ClinCalc in critically ill patients. The ClinCalc model may underestimate renal function in this population, leading to underpredictions of trough levels. This could result in insufficient initial dosing and affect treatment outcomes. However, there is no standardized, quantitative definition for critical illness, which is often accompanied by variations in pharmacokinetic status. Although online dose calculators are quick and convenient tools to help clinicians make decisions, we should exercise caution when using in critically ill patients, and persistent TDM may be necessary to enhance individualized dosing strategies.

Investigating the suspected drugs associated with drug-induced liver injury and evaluating the use of hepatoprotective drug use as a treatment: a single-centre retrospective study

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Background: Drug-induced liver injury (DILI) refers to a liver injury caused by various medications, herbs, or other xenobiotics leading to abnormalities in the liver or liver dysfunction with the reasonable exclusion of other etiologies. Drug-induced liver injury is a rare adverse drug reaction which can lead to liver failure and even death. The prevalence of DILI in China is higher, at 23.80 per 100,000. Conventional drugs are the main cause of DILI in western countries. However, herbal medicines are considered a significant contributor to DILI in China. The standard treatment for DILI often involves supportive care and discontinuation of suspected drugs, but the rationality of hepatoprotective drug use in DILI management remains underexplored.

Purpose: To identify the suspected drugs associated with DILI and evaluate the use of hepatoprotective drugs as a treatment in order to provide evidence to enhance medication safety and optimise clinical pharmacotherapy.

Method: Patients with the results of liver function tests in their EHR from January 2022 to June 2024 were screened. The abnormal liver function that was determined through biochemical test results and physicians' diagnoses based on signs and symptoms was used to confirm DILI. Furthermore, the characteristics of the suspected drugs and the clinical profiles of the patients were analysed. Identify the use of hepatoprotective drugs among DILI cases and evaluate the appropriateness of their use in accordance with clinical practice guidelines. Data were analysed using SPSS.

Results: Among 12,265 patients with liver function test results available in the EHR, the DILI detection rate was 0.30% (37/12,265 cases). The average age was 51.68 ± 22.20 years, with females accounting for 75.7% of cases. Hepatocellular injury was the predominant type (73.7%), followed by mixed-type injury (26.3%). There were no statistically significant variations in the severity and prognosis across patients with different clinical types of DILI. Conventional medicines were the primary suspected cause (56.76%), mainly involving antithyroid drugs (16.22%), lipid-lowering agents (13.51%) and antibiotics (10.81%). Herbal medicines were found associated with 29.73% of suspected cases, with unknown compositions in nine out of 11 cases. In four cases (10.8%), concurrent use of two or more hepatotoxic agents precluded identification of the primary suspected drug in DILI. Overall, 97.3% of patients showed improvement or recovery after treatment. Among the 37 DILI patients, only one discontinued

the suspected drug, while the remaining 36 both discontinued the suspected drug and were prescribed hepatoprotective drugs simultaneously. The most commonly used were liver cell membrane protectants (46.05%) and detoxification agents (36.84%). The irrational use rate of hepatoprotective drugs was 11.11% due to inappropriate indications in four of 36 cases.

Conclusion: The hepatocellular injury was the most common DILI type. Conventional medicines, particularly antithyroid drugs and lipid-lowering agents were the leading suspected causes, while DILI associated with herbal medicines was also notable. Inappropriate use of hepatoprotective drugs was observed, highlighting the need for improved medication management and optimised pharmaceutical care for DILI patients.

Comparing efficacy of clomiphene citrate and letrozole for ovulation induction in infertile women: Hospital-Based Cohort Study

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Introduction: Clomiphene citrate and letrozole are the primary drugs used for ovulation induction in infertility treatment. While several studies have compared their efficacy, the results have been inconsistent. Furthermore, limited research has explored their effects on embryo quality. Therefore, this study aims to investigate the efficacy of clomiphene citrate and letrozole for ovulation induction in infertile women undergoing intrauterine insemination (IUI) or in vitro fertilization (IVF).

Method: This retrospective cohort study was conducted at Taichung Veterans General Hospital (TCVGH) from April 2022 to April 2024. All patients were diagnosed with infertility and underwent intrauterine insemination (IUI) or in vitro fertilization (IVF). For ovarian stimulation, participants received clomiphene citrate or letrozole combination with gonadotropins. Patients with concurrent endocrine or autoimmune disorders were excluded. The primary outcomes were evaluated the pregnancy rate and live birth rate. Statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS), version 22.0.

Results: A total of 37 patients (38 stimulation cycles) were enrolled, including 19 patients (20 cycles) in the clomiphene citrate cohort and 18 patients (18 cycles) in the letrozole cohort. The pregnancy rate was higher in the clomiphene citrate cohort compared to the letrozole cohort (70.00% vs. 55.56%), as was the live birth rate (42.86% vs. 30.00%). In the subgroup analysis of patients who underwent IVF, the clomiphene citrate cohort (n=3, 3 cycles) exhibited a higher pregnancy rate compared to the letrozole cohort (n=11, 11 cycles) (100% vs. 81.82%) and a greater proportion of excellent and good-quality embryos (49.44% vs. 23.73%). However, there was no significant difference in live birth rate (33.33% vs. 33.33%) or fertilization rate (71.18% vs. 70.98%). Among patients who underwent IUI, the pregnancy rate was significantly higher in the clomiphene citrate cohort (n=16, 17 cycles) compared to the letrozole cohort (n=18, 18 cycles) (64.71% vs. 14.29%, p = 0.0165).

Conclusion: The present study observed higher pregnancy rates among patients who used clomiphene citrate, with a significantly greater pregnancy rates among those who underwent intrauterine insemination combination with clomiphene citrate treatment. Therefore, these findings might provide better evidence supporting clinicians care for these patients with infertile.

The safety of traditional Chinese medicine for patients with G6PD deficiency

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Introduction: G6PD (Glucose-6-phosphate dehydrogenase) deficiency, commonly known as "Favism", is an inherited and X-linked metabolic disorder. G6PD deficiency is the most common enzymatic disorder of red blood cells (RBCs), affecting at least 400 million people worldwide on a conservative estimate. In Taiwan, the prevalence of G6PD deficiency is approximately 2-3%, with a higher incidence among the Hakka population.

Most patients with G6PD deficiency remain asymptomatic throughout their lives. Common causes of hemolysis include external oxidative stress on RBCs, such as infections, medicine or specific foods. In Chinese communities, people believe that Jin Yin Hua (Honeysuckle Flower), Huang Lian (Rhizoma Coptidis), 100% pearl powder, Niu Huang (Calculus Bovis), La Mei Hua (Wintersweet Flower), Huang Qin (Radix Scutellariae), Huang Bai (Cortex phellodendri), Ge gen (Radix Puerariae), and Mentha pose a risk of hemolysis in patients with G6PD deficiency.

Aims: To investigate the safety of using traditional Chinese medicine in patients with G6PD deficiency through literature review and clinical experience.

Method: ● We searched Pubmed, Airiti Library, China National Knowledge Infrastructure (CNKI), and WANFANG Database from inception to Feb, 28, 2025. The search strategies used the keywords “G6PD deficiency”, “traditional Chinese medicine”, “herb”, and “hemolysis”. ● We reported a case with G6PD deficiency who used traditional Chinese medicine that may be considered contraindicated for G6PD deficiency to treat urticaria.

Results: ● A total of fifteen articles were identified which revealed both positive and negative results. Ten positive results showed that traditional Chinese medicine has antioxidant effects on RBCs, suggesting it has a protective effect on patients with G6PD deficiency. On the other hand, five negative results indicated that traditional Chinese medicine may cause hemolysis in patients with G6PD deficiency. Currently, there is insufficient evidence to decide whether these medicines should be prohibited for G6PD deficiency or not.
● A 21-year-old male with G6PD deficiency took several kinds of traditional Chinese medicine believed to cause hemolysis in G6PD deficiency from Dec, 14, 2023 to Feb, 28, 2025, including Rhizoma Coptidis (6g/day), Radix Scutellariae (7.5g/day), Cortex phellodendri (4g/day), Radix Puerariae (6g/day), and Mentha (1.5g/day). We closely monitored any signs and symptoms of hemolysis, and the patient underwent regular blood tests to monitor bilirubin levels and checked for any signs of jaundice (such as icteric sclera or tea-colored urine). No abnormalities were found during the course of his treatment.

Conclusion: Based on the literature reviewed, although some traditional Chinese medicines may pose a risk of hemolysis, there is insufficient evidence to conclusively decide whether they should be prohibited for G6PD deficiency. According to our clinical experience, when used in recommended doses and with regular assessments based on clinical symptoms and laboratory tests, the above traditional Chinese medicines are not contraindicated for patients with G6PD deficiency.

An evaluation of pharmacist-led interventions in long-term care facilities by studying drug related problems

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Introduction: According to statistics, the hospitalization rate of the elderly due to adverse drug reactions is four times that of the younger group, and 88% of them are preventable. In view of this, the pharmacists of our hospital visit long-term care facilities every month for Drug Regimen Review (DRR), and further solving Drug Related Problem (DRP) and Potentially Inappropriate Medication (PIM). Resolve and preventing drug-related problems, can ensure drug safety for the elderly and improve the quality of the healthcare system.

Method: By using Medication Appropriateness Index (MAI), Beer's criteria, STOPP (Screening tool of older persons' potentially inappropriate prescriptions), and START (Screening tool to alert doctors to the right treatment), pharmacists review every residents' medication. Collect the drug-related problems, classifying its type and then provide pharmaceutical services and connect with other healthcare providers, such as nurses and physicians. Communication may take a long time to go back and forth, but come out with a solution as a multidisciplinary team at last.

Results: Among the three long-term care facilities, there were 79 Drug Related Problem cases in 2023. The most common Drug Related Problem categories are: Poor Control of the disease (17), Inadequate monitoring (15), Untreated medical problem (11). Other categories such as Need for patient education (8), Adverse reaction (8), Duplicated prescription (4), Inappropriate drug selection (2), Inappropriate treatment (2), Non-adherence (2), Dosage too high (2), Drug interaction (2), Dosage too low (1), and Others (5). The acceptance rate by other medical staff are 97%.

Conclusion: Residents in long-term care facilities are usually those who have multiple medications. Because they got multiple diseases, the situation is relatively complicated, and with a mean of 6.58 Drug Related Problem cases every month. Therefore, pharmacists' intervention is crucial. In addition to regular monthly visits, pharmacists provide pharmaceutical services and communicate with physicians and nurses to ensure the safety of residents' medication, to improve the quality of the entire healthcare system.

Prognostic analysis of survival in patients with advanced non-small cell lung cancer treated with antineoplastic agents

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Introduction: To develop and validate a prediction model for the 5-year survival rate of patients with advanced non-small cell lung cancer (NSCLC) by integrating the basic information and clinical data of patients.

Methods: A total of 313 patients with advanced NSCLC from the Cancer Hospital of Shanxi Medical University were randomly assigned (7:3) to a training cohort and an internal validation cohort. Univariate and multivariate Cox regression analyses were performed to screen out the independent factors that affect the 5-year survival rate of patients and create a prediction model. The performance of the model 0020 was evaluated using the consistency index (C-index), calibration curve, and receiver operating characteristic (ROC) curve. The clinical decision curve analysis (DCA) was used to assess the clinical benefit of the prediction model. A nomogram was also created to visualize the predicted probability of 5-year survival.

Results: A good prognostic model was developed and a nomogram for model visualization was plotted. The

nomogram was constructed with nine variables: age, smoking history, N stage, bone metastasis, platelet count, lymphocyte count, lactate dehydrogenase, Ki67, and first-line treatment regimen. Based on the median risk score of the training cohort, all individuals were divided into highrisk group and low-risk group, and the high-risk group had poor overall survival (OS) in both cohorts (P<0.05).

Conclusion: A clinical prediction model was established to predict the 5-year survival rate of patients with advanced NSCLC.

Pre- and post- intervention analysis for efficiency of hospital committees in implementing measures to control antimicrobial resistance

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Introduction: Antimicrobial resistance (AMR) represents a significant global challenge to public health, necessitating the implementation of policies and practices pertaining to antibiotic stewardship. Committees associated with pharmacy practice, including those dedicated to antibiotic policy, infection control, and therapeutic drug management, are instrumental in promoting the safe utilization of pharmaceuticals, particularly antibiotics. However, the efficacy of these committees within hospital settings frequently remains inadequately documented or exhibits variability. The purpose of this study is to evaluate effectiveness of strategies to control antimicrobial resistance in the category-I (those with more than 50 beds) hospitals of Punjab.

The primary objective of this study is to evaluate the changes in the structural frameworks of committees associated with pharmacy practice, their operational functionalities, and their consequential effects on the safe utilization of antibiotics. The study hypothesizes that the implementation of formalized documentation and structured organized policies enhance antibiotic stewardship, reduce inappropriate antibiotic use, and improves infection control practices in hospitals.

Method: A comprehensive retrospective and prospective observational analysis will be executed across a variety of hospital institutions. Data will be collected on key determinants, including the number of hospitals with antibiotic policies, the number of individuals involved in antibiotic policy-making committees, training record on antibiotic policy, awareness assessment for AWaRe classification, the availability of an antibiogram from microbiology, the presence of infection control teams, the frequency and duration of meetings in six months, the functionality of Pharmacy and Therapeutics Committees (P&TC), and the availability of hospital formularies, antibiotic availability and consumption as daily defined doses per thousand patients for Reserve group antibiotics. Data collection methodologies will encompass structured surveys and reviews of hospital records. Statistical methodologies will be employed to facilitate comparisons of changes observed pre and post-implementation of documentation.

Results: It is anticipated that hospitals possessing documented antibiotic policies will demonstrate a substantial increase in compliance with antibiotic stewardship initiatives. The number of antibiotic policy committee members is expected to rise, with greater interdisciplinary collaboration. The availability of antibiograms in microbiology labs is projected to improve, leading to more precise antibiotic selection and deciding antibiotic rotations. Infection control teams are likely to become more active, holding more frequent and structured meetings to address antibiotic use concerns. The presence of hospital formularies is likely to improve, contributing to more rational prescribing practices and ultimately reducing Antimicrobial resistance.

Conclusion: This study will aim to demonstrate that structured documentation of pharmacy practice-related policies significantly improves the organization and effectiveness of antibiotic stewardship programs. It is anticipated that enhanced committee participation, increased policy implementation, and improved accessibility to antibiograms will contribute to better infection control and rational antibiotic use, thereby helping to mitigate AMR. Future research should explore the long-term impact of these changes on patient outcomes and AMR trends.

Precipitating factors of look-alike medicines in public supply of Pakistan

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Introduction: Medication errors due to Look-Alike and Sound-Alike (LASA) medicines present a significant risk to patient safety, particularly in healthcare systems. In Pakistan, public sector medicine supply chains face a lot of challenges, including procurement inefficiencies, regulatory gaps, and inadequate awareness among healthcare professionals. Whether international studies highlight LASA medicine risks, within Pakistan's public healthcare system. Identifying these factors is essential to developing targeted strategies for error reduction and improving patient safety.

This study aims to identify and analyze the key factors precipitating the issues related to the Look-Alike medications in the public supply chain of Pakistan. It seeks to evaluate the role of procurement practices, packaging similarities, prescribing habits, and regulatory oversight in contributing to these errors.

The research hypothesizes that systemic gaps in procurement policies and healthcare professional training significantly impact the incidence of LASA errors.

Method: A mixed-method approach was employed, combining quantitative analysis of medication error reports from public hospitals and qualitative interviews with pharmacists, procurement officers, and regulatory authorities. Data were collected from major public healthcare facilities across Pakistan over a six-month period. Statistical tools were used to categorize error frequency, while thematic analysis was applied to interview transcripts to identify recurring factors contributing to LASA errors.

Results: Factors that precipitating are,
•Lack of standardized procurement protocols leading to the inclusion of similarly named or packaged medicines.
•Inadequate regulatory enforcement on packaging differentiation.
•Insufficient training of healthcare providers on LASA risks.
•Reliance on handwritten prescriptions that exacerbate confusion.

The quantitative analysis revealed that more than 80% of stocks in surveyed public and private hospitals were found to be look alike with public sector LA number exceeding the safe limits of LA drugs, underscoring the urgency of addressing these issues.

Conclusion: Procurement policies, regulatory enforcement, and healthcare professional training, these critical gaps are collectively contribute to LASA medication errors in Pakistan's public supply system.

Strengthening regulatory oversight, implementing robust procurement guidelines, and enhancing healthcare worker training programs are recommended to mitigate these risks. Future research should focus on developing standardized LASA mitigation strategies and evaluating their effectiveness in reducing medication errors.

Real-world evaluation of administration-site reactions and patient preference regarding subcutaneous trastuzumab in Chinese patients with early breast cancer

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Introduction: Trastuzumab, a humanised monoclonal antibody targeting human epidermal growth factor receptor 2 (HER2), significantly improves clinical outcomes for HER2-positive breast cancer patients. Originally developed as intravenous (IV) infusion, trastuzumab (T-IV) requires prolonged administration time, additional nursing resources, and increased healthcare costs, which can negatively impact patient compliance, convenience, and overall quality of life. Subcutaneous trastuzumab (T-SC), containing a fixed dose of 600 mg trastuzumab combined with recombinant human hyaluronidase, simplifies administration, shortens administration duration to approximately five minutes, reduces healthcare resource utilisation, and potentially improves patient adherence. International randomised clinical trials, including HannaH and PrefHer studies, demonstrated T-SC's non-inferiority to T-IV regarding pharmacokinetics, efficacy, and overall safety profiles. However, T-SC was associated with higher rates of mild local injection-site reactions compared to T-IV. Given T-SC's recent introduction in China (February 2024), real-world evidence regarding administration-site reactions, patient acceptance, and preference among Chinese patients remains limited. This study aimed to evaluate local administration-site reactions, patient preference, and adherence associated with T-SC in Chinese patients with early-stage HER2-positive breast cancer under routine clinical practice conditions.

Method: A retrospective observational study was conducted involving 75 patients with early-stage HER2-positive breast cancer who received T-SC at our hospital between February and September 2024. Eligible patients were aged ≥18 years, diagnosed with stage I–III HER2-positive breast cancer, receiving trastuzumab for the first time as adjuvant or neoadjuvant therapy, and consented to follow-up. Administration-site reactions (pain severity rated by numerical rating scale, duration of pain, and local skin abnormalities), proportion switching from T-SC to IV trastuzumab, and patient preference regarding administration route were systematically assessed through structured telephone or face-to-face interviews after initial T-SC administration.

Results: Seventy-five patients were enrolled, with median age 53 years and median body mass index (BMI) 23.2 kg/m². Among them, 72.0% underwent breast surgery, 92.0% received chemotherapy, and 8.0% received radiotherapy. Following T-SC administration, 46 patients (61.3%) reported no significant injection-site pain, 19 (25.3%) experienced mild pain lasting ≤1 day, and 10 (13.3%) experienced pain lasting >1 day. Injection-site skin abnormalities, such as bruising, erythema, or swelling, occurred in nine patients (12.0%). Regarding patient preference, 57.3% preferred T-SC primarily for convenience and shorter administration time, while 21.3% preferred IV administration. Presence of concurrent intravenous therapies (37.3%) significantly influenced patient preference, whereas injection-site reactions had minimal impact. The proportion of patients switching from subcutaneous to intravenous administration was low (only 3 patients, 4.0%).

Conclusion: Real-world data from Chinese patients with early-stage HER2-positive breast cancer indicate that T-SC has a favourable safety profile, with mild, manageable local administration-site reactions. The majority of patients preferred T-SC due to improved convenience and shorter

administration duration, suggesting strong clinical acceptability and adherence. These findings support broader adoption of subcutaneous trastuzumab in routine Chinese clinical practice.

Prescribing patterns of vancomycin for inpatients in a super-tertiary care hospital in Thailand

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Introduction: Drug utilization evaluation is a strategy to optimize drug use to achieve the best possible patient outcomes. Inappropriate use of antimicrobials is a major cause of antimicrobial resistance and increases cost of treatment. Vancomycin is widely used as empirical therapy against Gram-positive bacteria, including methicillin-resistant Staphylococcus aureus (MRSA) and Ampicillin-resistant Enterococci. This study aimed to assess the prescribing patterns and cost of vancomycin therapy at Rajavithi Hospital, a Super-Tertiary Hospital in Bangkok, Thailand.

Method: A retrospective cross-sectional study was conducted between June and August 2020. We accessed information from electronic medical records (EMRs) of adult patients (≥ 18 years) who were admitted at Rajavithi Hospital, and received at least one dose of parenterally administered vancomycin. The data were analyzed using descriptive statistics.

Results: A total of 214 patients were included in this study. Most of patients (53.5%) were aged between 18 and 65 years. The majority of suspected infections were bacteremia (34.0%), followed by pneumonia (26.5%). The empirical treatment was initiated in 84.5%. We found that inappropriate continuation of vancomycin after culture and sensitivity reports was observed in 42.2%. In addition, over 50% of patients received prolonged empirical treatment without clear evidence of beta-lactam resistance Gram positive bacteria. During the study period, total amount of vancomycin prescribed was 28.25 defined daily dose (DDDs) per 1,000 patient-days. The total cost of vancomycin was 2,877,696 THB (89,928 USD).

Conclusion: The findings indicate that vancomycin is frequently used as empirical therapy without subsequent adjustment based on culture results. Antimicrobial stewardship program should be implemented to ensure the appropriate discontinuation of vancomycin to reduce the drug resistance and cost of therapy.

Designing and implementing a new approach in multifactorial risk identification to improve patient prioritisation for pharmacists in Dr Gray's Hospital, Elgin

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Introduction: The landscape of acute hospital care has changed significantly in the post COVID-19 era and existing staffing models are increasingly insufficient to allow the pharmaceutical care of patients to be delivered using historical models of resource allocation. This has led to a greater risk of harm to patients from medicines in areas with inadequate pharmacist resource. The clinical pharmacy team at Dr Gray's Hospital (DGH) sought to redesign the way in which patients are prioritised and as such give greater assurance that patients at highest risk of harm are allocated pharmaceutical care input.

Method: Through a series of discussions with pharmacists, pharmacy technicians, hospital managers and senior clinicians, the following five patient categories were identified as requiring the highest level of input:
1. Patients at higher risk of harm from specified medicines as inpatients
2. Patients at higher risk of harm from specified medicines following discharge
3. Patients with a higher risk of harm from medicines due to a specific long term condition (LTC)
4. Patients with the highest level of clinical acuity
5. Patients receiving inpatient care in a non-standard area (non-standard bed space or inpatient care in an Emergency Department (ED)).

A morning meeting was initiated to identify and allocate patients for review. Medicines (and medicines used as proxy markers of specific LTCs) were further categorised into Tiers 1-3, with the aim that patients receiving Tier 1 medicines would be reviewed as the team's first level of priority, Tier 2 medicines would be reviewed same day and Tier 3 medicines would follow. Patient lists were constructed daily using Intellifront, which interrogates the inpatient Hospital Electronic Prescribing and Medicines Administration (HEPMA) system. In November 2024 the team began prioritising Tier 1 (inpatient) medicines patients on a daily basis, and in December the corresponding Tier 1 (discharge) medicines patients. In January 2025 highest acuity patients (those in the hospital's High Dependency Unit (HDU)) and patients in non-standard bed spaces were added. In March

2025 work began to incorporate those prescribed Tier 2 medicines.

Results: While staged implementation and refinement of this new model continues, greater assurance that patients at highest risk of harm are adequately allocated pharmaceutical care input has been achieved, with all patients electronically prescribed highest risk category medicines reviewed daily. Pharmacists also report a greater level of comfort in their clinical practice.

Conclusion: Moving away from arbitrary location based allocation of pharmacist resource has been effective in ensuring and providing assurance that the available pharmacist resource is used to maximise benefit for patients. Gaps in technology such as the ability to search for patients with designated clinical conditions and areas prescribing on paper still present a barrier to fully assured implementation, but ongoing work implementing an electronic pharmacist referral system should help fill this gap. This new approach has been particularly important in the setting of a district general hospital with a highly undifferentiated patient group in each ward. This increased assurance, achieved by improving underlying systems, should also reduce dissatisfaction and burnout among pharmacist colleagues.

Reducing interruptions to typists: Let the dispensers do-it-yourself

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Introduction: In KK Women's & Children's Hospital Outpatient Pharmacy in Singapore, typists play a key role in processing prescriptions by transcribing electronic prescription orders into pharmacy dispensing system and printing out drug labels. This typing process is critical in ensuring that correct drug labels are generated and the instructions by prescribers are translated into an easy-to-read format on labels in addition to ensuring accuracy in billing. Observations showed on average, typists are interrupted every 20 minutes. While the causes are multifactorial, one common reason is having to rework the prescription when there is any typing error (wrong instructions on the label, incorrect drug or quantity supplied) or when patients request to remove/add a drug or change the quantity to collect during dispensing. Dispensers would request typists to rework the prescription disrupting typists' momentum and slowing down the typing process. Frequent interruptions can be stressful and increase typing errors. Hence there must be a strategy to minimise prescription rework.
It is hypothesized that interruptions can be reduced if dispensers can rework some prescriptions on their own.

Method: A training guide on how to Do-It-Yourself (DIY) for simple changes was curated and disseminated to all dispensers. After self-reading, dispensers were allowed to make changes under the direct observations of trainers. Dispensers must be assessed to be competent by the trainers using a competency checklist before they were allowed to DIY.

To ensure medication safety and proper billing, dispensers were only allowed to make straight-forward changes. Criteria for changes that were approved for DIY were clearly defined and shared. Dispensers who DIY were also required to double-check and confirm that changes made were correctly reflected in two different systems (both pharmacy and billing system).

Results: Typists reported they faced less interruptions by dispensers once dispensers started to DIY. A third of them reported less than three interruptions in each typing shift that lasted about 3 hours whereas one in two typists reported one or two interruptions every hour. About two thirds of the typists found this initiative extremely or very helpful in reducing interruptions. Nevertheless, they noted that some dispensers (especially new hires) still approached them for simple changes.

Almost all dispensers agreed that the training guide was self-explanatory. Dispensers expressed their confidence in carrying out simple changes, but would still approach typists to make changes when they could not print the labels, or if the instruction on drug label was wrong, or the dosing was too complicated, or when they wanted to inform the typist about a typing error.

In response to the feedback gathered, two key issues are addressed. Firstly, all printers were checked to ensure that they were in good working condition. Dispensers were also taught how to trouble shoot if they encountered printing issues. Lastly, new dispensers were trained so that they were also competent in doing simple changes.

Conclusion: Training dispensers to take over simple prescription rework reduces unnecessary interruptions to the typists. There were no known medication errors or billing related issues arising from DIY since implementation.

Automating adverse drug reaction (ADR) report analysis for enhanced risk mitigation

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Background: Adverse Drug Reaction (ADR) reporting is a cornerstone of pharmacovigilance, enabling the identification of drug safety concerns and the development of risk mitigation strategies. Traditional manual analysis of ADR reports is labour-intensive, error-prone, and difficult to scale, limiting the timeliness and effectiveness of safety interventions.

Purpose: This project aims to automate the analysis of ADR reports to improve operational efficiency, enhance data accuracy, and provide actionable insights through dynamic visualization tools.

Method: An automated workflow was developed using Microsoft Excel, Tableau Prep, and Tableau Desktop. Drugs were first mapped to Anatomical Therapeutic Chemical (ATC) codes in Excel to ensure standardized categorization. Tableau Prep was utilized to clean, structure, and transform the data, while Tableau Desktop enabled the creation of interactive dashboards for real-time exploration of ADR trends and safety signals.

Results: The automated process significantly reduced the time required for ADR analysis, streamlined data processing, and minimized errors associated with manual handling. Dynamic visualizations allowed for more accessible identification of safety signals, highlighting trends by drug class, demographics, and frequency of ADRs. Conclusion
Automating ADR report analysis enhances the efficiency, accuracy, and scalability of pharmacovigilance efforts. This approach supports timely identification of safety signals, better risk mitigation strategies, and improved patient safety outcomes. Future advancements could include incorporating machine learning for predictive analysis and extending capabilities to global datasets.

Reducing medication errors in pediatric emergency triage: The impact of standardized sodium bicarbonate guidelines

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Introduction and Background: Sodium bicarbonate administration in pediatric emergency settings has been associated with adverse drug reactions (ADRs), including burns and extravasation. Previously, cases of sodium bicarbonate-related burns were reported in the Emergency Department (ED) . at that moment there were not standardized guidelines available for the administration. Purpose: The study aimed to develop and implement evidence-based sodium bicarbonate administration guidelines for pediatric emergency triage, reducing ADRs and improving patient safety.

Methods: Guidelines were developed using international standards, incorporating proper dilution techniques, administration rates for both peripheral and central lines during emergency situations, appropriate doses, compatible solvents / fluids, side effects, contraindications were added. The guidelines were reviewed with Pediatric Intensive Care Unit (PICU) faculty and by P&TC. after the approval guidelines were initially implemented in the ED triage. A six-month follow-up was conducted to assess the impact on ADR incidence compared to the previous year.

Results: The implementation of standardized protocols led to a significant reduction in ADRs associated with sodium bicarbonate administration. The six-month follow-up data showed a decrease in reported cases of burns and extravasation compared to the previous year, indicating improved medication safety.

Conclusion: Standardizing sodium bicarbonate administration protocols in the ED resulted in reduced ADRs and enhanced patient safety. This initiative highlights the importance of evidence-based guidelines in minimizing medication-related risks in pediatric emergency care. Expansion of such standardized protocols can further improve outcomes in critical care settings.

Evaluating the rational use of albumin based on evidence and practice: A concurrent study

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Background and Introduction: Medication use evaluations help identify patterns of overuse, underuse, or misuse, allowing for targeted interventions that enhance clinical decision-making. Evaluating the rational use of albumin is essential to ensure evidence-based practice, improving patient outcomes, and optimizing healthcare resources. Evidence supports the administration of albumin in specific conditions, including large-volume paracentesis in cirrhotic patients, spontaneous bacterial peritonitis, hepatorenal syndrome, hypovolemia, hypoalbuminemia, and acute liver failure In these cases, albumin has been shown to improve patient outcomes by stabilizing circulation, preventing complications, and serving as an adjunct therapy in critical

illnesses. However, its use is not always justified. Practices such as routine albumin administration for nutritional supplementation, initial burn management, and fluid resuscitation in sepsis are not supported by strong evidence and may have more cost-effective alternatives.

Purpose: The objective of this study is to evaluate the rational use of albumin in a tertiary care hospital. A Medication Use Evaluation (MUE) for albumin arises from its widespread use in tertiary care settings, As an expensive colloidal therapy, inappropriate prescribing of albumin can lead to unnecessary healthcare costs and potential patient safety risks and ineffective treatment outcomes. This evaluation aims to highlight the rationality of albumin use by assessing its clinical justification and adherence to guidelines

Methods: The study followed a structured medication use evaluation (MUE) protocol developed using internationally recognized guidelines, including the Surviving Sepsis Campaign (SSC), the National Institute for Health and Care Excellence (NICE), the American Association for the Study of Liver Diseases (AASLD), and the European Society of Intensive Care Medicine (ESICM). A standardized protocol was designed to assess rational indications, laboratory parameters, dosing, frequency, duration of therapy, and prior use of crystalloid solutions before albumin initiation. This protocol was reviewed and discussed with the endocrinology faculty before being implemented in a pilot phase to ensure feasibility and alignment with clinical best practices. A concurrent audit was conducted from September to November 2024, evaluating 150 hospitalized adult patients who were prescribed albumin. Pediatric patients were excluded from the study. Data comprised of including demographics (age, gender, underlying conditions), indications for albumin use, serum albumin levels prior to administration, total albumin dose, frequency, and duration, use of crystalloid therapy (e.g., normal saline, lactated Ringer's) before albumin initiation, and laboratory values (e.g., serum creatinine (SCr), blood urea nitrogen (BUN), aspartate aminotransferase (AST), alanine aminotransferase (ALT)) to assess renal and hepatic function.

Results: The total rational compliance was found to be 87.5% and the other 12.5% cases were non-compliant to guidelines.

Conclusions: Overall, the study shows a relatively high compliance rate (87.5%) with clinical guidelines. The high compliance rates for rationale indication and appropriate dosing suggest that albumin is generally prescribed for clinically justified conditions in LMIC

Evaluating the need for an antifungal stewardship program to improve prescribing practices in a low-middle-income country

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Background: Antifungal Stewardship Programs (AFSPs) are designed to optimize the selection, dosing, and duration of antifungal therapy within hospitals. The rising incidence of fungal infections has led to the overuse and misuse of antifungal agents, contributing to the global expansion of antifungal resistance.

Purpose: The increasing prevalence of invasive fungal infections, limited diagnostic procedures, and inappropriate antifungal prescribing have accelerated resistance, ultimately leading to higher treatment costs due to complications. This study aims to assess the rational use of fluconazole ensuring effective outcomes while minimizing resistance through an Antifungal Stewardship Program.

Methodology: A retrospective analysis was conducted on 359 patients from June 2024 to December 2024. The rational use of fluconazole was assessed based on key audit metrics, including indication, loading dose, maintenance dose, culture sensitivity testing, (1,3)-β-D-glucan (BDG) testing, and duration of therapy. The study focused on geriatric and pediatric patients, with exclusion criteria including chemotherapy patients and pediatric patients under one year of age.

Results: Of the 359 patients analyzed, 133 (37.04%) were excluded based on the criteria, leaving 235 (64.45%) for evaluation. Among them, culture sensitivity testing was performed in 225 patients (62.67%), whereas 124 patients (34.54%) received fluconazole without prior culture sensitivity testing.

Conclusion: Although the data is limited, further research is needed to comprehensively assess the rational and irrational use of antifungal therapy. However, the findings highlight the importance of implementing an Antifungal Stewardship Program in low- and middle-income countries (LMICs) to reduce the incidence of antifungal resistance. Additionally, during shortages of raw materials, the stewardship program has played a crucial role in optimizing available medications, ensuring their appropriate use, and enhancing treatment outcomes.

Enhancing renal dose optimization strategies in hospitalized patients: A novel approach for increased medication safety and clinical outcomes

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Background: The kidneys play a vital role in excreting substances from the body, making their proper function crucial to prevent toxicity and organ damage. Drug metabolism and elimination heavily rely on renal function, posing challenges in patients with compromised kidney function.

Purpose: Pharmacists play a pivotal role in adjusting drug doses to maintain therapeutic levels and prevent adverse effects, thus optimizing patient care and reducing economic burden.

Methods: This retrospective cross-sectional study evaluated pharmacist-led renal dose adjustments in hospitalized patients from October 2023 to December 2023. Data extracted from the Computerized Physician Order Entry system included interventions categorized by their impact on dosage and subsequent cost savings. The Cockcroft-Gault equation was used to calculate creatinine clearance, guiding dose adjustments.

Results: Of the 426 interventions reviewed, 203 resulted in a significant cost reduction totaling approximately Rs. 29 million. Antibiotics, particularly Meropenem and Piperacillin/Tazobactam, were frequently adjusted drugs. Clinical circumstances were considered in some interventions, with certain medications withheld due to nephrotoxic potential in patients with end-stage renal function.

Conclusion: The study highlights the frequency of incorrectly done medications despite available guidelines, emphasizing the critical role of pharmacists in optimizing drug therapy. Pharmacist interventions not only improve patient outcomes but also contribute to developing hospital policies and educational opportunities for better clinical services. Pharmacist-led renal dose optimization is integral to ensuring safe and cost-effective medication use in hospitalized patients with renal compromise. Further emphasis on pharmacist involvement and ongoing research is warranted to enhance patient care and resource utilization.

Enhancing patient safety through standardized storage of high-alert medications in nursing units: A quality improvement initiative in a low-middle-income country

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Background and Introduction: Pakistan, as a low-middle-income country, faces significant challenges in medication storage due to limited resources. Improper and unsafe storage of high-alert medications (HAMs), including insulin, poses a substantial risk to patient safety, medication efficacy, and overall quality of care. Audit observations have highlighted frequent storage-related errors in nursing units, emphasizing the need for standardized storage practices to minimize risks and enhance medication safety.

Purpose: This study aimed to implement standardized storage practices for high-alert medications in nursing units over one year. The initiative included the introduction of auxiliary labels, designated storage bags, and clear insulin storage guidelines to reduce medication errors and improve compliance with safe storage protocols.

Methods: The pharmacy department led this initiative by developing standardized insulin storage flyers for opened and unopened vials and pens, as well as auxiliary labels for HAMs. High-alert medication storage (HA) bags were introduced in nursing units for floor-stock medications. Following the implementation, a self-assessment survey was conducted to evaluate the impact of these interventions.

Results: Post-implementation survey responses indicated a significant improvement in medication storage practices, with 93.3% of respondents reporting a reduction in storage-related errors. Standardized labeling and designated storage areas enhanced compliance with safe medication handling, ensuring greater consistency and adherence to best practices.

Conclusion: The introduction of standardized storage solutions for high-alert medications significantly improved medication safety and reduced storage-related errors in nursing units. To sustain these improvements, ongoing monitoring through floor stock inspections and QPSD (Quality and Patient Safety Department) surveys is essential

Transforming electrolyte management in critical care unit: Evaluating the impact of Pharmacist-led interventions on prescribing practices in a tertiary care hospital

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Introduction: High-alert medications (HAMs) creates an elevated risk of patient harm, with reported error rates ranging from 0.24 to 89.6 errors per 100 prescriptions. While essential for therapeutic efficacy, especially in intensive care settings (ICUs), the inappropriate use of these medications can lead to severe patient harm. Despite cautious administration, persistent medication safety issues compromise overall patient safety in the ICU wards

Methods: A retrospective observational study was conducted using one year of data (January 2024 to December 2024) obtained from the Computerized Physician Order Entry (CPOE) system. This study aimed to evaluate pharmacist interventions in the prescription and administration of high-alert electrolytes, including Potassium Chloride, Potassium Phosphate, and Magnesium Sulphate, in both pediatric and adult intensive care units.

Total of 11,771 medication orders were reviewed. The interventions made by pharmacists during order verification and processing were systematically categorized into five key areas: order duplication, dose modification, dilution adjustments, changes in drug codes, and alterations in the route of administration. Data analysis was performed to quantify the frequency and impact of these interventions, highlighting the role of pharmacists in preventing medication errors and optimizing patient safety.

Results: A total of 11,771 high-alert electrolyte orders were processed over one year. Pharmacists intervened in 1,029 cases (8.74%) within the CPOE system, playing a crucial role in identifying and preventing potential medication errors. These interventions significantly contributed to enhancing patient safety and promoting safe medication practices in critical care settings, particularly concerning high-alert electrolytes.

Conclusion: Pharmacist-led interventions in the prescribing and processing of high-alert electrolytes played a critical role in minimizing medication errors in critical care settings. By actively reviewing and correcting orders, pharmacists enhanced patient safety and ensured adherence to safe medication practices. The findings highlight the necessity of pharmacist involvement in medication management, particularly for high-risk drugs, to prevent adverse events and improve overall healthcare quality.

Pharmaceutical care pathway for endocrine therapy of breast cancer

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Introduction: Endocrine therapy is one of the main treatments for hormone receptor-positive (HR+) breast cancer patients. There are many endocrine therapy-related drugs for HR+/human epidermal growth factor 2-negative (HER-2) breast cancer patients, which can be classified into at least 7 types according to mechanisms of action, such as selective estrogen receptor modulators (SERM), selective estrogen receptor down-regulators (SERD), aromatase inhibitors (AI), gonadotropin-releasing hormone analogues (GnRH-a), progestogens, as well as CDK4/6 inhibitors, mTOR inhibitors, and histone deacetylase inhibitors (HDAC) and other targeted drugs used in combination with endocrine therapy. The mechanisms of action, pharmacological and pharmacy properties, and long-term use of endocrine therapy-related drugs have significant effects on drug safety and medication adherence. However, there is no standardized pharmaceutical care pathway for this.

Objective: The aim of the study was to explore the standardized pathway of pharmaceutical care for endocrine therapy in breast cancer and to provide reference for clinicians.

Methods: Literature review, systematic review, and Delphi method were used to explore the key issues involved in endocrine therapy, and specific recommendations were given by the multi-background experts.

Results: we established a six-dimensional framework, including pharmacological and pharmacy characteristics, prescription management, pharmacoeconomics and real-world studies, combination therapy, monitoring and management of adverse drug reactions, and patient education. The experts gave recommendations regarding 22 key points in pharmaceutical care in endocrine therapy for breast cancer.

Conclusion: A standardized pharmaceutical care pathway for key issues related to endocrine therapy for breast cancer will facilitate optimization of treatment outcomes and enhancement of patient experience.

Exploring nursing perspectives on automated dispensing cabinets: Advancing safety and efficiency in a tertiary hospital

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Introduction: Automated Dispensing Cabinets (ADCs), introduced in the 1980s, represent a globally recognized innovation in enhancing medication safety and streamlining healthcare workflows. Fujairah Hospital, a tertiary hospital serving over 200,000 patients annually, implemented 18 ADCs across critical units to optimize medication management. This initiative reflects a commitment to innovation, equitable medication access, and sustainable healthcare practices.

Objective: This study evaluates nurses' perceptions of ADCs, focusing on their impact on workflow efficiency, equitable medication access, and patient safety improvements.

Material and methods: A survey-based study was conducted with 170 nurses working in units equipped with ADCs. Data were analyzed to identify demographic influences on ADC usage perceptions and to evaluate correlations between training adequacy, medication accessibility, and satisfaction levels. Statistical analyses assessed variations by age group, experience, and unit type.

Results: Among the predominantly female participants (89.4%) aged 30-39 years, 90% used ADCs daily, with 37.3% utilizing them 1-5 times per day. Key findings include: 53.5% strongly agreed that adequate training was provided. 54.1% strongly agreed that medicines are easy to locate. 86.5% reported ADCs improved workflow efficiency. 72.9% agreed ADCs significantly enhanced patient safety. 40% expressed complete satisfaction with the ADC system. Statistical analysis revealed significant age-related differences in perceptions of training adequacy, ease of locating medicines, and barcode scanning usage. Female nurses reported stronger agreement on ADC efficiency and patient safety contributions compared to their counterparts

Conclusions: ADCs positively influence nursing workflows and patient safety while supporting sustainable and equitable medication management. The study highlights the importance of robust training, user-friendly design, and efficient restocking systems to maximize ADC benefits. These findings align with global efforts to advance pharmacy practice through technology-driven innovation and multidisciplinary collaboration. Further research and continuous improvements are essential to optimize ADC integration in diverse healthcare settings.

Comparative effectiveness of antibiotic strategies for stenotrophomonas maltophilia infections: A systematic review and network meta-analysis

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Background: With mortality rates ranging from 23% to 77%, Stenotrophomonas maltophilia (SM) infections pose a significant global health concern. Treating SM infections is particularly challenging due to their intrinsic resistance to a wide range of antibiotics. The best antibiotic regimen against SM infections has not been identified.

Purpose: This study aimed to compare the effectiveness of different antibiotic regimens against SM infections by systematically integrating both direct and indirect evidence.

Methods: A comprehensive literature search was conducted in Embase, PubMed, and the Cochrane Library to identify relevant studies up to February 2025. Eligible studies included those with adult patients diagnosed with SM infections, comparing at least two antibiotic regimens and reporting relevant clinical outcomes. The quality of the included studies was assessed using the Newcastle-Ottawa Scale. The prespecified outcomes included 30-day all-cause mortality and clinical failure. A Bayesian random effects model was utilised to estimate risk ratios with corresponding 95% credibility intervals.

Results: A total of ten cohort studies involving 748 patients and seven cohort studies involving 738 patients were included in the analysis for 30-day mortality and clinical failure, respectively. All the included studies were of good quality, scored 8 to 9 on Newcastle-Ottawa Scale. The evaluated treatment regimens comprised of ciprofloxacin, levofloxacin, minocycline, tigecycline, trimethoprim/sulfamethoxazole (TMP/SMX), and TMP/SMX combined with fluoroquinolones (TMP/SMX/FQs). Minocycline was associated with lower 30-day mortality compared to TMP/SMX/FQs (RR, 0.23; 95% CI, 0.03–0.96). TMP/SMX/FQs trended towards higher 30-day mortality, compared with FQs (ciprofloxacin or levofloxacin) and TMP/SMX alone. There were no significant differences observed in clinical failure among FQs, minocycline, tigecycline, and TMP/SMX.

Conclusion: Minocycline had lower mortality than TMP/SMX/FQs, and the latter trended towards higher mortality than either TMP/SMX or FQs alone. Given the

limited number of studies, these findings should be interpreted with caution.

Patterns of antimicrobial consumption at the ola during Children's Hospital in Freetown, Sierra Leone: A global point prevalence survey.

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Background: Antimicrobial resistance (AMR) is associated with approximately 5 million deaths each year, mostly in low-income countries such as Sierra Leone. The high rate of antimicrobial consumption and limited stewardship activities contribute to the higher incidence of AMR in this context. Despite the escalating threat of AMR, there is a lack of comprehensive data on its drivers, which hinders the development of effective interventions and policies. Although a National AMR Action Plan has been developed, a fully functional antimicrobial stewardship programme is still lacking, and the laboratory capacity to support bacterial culture remains underdeveloped. To address these challenges, the Commonwealth Partnerships for Antimicrobial Stewardship (CwPAMS) program is being implemented across eight countries, including Sierra Leone.

Aim: To describe the s consumption at the Ola During Children's Hospital (ODCH) in Freetown, Sierra Leone.

Method: The survey was conducted on a single day using the Global Point Prevalence Survey (G-PPS) methodology. All in-patients admitted to the wards before 08:00 hours on the day of the survey were included. Five (5) antimicrobial stewardship champions were trained to collect routine inpatient data from charts. A total of 152 out of 162 charts that meet the inclusion criteria were validated for entry into the G-PPS system for analysis. Only antimicrobials prescribed for systemic use were selected for analysis. The data was analysed descriptively and included the use of the AWaRe classification.

Results: The prevalence of antimicrobials prescribed for systemic use was 78.3%. All patients were treated empirically without culture results. The ACCESS group of antibiotics accounted for 38% of antibiotics prescribed, and over half (57%) were in the WATCH group. The most common indications for prescribing antimicrobials were lower respiratory tract infections 24.1% and malaria 31.9%. Furthermore, the most frequently prescribed antibiotics were the 3rd generation cephalosporins 46.7%, followed by aminoglycosides 20.5%. Carbapenems were rarely prescribed 0.6%. Only 2% of patients were prescribed anti-tuberculosis medications and 0.7% prescribed antivirals. Over 95% of the prescriptions did not have a stop/ review date. About 30% of the prescriptions did not adhere to local prescribing guidelines.

Conclusion: The findings of this study provide a clear roadmap for improving antimicrobial stewardship at ODCH. The study's findings revealed a high prevalence of antimicrobial consumption at the hospital. The most antibiotics consumed are from the third-generation cephalosporins in the WHO classification's WATCH class. The key recommendations, including the implementation of a review/stop date policy, AWaRE restrictions, and the development of a microbiology laboratory, should be prioritized. Furthermore, establishing an AMS committee and fostering a culture of antimicrobial stewardship through education and regular audits are critical next steps to combat AMR and ensure optimal patient outcomes. Finally, to enhance compliance with policies and guidelines it is imperative clinical pharmacy ward rounds be incorporated in our daily practice as pharmacists.

Prevalence and temporal trends of second- and third-generation fluoroquinolone resistance in E. coli isolates from hospital settings: A meta-regression analysis

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Background: The extensive use of fluoroquinolones in treating Gram-negative bacterial infections has contributed to the increasing prevalence of antimicrobial resistance. However, limited studies have systematically analysed the prevalence of fluoroquinolone resistance (FQR), particularly in second- and third-generation fluoroquinolones. This study aimed to estimate the overall prevalence and time-based

pattern of second- and third-generation fluoroquinolone resistance in Escherichia coli (E. coli) within hospital settings.

Methods: This study was a subgroup and meta-regression analysis from a systematic review and meta-analysis on the prevalence and risk factors of fluoroquinolone resistance in Gram-negative bacteria. A systematic review and meta-analysis were conducted, screening studies published between January 1, 2014, and October 31, 2024, from the PubMed, Medline, Embase, and CINAHL databases, following the PRISMA flowchart guidelines. Studies were included based on the following criteria: observational designs (cohort or case-control studies, with prospective or retrospective sampling), evaluation of Gram-negative bacteria for fluoroquinolone resistance in human subjects (patients), investigation of fluoroquinolone resistance and associated risk factors, and publication in English. Data analysis focused on second- and third-generation fluoroquinolones in hospital settings, including pooled prevalence estimation and meta-regression for temporal trend analysis, was conducted using R Studio (version 4.2.3) with the metafor package.

Results: A total of 25 studies were included in the systematic review and meta-analysis which only 9 studies that included to the subgroup analysis. The result of meta-regression analysis suggest that second-generation of fluroquinolones have higher resistant rate to E.coli with the pooled prevalence of ciprofloxacin resistant was 46.77% (95% CI: 25.13 – 68.41%), and norfloxacin resistant was 62.98% (95% CI: 27.51 – 98.45%) compare to third-generation (levofloxacin) which the pooled prevalence of resistant was 38.92% (95% CI: 7.94 – 69.90%). The temporal trend of second-generation fluoroquinolone resistance to E. coli increased in effect size from 2016 to 2024, which was statistically significant only for norfloxacin (p-value = 0.0250) but not for ciprofloxacin (p-value = 0.3190). The resistance proportion of ciprofloxacin and norfloxacin increased by 17.6% and 43.9% per year, respectively, but these trends were not statistically significant (p-values: 0.3221 and 0.5593). In contrast, levofloxacin resistance increased significantly by approximately 52.8% per year (p-value = 0.0269), even though the overall effect size did not show a strong trend (p-value = 0.5610).

Conclusions: Resistance to second-generation fluoroquinolones against E. coli was higher than that of third-generation fluoroquinolones. However, levofloxacin, a third-generation fluoroquinolone, showed a concerning upward trend in resistance rates.

Reducing hospital readmissions: The evaluation of a pharmacy led transition of care service

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Introduction: The transition of care (ToC) from hospital to primary care providers is a period of high-risk for patients. Poorly coordinated transitions are associated with an increased incidence of adverse drug events, patient harm, and readmission to hospital. Pharmacists working in interdisciplinary teams can optimise medication management pathways to minimise negative patient outcomes. A ToC Project was Government funded to develop, pilot, and evaluate a pharmacist-led ToC model for high-risk patients.

The aims of this study were to describe a pharmacist-led ToC model and evaluate all-cause emergency department (ED) representations, hospital readmissions, and the probability of death following implementation.

Method: A literature review and extensive engagement with key hospital and community stakeholders informed the development of the ToC model, which was reviewed and endorsed by a Project Oversight Committee. The model was applied to high-risk patients admitted to the Vascular Surgery and Respiratory wards of a major quaternary hospital in Australia. Patients were identified through assessment of their 30-day risk of readmission using the LACE Index (Score > 10 = "high-risk').

A ToC Pharmacist and Pharmacy Assistant provided discharge interventions, including medication reconciliation, education, and a patient medication list. A copy of this list was communicated to the patient's nominated General Practitioner (GP) and Community Pharmacist (CP). The ToC pharmacist conducted a post-discharge review with the patient at approximately 7-days. A medication management plan (MMP), including medication issues and recommendations to optimise therapy, was communicated to the patient's GP and CP after the review. Patients with ongoing concerns were identified for in-person pharmacist review scheduled to coincide with their post-surgical outpatient appointment.

Patient-level administrative data were used to match the study population to control admissions, based on key patient demographic and hospital episode characteristics (covariate balanced approach). A matched cohort analysis was undertaken to estimate the effect of the ToC model on patient outcomes. Propensity score matching was used to

minimise treatment-selection bias. The primary outcomes were mean number of all-cause ED representations and hospital readmissions at 90-days post discharge, and the secondary outcome the probability of death at this time.

Results: A total of 292 patients were eligible for inclusion and 263 (90.1%) participated in at least one post-discharge review. Approximately 90% of patients were older than 50 years of age and 70% were male. An MMP was sent to 89% of GPs (containing a mean of 3.4 recommendations) and 67% of CPs (mean of 1.6 recommendations) following the initial post-discharge review.

A total of 230 matched control admissions were identified. When compared to the control group, all cause hospital readmissions were significantly lower; 0.82 vs 1.24, P<0.001, as was the probability of death; 0.03 vs 0.12, P=0.001. The mean number of ED representations was higher in the ToC group than for the control group; 1.05 vs 0.8, P=0.003.

Conclusion: The ToC model of care resulted in significantly fewer subsequent all-cause hospital readmissions but not ED representations at 90-days. The probability of death was significantly lower. The results will inform future models of care.

Impact of deprescribing intervention on medications in hospitalized older adults in Malaysia: A randomized controlled trial

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Introduction: Polypharmacy and the use of potentially inappropriate medications (PIMs) are common among older adults. This study aimed to assess the impact of a pharmacist-led deprescribing intervention on medication use and PIMs using a locally developed screening tool (MALPIP).

Methods: This study was an 18-month, cluster-randomized, open-label, parallel-arm controlled trial conducted in public hospitals in Malaysia. Eligible participants were patients aged 60 and above with at least one prescribed medication and one existing comorbidity. In the intervention arm, pharmacists used the MALPIP tool to assist in deprescribing while control arm received usual care.

Results: At admission, both groups had similar numbers of medications (Intervention: 8.10 vs. Control: 7.83, p=0.225), with the control group had significantly more PIMs at baseline (1.61 vs. 1.36, p=0.023).At discharge, both groups showed increased medication counts, though the increase was smaller in the intervention group (0.36, p=0.017) compared to the control group (0.87, p<0.001). By the 180-day follow-up, both groups maintained higher medication counts. For PIMs, both groups showed similar significant increases at discharge (intervention: +0.22, p=0.002; control: +0.19, p=0.001), with very similar number of PIMs at 180 days.

Conclusion: The intervention did not result in a reduction in the total number of medications or PIMs at discharge and the 6-month follow-up. Findings suggest that a more comprehensive, multidisciplinary approach involving doctors and patients, alongside pharmacist-led efforts, may be necessary to achieve effective outcomes.

Use of BioSpecifics in institutional and community settings: One year clinical, financial and operational experience

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Background: Bispecific antibodies are a novel class of therapeutics that enable simultaneous targeting of tumor cells and immune cells, offering transformative potential in oncology. Despite their rapid adoption, data on their comparative utility and operational integration in institutional and community care settings remains sparse. This study addresses critical gaps by evaluating the clinical, financial, and operational impacts of implementing bispecific therapies across diverse healthcare environments.

Purpose: To assess the real-world experience of bispecific antibodies in oncology over one year, focusing on clinical efficacy, cost-effectiveness, operational challenges, and multidisciplinary collaboration. The study aims to identify key

drivers for success and areas for improvement in therapy deployment.

Method: This retrospective, multi-site observational investigation included patients treated with bispecific antibodies for hematologic malignancies and solid tumors across institutional and community settings. Data was collected from patient records, financial reports, and workflow analyses. Metrics included remission rates, incidence of CRS and ICANS, therapy initiation time, and cost-per-patient outcomes. Multidisciplinary teams, including pharmacists, oncologists, and nurses, were interviews/surveyed to evaluate operational and collaborative efforts.

Results:

•Outcomes: Patients demonstrated meaningful remission outcomes with effective management of side effects, including CRS and ICANS, through standardized protocols.

•Financial Metrics: Positive ROI was observed, with a 15% reduction in hospitalization costs due to decreased complications.

•Operational Insights: Therapy initiation time was reduced by 30% following workflow optimization and staff training. Challenges included managing adverse events and ensuring access in underserved areas.

•Collaborative Benefits: Integration of safety pharmacists led to improvement in adverse event mitigation.

Conclusion: The adoption of bispecific antibodies demonstrates significant clinical and financial benefits, particularly in institutional settings. Community settings require additional support to address operational barriers. Future efforts should focus on expanding access, optimizing safety protocols, and exploring combination therapies. This work highlights the importance of multidisciplinary collaboration in achieving successful outcomes and provides a framework for broader application of bispecific therapies.

Effectiveness of strategies to reduce persistent opioid use post-surgery: A systematic review

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Introduction: Up to 15% of opioid-naïve patients and 40% of prior opioid users develop persistent opioid use after surgery, increasing risks of harms such as tolerance, dependence, and opioid-related adverse effects. The aim of this study was to examine the effectiveness of strategies to reduce persistent opioid use post-surgery.

Method: A systematic search of three electronic databases identified original research articles reporting quantitative outcomes on organisational strategies for reducing persistent opioid use after surgery. Two independent reviewers conducted study selection and quality assessment.

Results: Of the 40 full texts assessed for eligibility, 11 were included in this review. Six studies implemented patient-targeted strategies to reduce persistent opioid use, two targeted prescribers, and three focused on multifaceted strategies. Among patient-targeted approaches, two were effective: including a digital behavioural medicine program (median decrease in opioid consumption at 6 weeks post-surgery: MME 330 vs 98, $p<0.001$) and a preoperative educational video with postoperative text messaging (86% increased odds of opioid cessation at 12 weeks, $p<0.001$). Both prescriber-targeted strategies reduced persistent opioid use, with procedure-specific opioid prescribing guidelines lowering incidence (adjusted incidence: -0.78, $p<0.001$) and a statewide opioid safety initiative reducing chronic prescribing (26.9% to 14.1%, $p<0.0001$). A transitional pain service significantly lowered the proportion of patients using opioids at 90 days post-surgery (0.07% vs 9.9%, $p=0.04$).

Conclusion: Digital patient-targeted strategies and prescriber-targeted strategies seem to effectively reduced persistent opioid use and may offer resource-efficient

alternatives to more complex interventions. However, few effective strategies have been identified, and further research is needed to explore a broader range of interventions and address the ongoing challenge of persistent opioid use.

Building pharmacy antimicrobial stewardship capacity through structured mentoring of intern pharmacists

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Introduction: Antimicrobial stewardship (AMS) refers to coordinated interventions to combat antimicrobial resistance (AMR). Pharmacists are key members of AMS teams/programs making invaluable contributions to such programs. However, studies have shown that pharmacists especially in Low and Medium Income countries (LMICs) often lack requisite training in AMS which leads to an inability to provide meaningful services to patients and public in tackling AMR. Building AMS capacity in pharmacists involves a balanced mix of education, hands-on training/practical exposure as well as opportunities for leadership development, research, and AMS data management/reporting. In Nigeria, Intern Pharmacists are Pharmacy graduates undergoing mandatory pre-licensing training for one year in accredited centres under the direct supervision of registered Pharmacists. The focus of the one-year internship is to enhance knowledge and practical skills of the pharmacy graduate by exposing them to pharmaceutical care and other pharmacy services. Improving access to AMS capacity building opportunities during internship will strengthen pharmacists to engage in AMS activities and combat AMR.

Purpose: To enhance Antimicrobial stewardship capacity in pharmacists through improved knowledge and skills during the mandatory one year internship.

Method: Fifty-nine (59) Intern Pharmacists were recruited via expressions of interest in 2023 and 2024 at the University of Nigeria Teaching Hospital, Ituku Ozalla, Enugu state, South East Nigeria. They were exposed to structured learning and practical sessions involving AMS activities. The structured learning included fundamental microbiology, clinical pharmacology of antimicrobials, AMS principles, selection of appropriate therapy, amongst others. These sessions held for one hour once a week. They were also trained on the practical aspects of antibiotic consumption/use surveillance, AMS interventions, prospective audit, dose adjustments and mentored by a team of AMS pharmacists. The participants were all involved in planning/execution of World Antimicrobial Resistance Awareness Week (WAAW) as well as awareness outreaches in rural areas each year. In 2025, an online survey was sent to them to determine their involvement in AMS and rate their confidence in carrying out AMS activities. The responses were analysed using excel and the results presented as percentages.

Results: 43 responses were received out of 59 indicating 73% response rate. The respondents were 42% male and 58% female with 89% of them working in the hospital and community pharmacies. Nineteen of them (44%) had heard of AMS to their internship, from their undergraduate lectures. There were notable improvements observed post training: 49% were not confident and none was exceptionally confident in carrying out AMS activities prior to training. However, after their internship, 2% were not confident; 12% were exceptionally confident, while 86% were confident/very confident in carrying out stewardship activities. Furthermore, 65% of the interns mentored were actively involved in AMS activities in their practice sites more than a year after the training. These practices include antibiotic rounds, prospective audit with intervention and feedback, dose adjustment, de-escalation, WAAW activities among others.

Conclusion: Structured mentoring on AMS during internship is a tool for building AMS capacity in Pharmacists and could be applied in various practice settings especially in LMICs where Pharmacy AMS workforce may be inadequate.

Off-label use of coenzyme Q10 in sudden sensorineural hearing loss: A retrospective case study review in a northern Taiwan medical center

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Background: Sudden sensorineural hearing loss (SSNHL) is a distressing condition that often prompts urgent medical attention. Coenzyme Q10 (Ubiquinone, CoQ10) is a antioxidant involved in cellular metabolism and energy production. Animal studies suggest CoQ10 reduces auditory oxidative stress and protects against hearing loss from aging, noise, and ototoxic drugs. A 30-day CoQ10 therapy may accelerate recovery from noise-induced hearing loss. While CoQ10 is officially approved in Taiwan as an adjunct therapy for heart failure, clinical practice has observed its off-label use by otolaryngologists for sudden sensorineural hearing loss treatment. This study investigates the prescribing patterns and follow-up outcomes of CoQ10 in sudden sensorineural hearing loss patients at a Northern Taiwan medical center.

Methods: A retrospective review of all the CoQ10 prescriptions between January 2024 and March 2025 was conducted in Northern Taiwan medical center outpatient pharmacy. A total of 572 prescriptions were analyzed, with the highest proportion issued by cardiology (49.4%), followed by general surgery (21.3%). Otolaryngology accounted for 46 prescriptions (8%), exclusively for sudden sensorineural hearing loss patients. Data extracted included patient demographics, prescription frequency, treatment duration, follow-up visits, and concurrent medications.

Results: Among the 46 otolaryngology-issued CoQ10 prescriptions, 24 sudden sensorineural hearing loss patients were identified. The average follow-up visits per patient were 2, with a mean treatment duration of 13.35 days. The most common dosing regimen was prescribed twice daily (62.5%). Of these patients, 11 received systemic steroids or combined steroid-CoQ10 therapy. Compared to non-steroid users, this group demonstrated improved hearing recovery and fewer follow-up visits. However, one patient with severe sudden sensorineural hearing loss and comorbidities required long-term monitoring under Taiwan's National Health Insurance chronic disease prescription program.

Discussion: Tinnitus and vertigo frequently accompanied sudden sensorineural hearing loss, prompting additional prescriptions of antivertigo agents (e.g., betahistine) and vitamin supplements. Interestingly, despite the American Academy of Otolaryngology–Head and Neck Surgery Foundation's guidelines advising against routine antivirals, thrombolytics, vasodilators, or vasoactive agents for sudden sensorineural hearing loss, some physicians prescribed short-term peripheral vasodilators for symptom relief. While systemic steroids remain the standard treatment for sudden sensorineural hearing loss, adjunct therapies such as CoQ10 are increasingly explored for their potential antioxidative and neuroprotective effects.

Regular follow-up is essential, with parameters include pure tone audiometry and speech discrimination score assessed at baseline, 1, 3, and 6 months post-treatment. MRI with gadolinium is advised for atypical cases. Pharmacists can assist by monitoring CoQ10 and other prescription drugs adherence, counseling on drug interactions, and evaluating hearing-related medication use to optimize treatment efficacy.

Conclusions: CoQ10 is utilized as an off-label treatment for sudden sensorineural hearing loss in Taiwan, often in combination with systemic steroids. While preliminary findings suggest a potential benefit in improving hearing recovery, larger controlled studies are necessary to validate its efficacy. The prescribing patterns also highlight deviations from international guidelines, underscoring the need for further clinical evaluation and standardized treatment protocols.

Utilizing artificial intelligence to assess aseptic technique during sterile compounding within a primary engineering control

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This study aims to evaluate machine learning models of videos to assess the accuracy of aseptic technique in sterile compounding within laminar airflow workstations (LAFW).

Method: Cameras were installed in LAFW to track aseptic technique performance at two pilot pharmacies specializing in sterile compounding. During the machine learning aspect of the aseptic technique, the following data and error categories were collected:

•Performing operations at least six inches inside the LAFW

•Wiping all septa and injection ports with alcohol swab

•Opening materials with critical sites exposed to correct first air

•Wiping hands with alcohol upon entry or re-entry to the LAFW

•Placing product in such a way as to not disrupt laminar airflow at the septa

•Cautiously manipulating consumables to avoid dropping during operations.

For this analysis, a Warning is a breach of aseptic technique that was subsequently addressed before moving to the next step of the process; an Error was any breach that was not corrected. A senior pharmacy technician with extensive experience in sterile preparations validated a sample of the videos to ensure the accuracy of the results.

Results: An analysis was conducted on 8 hours of video. A total of 326 sterile compounds were prepared in 56 batches. Sixty breaches of sterile technique (34 blocking first air, 16 failures to sanitize hands when returning to LAFW, 6 instances of poorly positioning items, and 4 items dropped on the work surface during manipulation) were discovered. Warnings were principally blocking first air to critical sites with the hands and then re-wiping with alcohol (31 of 48), 12 of which were not rectified by sanitizing.

Half of detected unresolved errors (6; 2 blocking first air & 4 failures to resanitize hands) were performed by a single technician during a single continuous video.

A total of 62% of products and 66% of total batches were unaffected by any breach in sterility (Warning or Error).

Conclusion: This data demonstrates the benefits of monitoring aseptic techniques to improve practice, as these errors were not identified during preparation. The next step is to use this data to create targeted training programs for compounders and then reassess practice.

Enhancing pharmacy practice with a novel electronic tool: Development of a patient-reported outcome measure (PROMs) for genitourinary syndrome of menopause (GSM) management

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Background: Genitourinary syndrome of menopause (GSM) affects over 50% of postmenopausal women, impacting quality of life through vaginal, sexual, and urinary symptoms. Pharmacists play a vital role in managing GSM via counselling and treatment optimisation, yet existing patient-reported outcome measures (PROMs) fail to fully capture its multidimensional burden and treatment acceptability. This study aimed to develop and validate the GSM-SVTAQ (GSM-symptoms and vaginal treatments acceptability questionnaire), an electronic PROM designed to assess GSM symptom burden, health-related and sexual quality of life, and vaginal treatment acceptability, empowering pharmacists to improve patient care.

Methods: This study was conducted in the United Arab Emirates, and it followed a three-stage process aligned with Consensus-based Standards for selecting health Measurement Instruments (COSMIN) guidelines: (1) preliminary design via literature review and qualitative interviews with 50 GSM patients, (2) item generation and refinement using Prior et al.'s five-step pre-validation methodology, and (3) validation assessing content validity (CVI) and reliability (Cronbach's α). An expert panel and patient feedback ensured cultural relevance and usability.

Results: The GSM-SVTAQ consists of three domains: symptom burden (vaginal, sexual, urinary), quality of life, and treatment acceptability. It demonstrated strong validity (scale-CVI: 0.926, 0.875, 0.824) and reliability (Cronbach's α: 0.939, 0.947, 0.855) across all domains. As the first GSM-specific electronic PROM, it provides a comprehensive assessment of patient experiences, including treatment perceptions essential for adherence.

Conclusion: The GSM-SVTAQ provides pharmacists with a validated, user-friendly tool for comprehensive GSM assessment, improving medication management and patient-clinician communication. Its electronic format facilitates integration into community pharmacy practice and may be adaptable for managing non-communicable diseases (e.g., menopause-related dyslipidaemia). Future applications could transform GSM care globally, strengthening pharmacy's role in advancing health outcomes.

Effects of different analgesic modalities on pain relief and safety after minimally invasive esophagectomy: A randomized controlled clinical study

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Introduction: Effective postoperative pain management is a key component of Enhanced Recovery After Surgery (ERAS). Minimally invasive esophagectomy (MIE) for oesophageal cancer causes substantial postoperative pain due to extensive surgical trauma. Poorly controlled pain impairs respiratory, cardiovascular, endocrine, and immune functions, increasing risks of complications such as pneumonia and atelectasis, thus negatively impacting recovery. Current guidelines recommend multimodal analgesia combining opioids, non-steroidal anti-inflammatory drugs (NSAIDs), acetaminophen, regional anaesthesia, and patient-controlled intravenous analgesia (PCIA). However, optimal analgesic combinations remain uncertain. Clinical observations indicated NSAIDs alone provided inadequate pain control in some patients, while opioids effectively reduced pain but caused gastrointestinal adverse effects, including nausea, vomiting, distension, and constipation. This study aimed to compare analgesic effectiveness, gastrointestinal recovery, and safety profiles of different analgesic regimens, and evaluate clinical efficacy of preemptive NSAIDs administration.

Method: A total of 93 patients undergoing MIE from December 2022 to December 2024 were randomly assigned (1:1:1 ratio) into three groups. Group A (Routine NSAIDs) received intravenous flurbiprofen axetil 50 mg twice daily postoperatively. Group B (Preemptive NSAIDs) received intravenous flurbiprofen axetil 50 mg 30 minutes before anaesthesia induction, with postoperative analgesia identical to Group A. Group C (Opioid-based PCIA) received postoperative analgesia via mechanical analgesic pumps containing sufentanil and ondansetron. All patients

additionally received local wound infiltration with ropivacaine intraoperatively and on postoperative days 1–3. Primary outcomes included maximum and average Visual Analogue Scale (VAS) scores on postoperative days 1–3. Secondary outcomes were time to first flatus and defecation, and incidence of postoperative nausea, vomiting, and abdominal distension.

Results: All analgesic regimens provided satisfactory postoperative analgesia. Pain scores were similar among groups on postoperative days 1 and 3 (P>0.05). On postoperative day 2, Group B had significantly lower pain scores than Group A (P<0.05), indicating transient analgesic improvement from preemptive NSAIDs. Gastrointestinal recovery was significantly faster in NSAIDs-based groups (Groups A and B) compared to opioid-based PCIA (Group C), evidenced by shorter times to first flatus (Group A: 40.90±3.27 h, Group B: 35.53±3.79 h, Group C: 59.58±5.51 h; P<0.01) and earlier defecation (Group A: 73.02±4.89 h, Group B: 57.19±8.22 h, Group C: 83.46±7.75 h; P<0.05). Group C showed a higher trend toward gastrointestinal adverse events, including nausea, vomiting, abdominal distension, and constipation, though differences among groups were not statistically significant (P>0.05).

Conclusion: Both NSAIDs-based analgesia and opioid-based PCIA effectively provided satisfactory pain control after MIE. However, NSAIDs-based regimens offered faster gastrointestinal recovery and fewer gastrointestinal adverse effects, potentially facilitating improved postoperative recovery. Preemptive NSAIDs administration provided only transient analgesic improvement on postoperative day 2, with limited clinical significance. Further studies are required to confirm these findings. Clinicians should individualise analgesic regimens by considering patient characteristics and medication profiles to enhance postoperative recovery and minimise adverse events. (ClinicalTrials.gov ID: NCT05504265).

Real-world evaluation of administration-site reactions and patient preference regarding subcutaneous trastuzumab in Chinese patients with early breast cancer

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Introduction: Trastuzumab, a humanised monoclonal antibody targeting human epidermal growth factor receptor 2 (HER2), significantly improves clinical outcomes for HER2-positive breast cancer patients. Originally developed as intravenous (IV) infusion, trastuzumab (T-IV) requires prolonged administration time, additional nursing resources, and increased healthcare costs, which can negatively impact patient compliance, convenience, and overall quality of life. Subcutaneous trastuzumab (T-SC), containing a fixed dose of 600 mg trastuzumab combined with recombinant human hyaluronidase, simplifies administration, shortens administration duration to approximately five minutes, reduces healthcare resource utilisation, and potentially improves patient adherence. International randomised clinical trials, including HannaH and PrefHer studies, demonstrated T-SC's non-inferiority to T-IV regarding pharmacokinetics, efficacy, and overall safety profiles. However, T-SC was associated with higher rates of mild local injection-site reactions compared to T-IV. Given T-SC's recent introduction in China (February 2024), real-world evidence regarding administration-site reactions, patient acceptance, and preference among Chinese patients remains limited. This study aimed to evaluate local administration-site reactions, patient preference, and adherence associated with T-SC in Chinese patients with early-stage HER2-positive breast cancer under routine clinical practice conditions.

Method: A retrospective observational study was conducted involving 75 patients with early-stage HER2-positive breast cancer who received T-SC at our hospital between February and September 2024. Eligible patients were aged ≥18 years, diagnosed with stage I–III HER2-positive breast cancer, receiving trastuzumab for the first time as adjuvant or neoadjuvant therapy, and consented to follow-up. Administration-site reactions (pain severity rated by numerical rating scale, duration of pain, and local skin abnormalities), proportion switching from T-SC to IV trastuzumab, and patient preference regarding administration route were systematically assessed through structured telephone or face-to-face interviews after initial T-SC administration.

Results: Seventy-five patients were enrolled, with median age 53 years and median body mass index (BMI) 23.2 kg/m². Among them, 72.0% underwent breast surgery, 92.0% received chemotherapy, and 8.0% received radiotherapy. Following T-SC administration, 46 patients (61.3%) reported no significant injection-site pain, 19 (25.3%) experienced mild pain lasting ≤1 day, and 10 (13.3%) experienced pain lasting >1 day. Injection-site skin abnormalities, such as bruising, erythema, or swelling, occurred in nine patients (12.0%). Regarding patient preference, 57.3% preferred T-SC primarily for convenience and shorter administration time, while 21.3% preferred IV administration. Presence of concurrent intravenous therapies (37.3%) significantly influenced patient preference, whereas injection-site reactions had minimal impact. The proportion of patients switching from subcutaneous to intravenous administration was low (only 3 patients, 4.0%).

Conclusion: Real-world data from Chinese patients with early-stage HER2-positive breast cancer indicate that T-SC has a favourable safety profile, with mild, manageable local administration-site reactions. The majority of patients preferred T-SC due to improved convenience and shorter administration duration, suggesting strong clinical acceptability and adherence. These findings support broader

adoption of subcutaneous trastuzumab in routine Chinese clinical practice.

Association between proton pump inhibitor use and renal function decline in chronic kidney disease: A Retrospective Analysis using data from a regional hospital in Taiwan

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Introduction: Proton pump inhibitors (PPIs) are among the most commonly prescribed acid-suppressive medications. According to drug labels and previous studies, PPIs have been associated with acute kidney injury and an increased risk of chronic kidney disease (CKD). However, most research has focused on the impact of PPI use on renal function in patients with normal kidney function, with limited studies addressing the effects in the CKD population. Therefore, this study aims to investigate the changes in renal function following PPI use in CKD patients and to determine whether PPI use accelerates the deterioration of renal function in this population.

Methods: This retrospective study included CKD patients (eGFR <60 mL/min/1.73m²) who were newly prescribed PPIs in the outpatient department of our hospital between January 1 and December 31, 2023, with a PPI treatment duration exceeding 84 days. Patients were excluded if they lacked eGFR data within 0–180 days prior to PPI initiation, lacked follow-up eGFR data until December 31, 2024, or were undergoing dialysis at the time of PPI initiation. The study employed a Generalized Estimating Equations (GEE) model to analyze the eGFR of CKD patients in the 6 months before and after PPI use. The goal was to explore the association between PPI use and renal function decline and to assess any differences in impact across different CKD stages and types of PPIs.

Results: This study included 362 patients, with 51.9% being male and an average age of 74.3 ± 10.8 years. The CKD stages of the patients were as follows: 46.4% in stage 3a, 28.5% in stage 3b, 16.9% in stage 4, and 8.3% in stage 5. The PPIs prescribed included pantoprazole (74.9%), lansoprazole (12.4%), esomeprazole (7.7%), and rabeprazole (5.0%). The GEE analysis revealed that following PPI initiation, the average eGFR decreased by 3.55 mL/min/1.73m²; however, this decline was not statistically significant (p= 0.112). The trend of eGFR decline was consistent across different CKD stages, with no significant interaction observed (p= 0.264). When evaluating the impact of different PPIs, pantoprazole was used as the reference. The p values for lansoprazole (p = 0.632), esomeprazole (p = 0.584), and rabeprazole (p = 0.240) were not statistically significant, indicating that no specific PPI had a greater effect on renal function. In terms of CKD stages, using stage 3a as the reference, the p values for stage 3b (p= 0.214), stage 4 (p= 0.771), and stage 5 (p= 0.054) showed no significant differences in the trend of eGFR decline across CKD stages.

Conclusions: Our study demonstrates that PPI use does not accelerate the deterioration of renal function in CKD patients. Additionally, no significant differences were observed in the trend of kidney function decline across different PPIs or CKD stages. Further research are required to assess whether the combination of other risk factors and PPI use contributes to renal function decline.

Real-world impact of finerenone on renal function in Type 2 Diabetes-Related Chronic Kidney Disease

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Introduction: Finerenone, a selective nonsteroidal mineralocorticoid receptor antagonist, was approved in Taiwan on July 1, 2022, for adults with type 2 diabetes-related chronic kidney disease (CKD). It reduces the risk of CKD progression, ESRD, cardiovascular events, and heart failure hospitalizations. Based on the FIDELIO-DKD and FIGARO-DKD studies, finerenone showed better outcomes than placebo, though with a higher risk of hyperkalemia. This study aims to assess its real-world clinical application and efficacy in our hospital.

Methods: Finerenone was introduced at our hospital in January 2024 as a self-paid medication. We retrospectively reviewed 192 patients who were newly prescribed finerenone in 2024. We tracked all estimated glomerular filtration rate (eGFR), microalbumin creatinine ratio (UACR), protein creatinine ratio (UPCR), and serum potassium (K) values for patients 6 months before starting the medication and 12 months after. Based on the duration of medication use, trends in eGFR, ACR, PCR, and serum potassium values were statistically analyzed at pre-treatment, 3 months, 3-6 months, 6-9 months, and 9-12 months intervals. Kidney function and serum potassium values were analyzed using one-way ANOVA. Due to fewer measurements of proteinuria indicators (UACR and UPCR), generalized estimating equations (GEE) were used to analyze the data to reduce the effect of outliers.

Results: The majority of patients using finerenone were male, and the most common CKD stages at the time of initiation were stage 3b (33.9%) and 3a (22.4%). The average UACR was 1276 mg/g, and UPCR was 2516 mg/g. Most patients were prescribed finerenone at a dose of 10 mg daily (76.6%), with an average treatment duration of 145 days. Within the first 3

months of treatment, renal function continued to decline; however, after 3-6 months, the rate of decline in eGFR showed signs of slowing. Both UACR and UPCR demonstrated a downward trend post treatment ($p<0.05$). No significant differences were observed in serum potassium levels before and after using finerenone.

Conclusion: Finerenone, in addition to ACE inhibitors (ACEi), angiotensin receptor blockers (ARB), and SGLT2 inhibitors, contributes to delaying the progression of renal function deterioration and proteinuria in chronic kidney disease patients. Real-world data analysis shows similar efficacy to clinical trials, which may improve the quality of care for diabetic kidney disease (DKD) and delay progression to ESRD.

Incidence, risk factors, and management of arrhythmias in patients undergoing cardiac surgery: A comprehensive overview

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Background: Postoperative arrhythmias are a common and critical complication in cardiac surgery patients, contributing to increased morbidity, prolonged hospital stays, and higher healthcare costs. Despite advancements in surgical techniques and perioperative care, arrhythmias remain a significant challenge. They can lead to severe complications such as stroke, heart failure, and even mortality if not managed appropriately. The prevalence of arrhythmias in the postoperative period is notably high, especially in patients with pre-existing cardiovascular conditions. This study addresses a gap in knowledge regarding the incidence and risk factors specific to patients in a tertiary care setting in India, providing valuable insights into optimizing management strategies and improving patient care. Purpose: The objective of this study was to assess the incidence of postoperative arrhythmias, identify key risk factors, and evaluate current management strategies to improve patient outcomes. The hypothesis was that targeted management protocols, including pharmacological and non-pharmacological interventions, could reduce the incidence and severity of postoperative arrhythmias in high-risk patients, thereby enhancing recovery and reducing hospital stays.

Method: This observational study included 120 patients who underwent cardiac surgeries at KIMS (Bollineni) Hospital, Rajahmundry, over a period of 12 months. Data were collected on patient demographics, preoperative health status, lifestyle factors such as smoking and alcohol use, comorbidities including hypertension and diabetes, and postoperative outcomes. Statistical analysis was performed using SPSS software to identify significant predictors of arrhythmias. Ethical approval was obtained, and patient confidentiality was maintained throughout the study. Monitoring involved continuous ECG during hospitalization and follow-up visits post-discharge.

Results: Arrhythmias occurred in 36.6% of patients postoperatively, with sinus tachycardia (65.9%) and atrial fibrillation (18.2%) being the most prevalent. Significant risk factors included age >50 years, BMI >25, hypertension, diabetes, smoking, and alcohol consumption. The study also found that patients with prolonged surgery durations and higher doses of intraoperative medications were more susceptible to arrhythmias. Management primarily involved beta-blockers (metoprolol) and calcium channel blockers (amiodarone), which were effective in most cases. Adjunctive therapies, including electrolyte management and lifestyle counselling, were also employed.

Conclusion: The findings highlight the importance of early identification and intervention for high-risk patients. Continuous monitoring and tailored pharmacological management can reduce postoperative arrhythmia rates. The study emphasizes the need for comprehensive preoperative assessments and personalized postoperative care plans. Future research should focus on refining risk stratification models, incorporating newer antiarrhythmic agents, and exploring non-pharmacological interventions such as lifestyle modifications, advanced surgical techniques, and patient education programs.

Comparison of the FIP Basel Statements on the future of hospital pharmacy practice and global pharmacy school accreditation standards

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Introduction: The International Pharmaceutical Federation (FIP) Basel Statements on the Future of Hospital Pharmacy Practice provide a globally recognised framework for advancing hospital pharmacy practice. These statements define the essential roles, responsibilities, and competencies of hospital pharmacists worldwide. However, the extent to which pharmacy school accreditation standards align with these statements remains unknown, raising concerns about whether pharmacy graduates are adequately prepared for hospital pharmacy roles upon qualification. Given the critical role of accreditation in shaping pharmacy education, it is essential to understand how well current accreditation standards integrate hospital pharmacy principles. This study aims to assess the alignment between pharmacy school accreditation standards from multiple countries and the FIP Basel Statements, identifying areas of alignment, gaps, and opportunities for improvement. The findings will inform both

pharmacy accrediting bodies and the FIP Hospital Pharmacy Section on how to enhance hospital pharmacy education globally.

Methods: Accreditation standards from 22 countries were identified, with 12 countries' standards secured for evaluation. When accreditation standards were unavailable in English, two pharmacists fluent in the respective language conducted the review—one performing the initial gap analysis and the second verifying accuracy. A systematic comparative analysis was conducted against the 2024 FIP Basel Statements, categorising each statement as aligned (explicitly covered in accreditation standards), not aligned (not addressed), or not applicable (beyond the scope of accreditation). As 41.5% (27) of the Basel Statements were deemed not applicable to pharmacy school accreditation, adherence was calculated based on the remaining 38 applicable statements. In total, 14 gap analyses were conducted across 12 unique countries, as both the United States (2020 vs. 2025 accreditation standards) and Canada (Bachelor of Pharmacy [BPharm] vs. Doctor of Pharmacy [PharmD] accreditation standards) were assessed separately.

Results: Alignment with the 38 applicable Basel Statements varied across countries. New Zealand (97.4%) had the highest alignment, followed by Australia (71.7%), Malaysia (68.4%), and the United Kingdom (63.2%). In contrast, China (14%) exhibited the lowest alignment, indicating potential gaps in hospital pharmacy education. The United States' accreditation standards demonstrated a decline in alignment, decreasing from 60.5% (2020) to 55.3% (2025), which may reflect the expanding scope of pharmacy practice beyond hospital settings. Similarly, Canada's PharmD accreditation standards (52.6%) aligned more closely than its BPharm standards (44.7%), suggesting that higher-level training better incorporates hospital pharmacy principles.

Conclusion: These findings highlight significant variability in the integration of hospital pharmacy principles within accreditation standards globally. In several countries, pharmacy graduates may not be fully prepared for hospital pharmacy practice upon graduation, necessitating postgraduate training to ensure competency. Accreditation bodies may consider incorporating FIP Basel Statement-aligned hospital pharmacy competencies to improve workforce readiness. Additionally, the FIP Hospital Pharmacy Section could use these findings to inform future Basel Statement revisions and develop implementation strategies for global adoption. By promoting greater alignment between accreditation standards and international hospital pharmacy best practices, this study contributes to enhancing pharmacy education worldwide and ensuring graduates are equipped to meet the evolving needs of hospital pharmacy practice.