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CONFERENCE ABSTRACTS

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Hospital pharmacy

Determination of a patient waiting time using the speedy-Q system in the outpatient pharmacy at Edenvale Hospital

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Background: Long patient waiting times were stated as a common reason for patients' complaints of poor patient experience at Edenvale Hospital pharmacy. Using the fishbone diagram, the root cause analysis revealed that lengthy prescriptions, high patient volumes, shortage of staff, poor infrastructure and poor queuing system were amongst the top contributing factors. Waiting times are of great concern to staff involved in serving the patients, as working in a stressful environment can impact the mental and physical well-being of staff members. With pharmacy being the endpoint of service at the hospital, outpatients are generally exhausted from the preceding consults in other departments and hence cannot wait for long periods in the queue. Despite financial limitations and resource constraints, the dispensing process was restructured by implementing an innovative system using only existing resources to attain radical change and combat the long waiting times in pharmacy**.**

Purpose: The aim of this study was to improve waiting times at the pharmacy by implementing an innovative dispensing system (the Speedy-Q System). The study objectives were to determine a) whether the Speedy-Q system has an impact in decreasing patient waiting times in OPD pharmacies and b) whether the Speedy-Q system enhances patient experience.

Method: The cross-sectional, observational study was conducted over a period of 12 months (from December 2022 to November 2023). The study population consisted of 2 880 outpatients who visited the pharmacy. Each patient visiting the pharmacy was allocated a file number and a queue (priority, acute/express, new chronic, and repeat chronic) by a queue marshal. A time trial record slip was attached to the file to record time in and time out. Once the pharmacist called the patient's file number to a specific window, the patient was helped, and then the next patient was called. Data was collected manually via stat sheets and then computed using Microsoft Excel.

Results: The average monthly waiting time was 17 minutes. The waiting times have been below the estimated provincial target of 60 minutes. A comparison of Pre-Speedy Q and Post-Speedy Q showed a decrease in average monthly waiting times by 58 minutes, a 78% decrease in monthly average waiting times after the implementation of Speedy-Q. Patient surveys showed that 100% of patients were satisfied with the speedy Q system. The staff at the pharmacy showed a favourable response rate of 100% to the new system.

Conclusion: It is evident that the waiting time has drastically decreased since the implementation of the Speedy-Q system. The speedy-Q system has improved efficiency in outpatient pharmacies, hence enhancing patients' experiences. The speedy-Q system is beneficial to the profession/institution, and it is easy to replicate in various departments/facilities. The proposed automated Q-flow system and robotic system will assist in eliminating human error. Research on chronic prescription where medication will be pre-pack in advance for patients need to be carried out and this will further aid to decrease in waiting times.

To assess a possible toxic effect of "Herbex attack the fat syrup" on isolated human neutrophils

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Background: There seems to be limited scientific evidence to evaluate the safety and effectiveness of herbal medicines. “Herbex attack the fat syrup” is a herbal syrup medication that is used to lose weight. The patient information leaflet of "Herbex attack the fat syrup" states that the side effects are not known. Obesity has major health problem implications. Herbal medicines can still be dangerous, although they are claimed to work gently with milder or no side effects and are natural. The objective of this study was to assess a possible toxic effect of “Herbex attack the fat syrup” on isolated human neutrophils.

Methods: The study was conducted at Sefako Makgatho Health Sciences University (SMU) in the Pharmacology Department laboratory. A quantitative experimental design was used to perform the study. Blood samples from 8 healthy volunteers were used to perform the study. Thirty millilitres of blood were withdrawn using venepuncture from healthy volunteers by a qualified nurse. Freshly isolated human neutrophils were incubated with “Herbex attack the fat syrup”. The cells were used within 3 hours to perform the following toxicity test, determination of superoxide production (using PMA, fMLP, and zymosan as stimulant), ATP production measurement and MTT assay. Superoxide production and ATP production were determined by measuring the chemiluminescence of isolated human neutrophils. MTT was used to test the viability of the neutrophils.

Results: Different concentrations of DMSO were found to decrease the superoxide production (SOP) and phagocytosis of neutrophils. The time to reach the maximum superoxide production in neutrophils, especially for fMLP-stimulated neutrophils, was significantly increased. Zymosan (ZOP) and PMA at some concentrations decreased the time response for the release of the oxides compared to the control. DMSO increased the time response. Herbex concentrations had a significant inhibitory effect on unstimulated neutrophils but a limited inhibitory effect on stimulated neutrophils by PMA, fMLP and ZOP. The effect of herbex on unstimulated cells decreased the time to maximum while PMA and ZOP stimulated cells showed the same results. fMLP-stimulated cells tend to show an increased time to the maximum. A decrease in ATP production was observed in the presence of different concentrations of Herbex. Chemiluminescence decreased after 25% with an increase in Herbex concentrations. An increase in absorbance was seen, which was significant at the highest doses of Herbex syrup. The mean % cell viability was 15.6% for all concentrations.

Conclusion: The study showed that “Herbex attack the fat syrup” does have different effects on the superoxide production of neutrophils. Both ATP and MTT toxicity assays show toxicity at the higher doses of “Herbex attack the fat syrup”, but it is inconclusive due to colour interference, which needs to be further investigated. The mechanism by which Herbex has a significant inhibitory effect on unstimulated neutrophils is not yet known; this needs to be further investigated.

Utilisation patterns of commonly prescribed Aantimicrobials before and after the COVID-19 pandemic in uMngungundlovu District, KwaZulu Natal, South Africa

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Background: High and irrational utilisation of antimicrobials is the most critical driver of antimicrobial resistance (AMR) in the world. Therefore, the World Health Organisation (WHO) encourages and assists member countries to assess utilisation patterns of antimicrobials and, when necessary, to implement sustainable programmes to reduce antibiotic consumption – locally, regionally, and at national levels.

Purpose: In this study, utilisation patterns of five commonly prescribed antimicrobials, which are mainly indicated for respiratory tract infections (RTIs), sexually transmitted infections (STIs), and protozoal infestations, were investigated.

Methods: This was a retrospective drug utilisation review (DUR) study. Consumption data of amoxicillin 500 mg capsules, amoxicillin/clavulanic acid 1 000 mg tablets, azithromycin 500 mg tablets, doxycycline 100 mg capsules, and metronidazole 400 mg tablets were obtained from twelve public healthcare facilities in uMgungundlovu district, KwaZulu-Natal South Africa. The Anatomical Therapeutic Chemical (ATC) codes for antibiotics and their ATC daily defined doses (DDD) were obtained from the WHO ATC DDD database. The uMngungundlovu district’s population estimates for 2019, 2020, 2021, 2022, and 2023 were obtained from Statistics South Africa (StatsSA). Analysis and interpretation of antibiotic consumption were informed by Hutchinson et al. (2004). The study proposal obtained ethics approval from the University of KwaZulu-Natal bioethics research committee (Ref No.: BREC3100/2021) and the KwaZulu-Natal Department of Health (Ref No.: 202109_020).

Results: Utilisation of amoxicillin 500 mg (ATC Code - J01CR02) increased steadily from 904 g to 1 065 g per year between 2019 and 2023. However, amoxicillin 500 mg DDD-

year per 1000 population remained between 0,5 and 0,6 during this period. Consumption patterns of amoxycillin/clavulanic acid 1000 mg (ATC Code - J01CR02) and azithromycin 500 mg (ATC Code - J01FA10) were like that of amoxycillin 500 mg, although utilisation of amoxycillin/clavulanic acid 1000 mg decreased by 16% in 2020 as compared to 2019. Surprisingly, there was a steep increase in utilisation of doxycycline 100 mg (ATC Code - J01AA02) from 2 274 g (i.e., 20 DDD-year per 1 000 population) to 4 811 g (i.e., 40 DDD-year per 1000 population) in 2019 and 2023, respectively. Metronidazole 400 mg (ATC Code - G01AF01) consumption decreased from 7 DDD-year per 1,000 population to 4 DDD-year per 1,000 population in 2019 and 2023, respectively.

Conclusion: This DUR study suggests that consumption of most of the commonly prescribed antibiotics increased sharply in the public healthcare sector in the uMngungundlovu district, KwaZulu-Natal, South Africa, during the COVID-19 pandemic. The reasons for the high consumption of bacteriostatic antibiotics, which are prone to bacterial resistance, such as doxycycline, require further investigation.

Opportunities for improving clinical pharmacy services through behaviour change methodology to optimise from hospital digital medical records platform

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Introduction: The rapid evolution of technology over the past several years has created a new and exponentially growing field of digital health and electronic data systems for pharmacists and health professionals.

The implementation of a hospital digital medical records platform across a network of hospitals offered the opportunity to improve clinical pharmacy services, especially in low-resource healthcare systems.

Transitioning from paper-based clinical pharmacy systems and adopting a digitally enabled platform necessitated a shift in clinical pharmacists' (CPs) processes and behaviour. Behaviour change interventions are 'Coordinated sets of activities designed to change specified behaviour patterns.

The aim of this improvement initiative was to explore how behaviour change methodology with the implementation of the new hospital digital medical records could improve the number of patients reviewed and clinical pharmacist intervention recommendations.

Method: This was a multicenter, prospective qualitative study conducted in 15 hospitals in South Africa, from May 2023 to February 2024. Principles from The Model for Improvement as defined by the Institute for Healthcare Improvement (IHI) were applied. Interventions included workshops, online surveys, and weekly check-in sessions. Workshop themes included behaviour change, will-building, adopting a "can do" culture and lateral learning opportunities from clinical pharmacists. It was fundamental to understand what the motivation for each pharmacist was to make the change, take action that will result in a change and be aware of the barriers which will hinder them from making the sustained change.

The number of patients reviewed and pharmacist interventions recommended during pre- and post-intervention were compared.

Results: A total of 15097 patients were reviewed from October 2022 to May 2023 (pre-intervention) compared to 20471 patients from June 2023 to February 2024 (post-intervention). Resulting in a 35.6% increase in the number of patients reviewed. Five thousand one hundred thirty-four pharmacist interventions were recommended during Oct 2022-May 2023 with an acceptance rate of 85.61%, followed by 5621 interventions recommended during the post-intervention phase, with an accepted rate of 79.52%. A 9.5% increase in the number of pharmacists' recommendations was observed. However, a reduction (7.1%) in accepted interventions was noted.

Conclusion: Clinical pharmacist resources are limited in LMIC often encapsulated with daily dispensing of medication and other operational duties. With the implementation of a hospital digital medical record platform, the ability to work more efficiently was enticed. However, only after successfully established behaviour change practices within the pharmacists a positive shift towards more patients reviewed was noted.

It was evident that when adopting a more efficient methodology for conducting clinical pharmacy patient care rounds and optimising from the digital electronic medical records, more patients benefited from the skills and knowledge of clinical pharmacists. Ultimately providing better patient care within the group of private hospitals.

Reduction of ceftriaxone utilisation through pharmacist-led interventions

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Introduction: Antimicrobial resistance (AMR) is one of the top 10 global public health threats facing humanity.

Broad-spectrum antibiotics such as 3rd generation cephalosporins are categorised as "Watch" antibiotics by the World Health Organisation (WHO), which should be used with caution due to their potential to cause antimicrobial resistance.

Ceftriaxone is among the most widely prescribed due to its high potency, broad-spectrum activity and low-risk toxicity profile and its wide range of registered clinical indications.

Ceftriaxone utilisation was the third-highest prescribed antibiotic within the group of hospitals, followed by amoxicillin/ acid and meropenem. COVID-19 has been identified as a driver for the increased use of ceftriaxone between 2020-2022 within the group.

It is well described in literature that pharmacist-led interventions can be successfully implemented to impact on the judicious prescribing of antibiotics.

The aim of this improvement work is to show that through pharmacist led interventions, a reduction of ceftriaxone utilisation is probable.

Methods: This multi-centre, prospective study was conducted within six hospitals in South Africa from October 2023 to February 2024.

Improvement initiatives were identified based on the Breakthrough Series Collaborative and the model for improvement methodology.

Interventions included: 1. Identifying top prescribers of ceftriaxone within each hospital, followed by pharmacists led discussions with these prescribers based on evidence-based guidelines for ceftriaxone 2. Patient specific pharmacists' interventions based on antibiotic stewardship principles for rational ceftriaxone usage.

The average Defined Daily Doses (DDD) for ceftriaxone utilisation were compared pre- (May-Sept 2023) and post-intervention (Oct-Feb 2024) phases. The number of ceftriaxone pharmacist interventions was recorded and analysed.

Results: The average DDD's for October – February 2024 was 11.28 DDD's, compared with the 12.49 DDD's for May – September 2023. A 9.7% reduction in ceftriaxone utilisation. 144 interventions pertaining to ceftriaxone were recorded by pharmacists, of which 82 (56.9%) related to hang time, 16 (19.5%) and 12 (8.3%) related to duplicate antimicrobial spectrum and antimicrobial selection based on culture sensitivity, respectively.

Conclusion: This study highlights the positive impact that pharmacists had on the utilisation of ceftriaxone. Pharmacists have been established as a key resource within the multidisciplinary team.

Building a strong collateral relationship between pharmacists and clinicians is crucial for effective antimicrobial stewardship initiatives.

Open communication & collaboration of evidence-based guidelines on the rational use of ceftriaxone contributed to the effective execution of this antimicrobial stewardship initiative.

A South African model for reducing specialised high-cost medication rejections: clinical pharmacists led interventions

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Introduction: The affordability of life-saving medications is a critical issue affecting millions of patients globally. Pharmacists are increasingly called to provide services to facilitate patients' access to care and improve health and medication use and outcomes. Pharmacists are now recognised as a key resource of healthcare institutions for the promotion of safe and rational use of medication. However, the economic impact of pharmacists within the healthcare system is a developing branch of clinical pharmacy services. Pharmacists play an evolving role in improving access to specialised high-cost medication (SHCM) and decreasing the financial burden associated with these SHCM to both patients and healthcare systems.

In South Africa, private medical schemes have restricted funding criteria for SHCM in hospitals that involve assessing effectiveness and efficiency of treatment. Healthcare providers must provide letters of motivation and clinical pathology reports to support the need for SHCM on behalf of patients. Rejection of the motivations may result in out-of-pocket costs to patients.

Within the medication management pathway, pharmacists possess specialised clinical knowledge in motivating SHCM from an evidence-based perspective, providing a vital service to determine appropriate use and ensure access to SHCM for patients.

The aim of this study is to highlight the impact that clinical pharmacists have made by motivating SHCM on behalf of

patients and supporting the multidisciplinary healthcare team.

Method: This improvement initiative was conducted in a network of 47 private hospitals over a 4-year period from 2019-2023.

The interventions were designed using the model for improvement methodology with the aim of addressing the inefficiencies and impact on patient care related to the magnitude of additional clinical motivation requirements for SHCM by medical schemes.

Interventions included a two-tier approach.

1. National coordination and implementation of targeted interventions for specific SHCM. Interventions included design of evidence-based template letters of motivation for SCHM, designed report that highlights targeted list of in-hospital patients that will require additional motivation.

2. Implement hospital-level interventions led by clinical pharmacists to motivate SHCM proactively.

3. Risk stratification is needed to reduce out-of-pocket payments of SHCM for patients.

Results: Over the 4-year period a ZAR445 970 577 reduction was noted when compared calendar year 2023 (ZAR211 124 825) with 2019 (ZAR657 095 402) value for additional letters of motivation & pathology reports requested by medical schemes for SHCM. This resulted in a reduction of 68% for potential out of pocket payments from patients. Clinical pharmacists contributed towards 9072 SHCM motivations during this study period.

Conclusion: Although South Africa is a resource-constrained country, it is proven that creative initiatives and interventions leveraging clinical pharmacists can significantly impact medication rejections and improve access to SHCM for many patients. Not only did pharmacists enhance healthcare efficiency, but they ultimately improved patient care.

Enhancing pharmacy operations in resource-limited environments: Leveraging EMR and E-scripting for remote healthcare provision.

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Background: A South African Private Hospital Group introduced an electronic medical record (EMR) and e-scripting system. This innovation became particularly vital during resource-constrained scenarios such as the COVID-19 pandemic, allowing pharmacists to deliver remote healthcare while meeting South African Pharmacy Council requirements as published in the Good Pharmacy Practice Manual.

Purpose: This abstract investigates how the EMR and e-scripting facilitated Phase 1 dispensing, which focuses on the interpretation and evaluation of prescriptions during the COVID-19 pandemic at a Western Cape Private Hospital.

Method: Amidst COVID-19, asymptomatic pharmacists awaiting test results conducted remote Phase 1 dispensing using the EMR through a Virtual Private Network connection.

Receipt of the prescription and confirmation of integrity was ensured through robust procedures built into the EMR for identification of patient, prescriber, and funder entity. E-scripts are securely transmitted in real-time, with provisions for verifying legality/authenticity and maintaining permanent records.

Pharmacists utilised the EMR to assess prescriptions comprehensively, considering therapeutic, individual appropriateness, and socio-economic aspects. This included evaluating medication safety, contraindications, interactions, and suitability for the individual's condition. Pharmacists intervened as necessary, collaborating with prescribers and other healthcare providers to address identified issues and formulate action plans via e-journal entries.

Results: By utilising the EMR and e-scripts, pharmacists remotely validated scripts, allowing in-house pharmacists to focus on dispensing phases 2 (preparation and labelling) and 3 (provision of information and instructions to the patient to ensure the safe and effective use of medicine). Operationally, there were no changes in dispensing service delivery noted by hospital patients or staff. No locums were required during the isolation of a non-symptomatic pharmacist. The remote validation of scripts also allowed for better social distancing in pharmacies during this period.

Conclusion: Integration of EMR and e-scripting technologies enables remote healthcare provision during crises like COVID-19, ensuring safe medication use through robust interpretation, evaluation, and pharmacist interventions.

Comprehensive weight management: Implementing a multidisciplinary weight Loss team - Insights from a regional hospital

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Introduction: The weight loss centre at the hospital in Taiwan analysed data from 199 patients between July and December 2023, uncovering unique insights into weight management strategies tailored for two distinct groups: the 31-40 age

demographic and severely obese patients. This study emphasises the need for personalised, multifaceted approaches to address the specific challenges and health risks associated with each group.

Methods: The authors comprehensive evaluation involved assessing demographic details, health outcomes, and treatment preferences. For the 31-40 age group, strategies were aligned with their lifestyle, focusing on career, family, and health consciousness. For severely obese patients, the approach was more intensive, addressing the high health risks and psychological impacts of obesity. Treatment modalities included pharmacotherapy, lifestyle interventions, and leveraging digital platforms for patient engagement.

Results: The analysis revealed a majority of patients were female (65%) with an average age of 41 years. The 31-40 age group (34% of cases) showed a preference for pharmacological treatment combined with lifestyle modifications, citing career and family pressures. Severely obese patients faced significant health risks like diabetes and hypertension, requiring a more aggressive, long-term management strategy involving a multidisciplinary team.

Discussion: Tailoring weight management to fit the specific needs of these groups showed promising outcomes. For the 31-40 age group, short-term, six-month goals with customised treatment plans were effective, while severely obese patients benefited from a comprehensive, team-based approach, ensuring treatments were covered by insurance and met health regulations.

Conclusion: This experience underscores the importance of a diversified, patient-centred approach to weight management, particularly for individuals in critical demographic groups or with severe obesity. By integrating personalised pharmacotherapy, lifestyle changes, and a multidisciplinary team, the authors can offer optimised treatment pathways that cater to the varied needs of this patient population. These strategies not only enhance patient outcomes but also contribute to the broader discourse on obesity management in pharmaceutical care, reflecting this commitment to advancing healthcare practices and patient well-being in Taiwan.

Demand planning and forecasting to improve medicine availability in Limpopo Province, South Africa-operational research project

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Background: This abstract is based on a pharmaceutical demand planning project conducted in Limpopo Province, South Africa. The project focused on improving medicine availability of dispersible paediatric dolutegravir 10mg through robust demand planning and forecasting methods. Inadequate medicine availability is a major concern in Limpopo, particularly for paediatric formulations, leading to compromised patient care and outcomes. The government introduced paediatric dolutegravir (p-DTG) as a new regimen for children living with HIV, requiring a systematic approach to demand planning and forecasting to ensure maximum order fulfilment. This project aimed to use historical usage data, inventory collaboration, inventory segmentation, and real-time monitoring to accurately predict stock requirements.

Purpose: The study explored how healthcare facilities can improve supply chain efficiency and resilience to meet demand and adapt to changes, using p-DTG as a case study. The authors aimed to optimise the supply chain efficiency and medicine availability of p-DTG while developing a sustainable system for future needs.

Method: Historical data on medicine stock demand and supply (stock receipts and dispensed) was analysed to provide insight into consumption patterns, using (i) facility stock cards, (ii) the national primary health care system – SVS, and (iii) the hospital stock management system - Rx solution. Advanced forecasting methods, real-time data monitoring on existing health information systems, and physical stock counts were employed to enhance accuracy in predicting medicine demand. Limpopo Province ART Working Committee's Demand Planning Sub-Committee Task Team collaborated with pharmaceutical companies and distributors on delivery schedules and communicating fulfilment of orders.

Results: Capricorn District had 882 eligible patients and inventory levels of 1,263 units in the October-December 2023 quarter. This could initiate 34% of eligible patients with a six-month supply. This rose substantially to 12,476 units in the January-March 2024 quarter, which is enough stock to supply 99% of eligible patients with a 6-month supply. Similarly, in Mopani District, having 1304 eligible patients, stock levels improved markedly from 2,133 units during October-

December 2023 to 11,349 units in the subsequent January-March 2024 period. 2 133 p-DTG units could only initiate 36% of eligible patients, which improved to enough stock to supply 98% of eligible patients with a six-month stock supply. By integrating demand planning with supply chain management processes and distribution networks, supply chain efficiency was optimised.

Conclusion: Establishing systematic demand planning and forecasting had a very positive impact on improving medicine availability. By implementing supply chain monitoring and evaluation mechanisms, the authors were able to track medicine availability and address stock-outs. Continuous monitoring of demand for medicine utilising real-time data identified deviations and changes in demand patterns. Demand planning improved procurement decisions, mitigating low stock levels and ensuring sufficient stock levels. The use of technology such as Stock Visibility Solution (SVS), Synchronised National Communication in

Health (SyNCH) and RX solution improves medicine availability, supply chain resilience, and access to essential medicines. Continuous monitoring of medicine demand and consumption, as well as data-informed adjustment of min/max stock levels and data analytics, have improved medicine supply chain efficiency.

Enhancing patient medication safety via electronic communication of discharge medication information across 45 pharmacies

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Background: Communication of discharge medication information remains the cornerstone of medication safety and a pharmacist's role. It is essential for a high quality of care, adherence to prescribed treatments and safe administration by the patient. Medication communication tools include primarily clear medication label instructions, verbal communication via counselling of patients and/or documented tools. Whilst all are relevant in ensuring optimal communication, documented information tools are clear and direct, allowing for better understanding and confirmation of aspects at a later stage if unclear.

Aim: To improve patient medication safety via the development and implementation of an electronic communication system for medication information.

Method: Several interventions implemented to impact medication information included improvement methodology, staff training and availability of product information. Medication information was available from an external medication database that housed referenced literature about medication, diseases and safety information. Development of an electronic communication of medication information was embarked upon, overcoming challenges of printing and patient confidentiality. The pharmacist's role in the provision of medication information at discharge became a pivotal focus area for pharmacists. Training sessions highlighted the legal responsibility to effectively counsel when to issue documented discharge information and how to generate the electronic medication discharge document.

Results: The extent of communication has been measured by an in-house hospital patient survey. The survey reflects patients' perspectives on their hospital experience and care, including the provision of information at discharge. A score out of ten was attained as 7.81 and 7.87 for the financial year 2023 and the current year of 2024 (end February), respectively, for the discharge medication process. The current month's (February 2024) score showed a slight improvement of 0.16% when compared to the previous three months' average. These scores are reflected in the pre-electronic training sessions prior to the activation of the electronic communication scheduled for April 2024.

Conclusion: Coordinated communication between healthcare providers and patients is essential. The electronic communication of medication information at discharge has supported this, easing the process for both pharmacists and patients. Amidst the implementation process, the electronic communication of medication information has facilitated a swift transmission of information and encouraged patient engagement.

A digital promotion of pharmacist and nursing self-care and resilience strengthening towards a shift from prescription to person

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Introduction: Hospital pharmacy processes traditionally prioritise prescriptions and products over the patient. Adopting person-centred care approaches has improved pharmaceutical care, emphasising medication-related harm

as a priority (i.e. patient safety) and patient self-care to boost confidence to manage their health (patient care). Fundamental to this is the self-care of the 'carer' / healthcare worker to better serve patients. Burnout has affected many healthcare professionals, which can lead to patient care problems of medication adverse events. Thus, acquiring the skills of a healthcare worker's self-care and resilience building is important as a foundational step toward person-centred care.

Aim: To strengthen pharmacist & nursing self-care and resilience via the use of a resiliencemeter app, as a first step in the shift from 'prescription to person.'

Method: 'Prescription to person' was an approach of 'person-centred care' introduced primarily to the pharmacy staff. The first step of this concept included the development of a software application. The app required a user to apply listed resilience principles consistently. It further determined the degree of strengthening of the user's resilience over a targeted period. The resiliencemeter showed an individual's response at intervals, per principle, as well as a total score based on how many activities were completed by the user. The training was completed at different timeframes, with a first group comprised of pharmacists and a second group comprised of predominantly emergency department nursing managers. The training sessions introduced a concept of the embodiment of resilience principles by applying or practising listed activities daily. The activities included acts of awareness, self-compassion, and compassion for others, with the aim of improving mental, physical, and social resilience. The groups were invited to use the application for a continuous period of at least 60 days, reflecting one's commitment and perseverance in completing the activities with consistent repetition. The pharmacist group was also introduced to a second session of patient care.

Results: Two online pharmacist training modules were completed by 170 pharmacists. The resiliencemeter scored the percentage of activities completed at daily, weekly, and monthly intervals. The app was used by 35% of users who downloaded it. The pharmacy group (n=18) attained an average resilience score of 58.2% over an average of 25.7 days (Sept to Dec 2021), whilst the nursing group (n=21) attained an average resilience score of 66.5% over an average of 37.2 days (March to July 2022).

Conclusion: A substantial improvement in resilience was noted in participants who practised the resilience principles for a longer period. Higher resilience scores were also noted in the nursing group that engaged in weekly discussions on general compassion topics. Whilst app upgrades would have encouraged greater adoption, participants were challenged to ensure a consistent practice of self-care.

Enhancing medication safety in high-risk scenarios: Leveraging digital technology support for high-alert medication management

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Introduction: In the dynamic landscape and complexities of healthcare, ensuring medication safety in high-risk situations remains paramount. The World Health Organisation considers i. high alert medication and ii. environment are two contributing factors to high-risk situations, both of which have been the cornerstone of the hospital division's medication safety programme.

Aim: This abstract explores the integration of digital technology support tools that strengthened medication safety practises with high-alert medication and high-risk environments.

Method: The medication safety programme implemented across 45 facilities included an application and training of APINCHEN* high alert medication safe practises across the medication management pathway. It also introduced operating theatre and emergency department medication safety. The development of 3 digital tools included i. Medication safety dashboard – This development included an interface analysis of adverse events that allowed for the categorisation and monitoring of high-alert medication, error classification, and location. ii. Electronic safety alerts – allowed for individualised safety 'checks' of high alert and other identified medication when dispensing and administering iii. Safe medication practises dashboard – This twofold development included an electronic assessment of safety criteria relating to safe storage and high-risk medication, identified safe practices in theatre and emergency departments, and identified other risks in the facility. This generated a medication safety score per facility via a dashboard development.

Results: The development of digital tools has allowed for an understanding of the impact of high-alert medication within hospital facilities. High-alert medication constitutes 52.28% of reported patient-related adverse events, with antibiotics constituting 33.6% of the high-alert medication (FY 2023). Compliance with high-risk medication safe practices is 90.24% (FY 2023), 93.9% for theatre medication safety and 91.75% for ED medication safety, with an overall medication safety score of 92.8% for the hospital division. High-risk medication and high-risk environment non-conformances reflect gaps with zolpidem and potassium chloride practices, theatre-

pharmacy support, and ED medication communique compliance.

Conclusion: Leveraging digital tools has assisted in proactively understanding data, identifying existing system gaps and risks, and improving areas, a focus forward to mitigate and prevent medication errors…all components of a successful medication safety programme.

*APINCHEN – High alert acronym used as A-Anti-infectives, P-Potassium & electrolytes, I-Insulin, N-Narcotics & sedatives, C-Chemotherapeutics, H-Heparin & anticoagulants, E-Epidurals & Intrathecal agents, N-Neuromuscular blocking agents

Establishment of a national clinical pharmacy programme across 47 hospitals, from an anticoagulant safety-stewardship framework

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Introduction: The focus on rational medication use has, as expected, given rise to an extensive field of clinical pharmacy. This can be challenging when developing a clinical pharmacy programme within a hospital facility. With a primary focus on antibiotic stewardship, anticoagulant safety and stewardship focus is an essential next step in the establishment of a hospital clinical pharmacy programme. Anticoagulant therapy carries risks like bleeding, drug interactions and dosage errors. As clinical pharmacists focus on optimising therapy, they play a crucial role in managing anticoagulant risks.

Aim: This abstract highlights the role of a clinical pharmacist in an anticoagulant framework, giving rise to the establishment of a clinical pharmacy programme.

Method: The anticoagulant framework prioritised safety, stewardship, and education. Safety measures included high-alert medication checks for correct dosing completed as a combined model of dispensary-based and clinical pharmacy round reviews. Anticoagulant stewardship involves the review of safe prescribing (Inclusive of prophylaxis recommended, duplicate therapy and anticoagulant conversion), appropriate dosing, outcomes monitoring (especially INR), and drug-drug & drug-food interactions, managed during clinical pharmacy rounds. Education targeted inpatients, discharged patients, and outpatients with verbal and written medication information. Guidelines, training materials, and tools of targeted patient lists supported programme growth and standardisation. The anticoagulant framework concept was expanded to other specialities such as special population groups, targeted medication due to off-label and high-cost medication, and high-risk situations that included drug interactions. The framework was also crucial during COVID-19, ensuring investigational medication safety. Collectively, this clinical pharmacy programme empowered pharmacists to guide individualised treatment decisions for anticoagulant therapy in collaboration with doctors, enhancing patient care.

Results: Pharmacists across 47 hospitals reviewed an average of 44.97% of patients on anticoagulants (n= 290367) and recommended 6.57% (n=20057) interventions, with an average of 62.2% being accepted (n=12478) over a period from Oct 2018 to Feb 2024. The accepted intervention rate increased to 76.92% in FY 2023. Top 3 interventions related to dose recommendations for enoxaparin (3.3%), duplicate therapy with other anticoagulants (1.2%) and drug-drug interactions (0.6%). Discharge information was given to 37133 patients during this period. Application of this 'safety-stewardship' framework in the overall clinical pharmacy programme, encompassing other specialities, allowed for review of 40.13% of targeted patients and recommendations for 20.6% of interventions, of which 83.1% were accepted via the clinical pharmacy programme in FY 2023.

Conclusion: Reflective of the purpose of clinical pharmacy, the anticoagulant safety & stewardship framework has been an effective programme in managing anticoagulant risk in patients and strengthening the clinical pharmacy programme in a developing country.

Harmonising care: Integrating person-centred medication safety in an electronic dispensing and administration process with a strategic Medication pause

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Introduction: In the midst of the digital realm, maintaining patient focus for care and safety is vital. The 'Medication Pause' is a deliberate and structured interruption in the medication dispensing process designed to reduce errors. It draws from the "Prescription to Person' philosophy in which hospital processes traditionally focus on prescription and product rather than the patient. It is adapted from concepts of surgical pause and awareness of the present moment with full attention in an effort to ensure medication safety. The "pause" precedes a medication check integrating the World Health Organisation's "Know, Check, Ask' approach.

Aim: This abstract introduces the concept of Medication Pause and implementation thereof, applied across an electronic dispensing and medication administration processes, to impact medication safety.

Method: The medication pause was tested amongst pharmacists and nurses, with the intention of extending this practice to nurses when administering medication. The pilot test included a face-to-face shadowing training session, repeated with an electronic introduction to pharmacists at two hospital facilities, on the mediation pause methodology. During a medication pause, healthcare providers temporarily halt the medication dispensing and administration process to verify key safety information embedded in the electronic dispensing platform. This includes patient identity, prescribed medication checks of dosage and route, allergies, contraindications and drug interactions, bundled into the "Know, Check and Ask" methodology. Pharmacists and nurses applied this practice for a week, with management reminding the staff to apply the concept. A survey was given to the staff to test the process. The Medication Pause will be further fully implemented in selected identified facilities over the next months.

Results: 16 respondents, consisting of 7 pharmacists and nine nurses, completed the survey. 87.5% of respondents confirmed that the "Medication Pause' took a minute or less to do. They also confirmed that the practice made them 'feel safer and more focused.' There were different applications of the pause; 62.5% integrated it into their dispensing and administration process, and 25% completed their usual process and then practised the 'Medication Pause' at the end. Positive feedback was received from all respondents regarding the impact the 'Medication Pause' will have on patients and their professional practice.

Conclusion: The 'Medication Pause' in electronic dispensing and administration were positive but highlighted challenges of distractions, indicating the need for more training. Full implementation will continue in selected facilities in the coming months.

A beginner's guide to using the Enneagram in a leadership journey

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Introduction: My journey has been a steep, bumpy ride, leading to increased self-awareness. Being a competent professional and generally "nice" person did not equip me to be a competent leader. However, a passion for my work and a deep-seated gut feeling that I was moving in the right direction kept me going. I fell many times, but I didn't fail to get up, learn a lesson, and carry on.

I had a reasonable amount of self-awareness, but this was limited to knowledge of my functioning independently in a physical and emotional environment over which I had some control. I needed to facilitate new ways of functioning within the team and guide them in initiating collaboration with other healthcare professionals.

My knowledge of my behaviour in this type of complex environment was limited, and I floundered. It took me about five years to get over the worst of the bumps and falls. A large part of my self-awareness journey, and ability to lead a great team, has been Enneagram related.

Enneagram

This section will be a brief guide to the Enneagram without going into exhaustive detail. The Enneagram refers to nine different personality types. It is much more than a personality profile - it investigates the core motivations, defence mechanisms, and fears of each personality type.

It is not about stereotyping, rather it shows us how small and limited the authors have made these own boxes, and how understanding ourselves can set us free. No type is better or worse than another, each has its unique strengths and weaknesses. Understanding of these leads to increased self-awareness, as well as a better understanding of the behaviour of people around one.

Anecdotes of my experiences with the different personality types (mostly humorous and self-deprecating)

The pharmacy team of 11 has very diverse Enneagram types. I am a type 5 (pioneer/investigator) – for e.g. I tend to isolate and not share. I need to consistently praise a Type 2 (Helper), while balancing this with a Type 8 (Boss/active controller) who has very different strengths. I need to "protect" a Type 9 (Peacemaker) because she does not openly express her conflicts. Etc. Etc.

Knowing the Enneagram types helps me build on the strengths and minimise the weaknesses in this team. I see myself as the captain of a ship, the team does just fine without me, I clear the path ahead, and provide a buffer against the challenges.

An investigation into the incidence and management of substance-induced psychotic disorder at a tertiary academic hospital in Gauteng, South Africa

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Background: There has been an increase in knowledge and research on the prevalence of substance-induced psychotic disorder over the years, highlighting the negative impact it has on the economy, society, health care and psychiatry. Currently, data on the prevalence and management of substance-induced psychosis in South Africa is deficient, with only a few studies conducted on the prevalence of the disorder in the country and none conducted on the management thereof. This study aimed to investigate the incidence and management of substance-induced psychosis at a tertiary academic hospital in Gauteng, South Africa.

Methods: A prospective quantitative study was conducted among adult inpatients with substance-induced psychosis at a tertiary academic hospital. Data was collected from patient files and consultations with doctors and Nurses and recorded in a pharmaceutical care form. Data was captured and analysed using Redcap. Ethical clearance was obtained from SMUREC.

Results: In the preliminary data, a total of n=67 patient files were reviewed. From the reviewed files, 74.6% (50) patients were diagnosed with cannabis-induced psychosis, followed by stimulant-induced psychosis (22; 32.8%). This includes patients who presented with a dual diagnosis. The majority of patients were black (64, 95,5%) and male (61, 91.0%). The most used substances were cannabis (51, 77.3%), alcohol (34; 51.5%) and crystal methamphetamine (34; 51.5%). Risperidone was the antipsychotic drug of choice for treatment (63, 95.5%), followed by benzodiazepines, clonazepam (52, 78.8%) and lorazepam (30%). Treatment complied mostly with the National Department of Health (55, 83.3%) and the South African Association of Psychiatry guidelines (55, 83.3%). However, 53% (35) of the patients did not receive psychotherapy. Drug therapy problems (126) were identified. The majority were untreated conditions (29, 43.9%) and missed doses (24, 36.9%). Of the 126 problems, 54 interventions were made.

Conclusion: This study highlights a significant prevalence of substance-induced psychotic disorders and emphasises the need for comprehensive therapy that addresses both psychiatric and substance use aspects of care.

The impact of medication regimen complexity on patient-related and clinical outcomes in patients undergoing haemodialysis

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Background: Patients with kidney failure are known to have a complex medication regimen to manage a myriad of comorbidities and complications. Indeed, they have one of the highest pill burdens among patients with chronic illnesses, with a mean burden ranging from 8.2 pills per day before kidney transplantation to 18.0 pills per day immediately after transplantation. These medications are often prescribed by multiple different clinicians, adding to the complexity of patients' treatment regimens. However, most of the evidence on the association between regimen complexity and outcomes is largely limited to people on facility-based HD, and there are insufficient studies done in Australia on the impact of medication regimen complexity on patient-related and clinical outcomes among kidney failure patients across the different dialysis modalities.

Purpose: To quantify and compare the complexity of medication regimen and the differences in patient-related and clinical outcomes, including adherence, health-related quality of life (HRQoL), and hospitalisation over the preceding 12-month period in people on different haemodialysis (HD) modalities (facility-based HD and home HD).

Methods: This was a prospective and retrospective study targeting patients with kidney failure undergoing HD at an Australian regional dialysis centre. Medication regimen complexity was assessed using the 65-item Medication Regimen Complexity Index (MRCI), whereas patient outcomes were evaluated with validated self-reported questionnaires: 4-item Morisky-Green-Levine Scale (MGLS), EQ-5D-5L and EQ-VAS. Incidence of hospitalisation(s) was obtained from electronic medical records.

Results: Of 174 eligible adults, 145 (88 in-centre and 86 home) HD patients participated. Participants of both in-centre and home HD were predominantly men (65% and 75.4%, respectively) with a mean age of 62.45 ± 13.24 years

and 55.78 ± 11.99 years, respectively. The median MRCI score for home HD was higher than in-centre HD participants (26 vs 20.75, IQR 20.63-33 vs 13.63-28.38, respectively; p = 0.005). Whilst there is no significant difference in the non-adherence rate between the two groups, home HD participants had significantly higher scores for both the EQ-5D-5L index and the EQ-VAS scale. There was also a significant difference between the number of hospital admission(s), whereby home HD participants had fewer hospitalisations throughout the one year prior to baseline.

Conclusions: Despite the higher complexity of the medication regimen, home HD patients had better clinical and patient-related outcomes, including HRQoL and hospitalisations, compared to in-centre HD patients. Future research should warrant recruiting a larger sample of patients encompassing multiple dialysis centres across the different dialysis modalities, as well as various measures of medication regimen complexity, to improve patient outcomes.

Evaluation of pharmaceutical interventions in an intensive care unit

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Introduction: Due to complex pharmacotherapy often involving high-risk medications and the severity of the illness, critically ill patients are more vulnerable to adverse drug events. Pharmacists' participation in Intensive Care Units (ICUs) has been shown to improve patient's clinical outcomes when being directly involved in patient care as members of a multidisciplinary team. The aim of this study was to evaluate the activities of clinical pharmacists in a mixed intensive care unit of an acute general hospital by assessing pharmaceutical interventions and their impact on surrogate clinical outcomes.

Method: A data collection tool was developed and validated to capture and classify drug-related problems (DRPs) and pharmaceutical interventions (PIs) suggested by pharmacists in ICU, where a clinical pharmacy service has been operating for two years. Data on DRPs and PIs recommended by a team of pharmacists over three months in the ICU was collected and recorded in the data collection tool. A sample of DPRs and PIs were categorised and evaluated by an expert panel of healthcare professionals to assess the probability of a potential adverse drug event (ADE) occurring in the absence of the PI.

Results: The ICU pharmacist-patient profiles of 164 patients were included in this study, where 484 DRPs were identified in 135 patients; 38% were related to dose selection, 24% involved drug selection, and 13% were related to the need for monitoring. Most suggested PIs were related to adjustment in medication doses (40%), addition of medication (17%), and monitoring (16%). Anti-infectives for systemic use were the most common group of medications identified in DRPs (41%).

PIs were categorised according to their impact on surrogate patient outcomes. Pharmacists assisted in optimising fluid management for 17 patients, which involved hidden fluids in parenteral infusions, IV to PO conversions, and adjusting enteral feed. Therapeutic drug monitoring was recommended for 43 patients with subsequent dose adjustment to achieve therapeutic serum concentrations for medications with a narrow therapeutic range, including aminoglycosides, vancomycin, antiepileptic medications, and digoxin.

From the 113 PIs evaluated by the expert panel, 31 were found to have a medium probability, and 63 were assessed as having a low probability of preventing a potential ADE. The remaining 19 PIs had very low or zero probability of preventing a potential ADE. Interventions evaluated to have a medium probability of preventing a potential ADE included adjustment of medication doses and dosing intervals for nephrotoxic antibiotics, thus preventing further risk of nephrotoxicity and suggesting ECG monitoring and subsequent medication change due to drug-drug interactions causing prolonged QTc interval, thus potentially preventing arrhythmias.

Conclusion: The study has indicated that pharmacists' interventions in the ICU are effective in reducing the risk of occurrence of potential ADEs. Whilst the risk impact was estimated to range between medium to very low, a key aspect in patient-centric care is providing optimised pharmacotherapy to mitigate individual patient risks as a result of medication use. The study has demonstrated the outcome of activities within the multidisciplinary team in the ICU on surrogate clinical outcomes.

Best practice implementation strategy for the use of Oxytocin during labour

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Introduction: The use of oxytocin (OT) in obstetrics is associated with variability in practices, including concentrations used, dosing rates and duration of infusion.

Safety practices and standardisation of use of OT are recommended to increase safety and reduce risks to mother and baby. The aim of this study was to address OT use in a local acute hospital.

Method: The 'Safe Administration of Oxytocin Implementation Toolkit' developed by the Provincial Council for Maternal and Child Health, Ontario, Canada, was identified as being the most appropriate tool to carry out a gap analysis. Weaknesses in the local system were highlighted and addressed using the resources within the toolkit. A retrospective analysis of OT use in cases during the year 2022 was undertaken. A Best Practice Strategy was developed and discussed with an expert panel consisting of four obstetricians, two senior midwives and two pharmacists.

Results: The gap analysis indicated that local practice fulfils most of the required clinical checks with weaknesses in documentation practices. Out of 27 criteria listed in the toolkit, 14 were met, six were partially met, and seven were unmet. Data from 118 parturients from 2022, excluding moderate and high-risk pregnancies, multiple pregnancies, breech presentations and elective caesarean sections, was compiled and divided into two groups according to the use of OT. Over 55% of the participants were foreigners, and the most common age group was 27-33 years. More than half of the mothers were nulliparous. OT was used in 64.3% of the cases, 42.7% of which were inductions. The average Apgar Score at 1 and 5 minutes was nine, and no neonatal intensive care unit admissions were recorded. From the 46 cases where the frequency of contractions was more than 4 in 10 minutes, OT was used in 40 cases. In 11 out of the 16 cases where variable decelerations with concerning factors were noted, OT had been used.

The strategy developed focused on optimising practice through the development of checklists to support documentation and reduce the risk of errors. The expert panel confirmed the practicality and applicability of the proposed strategy. Subsequent sessions were carried out with midwives working at the labour ward to disseminate the strategy, create awareness of the safe use of OT practices and facilitate the implementation of the identified checklists to enhance documentation practices.

Conclusion: Efforts are required to avoid the routine use of OT and improve patient safety by adhering to best practices. The study indicated that OT use within the labour ward was undertaken within international parameters. The strategy developed was focused to improve on documentation practices so as to ensure standardisation of use and of methods of communication between the team members with regards to OT administration to individual patients.

Revolutionising pharmacy recognition: Evolution of the Australian and New Zealand College of Advanced Pharmacy

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Background: The Australian and New Zealand College of Advanced Pharmacy (ANZCAP) represents a pioneering advancement in pharmacy recognition and career progression. Addressing the limitations of previous models, ANZCAP emerged as a strategic response to bridge the recognition gap within the pharmacy profession.

Purpose: Recognising the need to establish a recognition framework that resonates with pharmacists, aligns with their career journeys and holds tangible benefits, ANZCAP aims to redefine recognition in a way that is meaningful, inclusive and motivates pharmacists toward continuous development.

Method: ANZCAP's development commenced with the acquisition of the existing Australian Advancing Practice (AP) credentialing programme. Previous efforts to engage pharmacists with the programme were reassessed, and a comprehensive review process ensued, incorporating qualitative surveys, workshops, focus groups, and expert consultations. Through an iterative approach, ANZCAP evolved into a prospective, merit-based system recognising speciality areas and levels of practice in line with existing medical nomenclature.

Three recognition programmes were developed.

- Foundation programme: recognition based on evidence of Prior Professional Experience.
- Independent programme: development of a portfolio of forty learning experiences subsequently submitted for recognition.
- Training programmes: adaptation of existing 2-year intensive workplace-based programmes for pharmacists working towards Resident or Registrar recognition.

All programmes are housed within an intuitive online portal, enhancing accessibility and user experience. This portal serves as a centralised hub, streamlining the portfolio-building and recognition process.

Results: To date, through the Foundation programme, over 900 pharmacists have been recognised at Resident, Registrar, or Consultant level. Initial portfolio submissions from the Independent programme, launched in November 2023, are expected from mid-late 2024.

Existing training programme candidates are being transitioned to the ANZCAP programme to complete their programmes with new candidates automatically enrolled into the new programme.

Conclusion: ANZCAP's future involves aligning recognition with promotion and remuneration, enhancing engagement among pharmacists. Work on pharmacy technician competency and recognition frameworks has begun to provide this group with meaningful career opportunities.

The programme's evolution will be guided by feedback, research, and a commitment to advancing pharmacy practice.

In the broader landscape, ANZCAP's journey involves cultivating partnerships with international pharmacy associations, leveraging collective expertise, and fostering an inclusive recognition culture.

Antimicrobial prescribing pattern for paediatrics in Ghana: An on-site global point prevalence survey of Ketu South Municipal Hospital

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Background: Inappropriate antibiotic prescribing is a major public health threat globally. Antibiotic consumption in low- and middle-income countries (LMICs) is on the rise because of rapid economic and population growth coupled with the high burden of infectious diseases. In pursuance of the ultimate goal of providing information and adding to existing data with respect to antimicrobials prescribed in hospital facilities in Ghana, this study seeks to present data on antimicrobials prescribed to paediatrics (0–18 years) in the Ketu South Municipal Hospital, Volta Region, Ghana, using the Global Point Prevalence Study (GPPS) tool to determine the significant trend in the prescribing pattern of healthcare professionals.

Method: An observational study was undertaken in February 2024 to access a typical activity, regarding admission and treatment of paediatric patients diagnosed of conditions that require antimicrobial intervention. A total number of 7 patients (6 for the paediatric medical ward (PMW) and 1 for the paediatric intensive care unit (PICU)) were admitted as paediatric patients on the day the study was conducted. The data collected were anonymously entered, validated, analysed, and reported using a web-based Global Point Prevalence Study (GPPS) application.

Result: There were 11 prescriptions administered to these children. These antimicrobials were all administered empirically for systemic use (ATC J01), and all admitted children (at PMW and PICU) were treated with at least one antimicrobial. The three most common infections reported in this facility are gastro-intestinal infection (29.2 %), pneumonia (25 %) and sepsis (12.5 %). Other types (malaria, HIV, upper respiratory tract infection (URTI), lower urinary tract infection and TB) accounted for a total of 33.3 %. Imidazole derivatives (27.3 %), second-generation cephalosporins (27.3 %) and beta-lactamase-resistant penicillins (18.2 %) were the most prescribed antimicrobials. Overall, the prevalence of antimicrobial use in admitting children was 100 % for both PMW and PICU. Antimicrobial prevalence by activity (medical, surgical and intensive care activity) for children was 100 %. For all the admitted children for medical, surgical, and intensive care purposes, there was 100 % adherence to prescription in terms of stating the reasons for administration, with stop/review date documented and compliance with guidelines. Of all the reported antimicrobials, there was a prevalence of 14.0 % for missed doses for the paediatric ward, with 7.14 % of the patients missing doses and all having the reasons of not being able to purchase the drugs.

Conclusion: Logistical challenges, among others, would be the major factor for empirical treatment of all the antimicrobials administered to the paediatric patients in this study, with broad-spectrum antibiotics being the most prescribed in this facility. This can contribute to the increase in antimicrobial resistance, as opposed to a more definitive treatment method. Hence, it is of great importance that reports such as this study would help expedite national awareness of the need for targeted treatment methods in hospital facilities. This will contribute to the fight against antimicrobial resistance, most especially in children who are often more susceptible to getting infections.

Implementing national high alert medications guidelines in Pakistan

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Introduction: High Alert Medications (HAMs) are medicines that are responsible for significant patient harm when used in error. The third WHO Global Patient Safety Challenge, Medication Without Harm, seeks to find ambitious solutions to ensure the safety of medication practices. The FIP Development Goals (DGs) were launched in September 2020, and this project supports multiple DGs, in particular aligned with DG 19: Patient Safety. The project is also aligned with the FIP HPS Basel Statements, which consider medication safety to be a foundation of hospital pharmacy practice.

Globally, in the developed healthcare systems, the risks of HAMs are made visible through a robust medication error/near-miss reporting system, which then translates into the system or process improvements. But pharmacovigilance (PV) in Pakistan is in its initial stages, where the healthcare

facilities are required to report Adverse Drug Reactions (ADRs) only, but so far, no mechanism or assigned healthcare regulatory body/autonomous organisation in Pakistan reviews and analyses the adverse drug events (ADEs), Medication error/near miss data reported by the public and healthcare facilities.

Method: Pakistan Society of Health-System Pharmacists (PSHP) organised a group of experts for this project and its first task was to revise the outdated list of high alert meds for Pakistan. The authors took ISMP's High Alert medicine list as the baseline and identified available drugs/classes in local market to update the list.

Since a mere list will not help in training the healthcare staff on the safe use of HAMs so, the expert group then started doing a literature review and analysed best practices across the globe ((e.g. ISMP, IMSN, IHI, AHRQ, WHO, FIP, ASHP, etc.) about these meds, this led to shaping up Practice and Teaching Guidelines on High Alert meds. To the best of this knowledge, there is no such comprehensive guideline available internationally that addresses all the listed HAMs' of that country in a single document. Hence, it was a landmark work done by the PSHP.

The draft was handed over to the Drug Regulatory Authority of Pakistan (DRAP) for review, approval and notification at the national level. Before that, PSHP also sought FIP's Hospital Pharmacy Section's expert panel review on the draft guidelines.

Results: PSHP published 1st updated national HAMs List on the DRAP's website in 2021. Later, in April 2022, the authors received an official endorsement from FIP HPS President Rob Moss, who acknowledged the work and its quality and also stated that such work can be a guiding path for other countries. DRAP officially notified guidelines in June 2022 and directed healthcare organisations to identify their HAMs lists and ensure staff training on these meds.

Since then, PSHP has started training and awareness on these guidelines through the Ministry of Health and Healthcare commissions. Several onsite and online training sessions were conducted with over 1500+ regulators, doctors, nurses, and pharmacists who have undergone training on this from all provinces in a year span. https://www.dra.gov.pk/publications/guidelines/pharmacovigilance/

Conclusion: Medication safety is a structured practice, and change in this area can be brought through a structured effort from the top to the grassroots level.

Methotrexate safety monitoring in patients with Rheumatoid Arthritis

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Background: Methotrexate (MTX) is the preferred disease-modifying antirheumatic medicine for Rheumatoid Arthritis (RA). MTX use can cause hepatotoxicity, nephrotoxicity and bone marrow suppression. To mitigate the adverse effects of MTX, the South African Standard Treatment Guidelines (STG) recommend monitoring aminotransferase (ALT) and full blood count (FBC) levels before initiation of MTX and every 12 weeks during treatment. However, the Western Cape Department of Health recommends monitoring FBC and ALT levels at least every six months in stable patients (on MTX for at least six months). Additionally, patients should use 5 mg of folic acid while taking MTX. Monitoring adherence to MTX safety criteria is critical to reduce the adverse effects of MTX, particularly after the COVID-19 pandemic, which hampered access to services.

Purpose: This study assessed adherence to the STG safety monitoring recommendations for RA patients on MTX in the Western Cape public sector during the COVID-19 pandemic.

Method: This was a retrospective medical records review of RA patients receiving MTX from January - December 2022. Patients included 1) were ≥18 years old, 2) received oral MTX for ≥ six months, and 3) had arthritis documented as a diagnosis. Data was extracted from the Western Cape Government Health and Wellness Central database. Data collected included the patient's age, sex, disease condition, MTX start dates, methotrexate treatment duration, FBC, platelets and ALT on initiation and during MTX treatment and folic acid prescription. Results were presented as counts, frequencies and means.

Results: Eight hundred and twenty patient records were reviewed. The mean (SD) age was 55.3±13.3 years (82.0 females), and the mean (SD) duration of MTX treatment was 77.3±46.4 months. At MTX initiation, 72% of the patients' FBC and ALT levels were recorded. About 91% and 89% of the patients had FBC and ALT tests done within six months of their latest MTX issue. Folic acid was prescribed in 96% of the patients at their latest MTX issue. White blood cell (WBC) count, platelet count and ALT concentration at the last test were within the normal range in 86%, 74% and 90% of the patients.

Conclusion: Most patients had FBC and ALT tests done at MTX initiation and within six months of their latest MTX prescription. Most patients also had WBC count and ALT concentrations within the normal ranges. Limitations of this

study are that RA patients without an electronically recorded diagnosis were not included, and prescribers' adherence to recommended guidelines during the study period included results from the last patients' visit (most relevant) only. A larger study is underway to evaluate adherence to the recommended guidelines to inform policy and resource implications.

Hemicorporectomy - What is the eGFR? Critically clarifying the effects of trans-lumbar amputation on renal function markers.

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Background: A male patient was admitted to the hospital after being involved in a multi-vehicle accident, where he suffered severe crushed injuries. These injuries led to the hemicorporectomy of the patient.

Hemicorporectomy, also called "trans-lumbar amputation," is defined as a radical and disfiguring procedure in which the lower extremities, bony pelvis, external genitalia, rectum, and bladder are surgically removed. This patient had all of these, and additionally, one kidney was removed.

Accurate renal function markers are necessary when prescribing renally eliminated medications. Pharmacists usually calculate Creatine Clearance (CrCl) or use the laboratory-calculated eGFR to adjust medication according to renal function. Hemicorporectomy can influence the accuracy of the different renal function markers, with even lower doses needed than most renal adjusted doses, causing challenges for the pharmacist to tailor the medication specifically for the patient.

Methods: This was an observational case study that focused on monitoring and treating a patient with trans-lumbar amputation. Research was done on the effect of amputation and removal of a kidney on renal function markers. Regular ward rounds and an electronic software programme were used to monitor the patient's vital signs, laboratory results, complications, and efficacy of treatment and to capture interventions made by the pharmacist. The focus of the pharmacist was on adjusting dosages of medication that are renal eliminated.

Results: The patient was hospitalised for 68 days and developed a severe wound infection, subsequently leading to multi-drug resistant bacteraemia. The pharmacist made a total of 44 interventions, which included the selection of medication for therapy, tailoring the dosage to the patient specifically, monitoring the patient's laboratory results & vital signs, advising on wound therapy or source control, managing side-effects and medication interactions. An example is using 125mg of meropenem twice a day with a 250mg dose after dialysis. The patient clinically improved and was transferred to a special facility.

Conclusion: The case emphasised the importance of a pharmacist's knowledge of medication and that renal markers should not be used blindly to adjust medication dosage. These markers should be interpreted for each patient.

Inhaled source control: An alternative approach to resistant Klebsiella pneumonia ventilator-associated pneumonia management

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Introduction: Ventilator-associated pneumonia (VAP) poses a significant threat to patients within the intensive care unit (ICU), and Klebsiella pneumonia Carbapenemase-producing Enterobacteriaceae (CPE) VAP infection is a particular challenge faced by Mediclinic Emfuleni. With rising antimicrobial resistance and accompanying complications such as kidney dysfunction, treatment choices are increasingly complex. Source control, a cornerstone of Antimicrobial Stewardship, aims to target infections at their origin. Given that VAP originates in the lungs, Mediclinic Emfuleni embarked on developing a protocol utilising Colomycin (Colistin) as nebulised therapy to decrease systemic exposure and associated adverse effects.

Method: A qualitative prospective observational case study review was conducted involving fourteen patients diagnosed with K. pneumonia CPE VAP. The study aimed to assess the efficacy of Colistin nebulising therapy and the implemented protocol by evaluating differences and similarities among cases.

Results: Among the 14 patients, various treatment modalities were administered, including monotherapy (n=5), combination therapy with tigecycline (n=6) and meropenem (n=3). Pre-nebulisation bronchodilator regimens varied, comparing the efficacy of Short-acting-beta-agonist (SABA, n=3), short-acting-muscarinic-antagonist (SAMA, n=2), and a combination of SAMA/SABA (n=9) in preventing bronchoconstriction induced by Colistin nebulisation. Additionally, physiotherapists provided percussion therapy post-Colistin nebulisation to some patients (n=8) to assess its impact on patient outcomes.

Patients on monotherapy with Colistin required an average of 12 days of Colistin nebulisation. Those on combination antimicrobial therapy required Colistin therapy for an average of 7 days. Patients receiving a single bronchodilator had a 60% chance of developing bronchoconstriction post-Colistin therapy, whereas those receiving a combination of

SAMA and SABA had an 11% chance. Furthermore, patients who underwent percussion therapy post-Colistin nebulisation exhibited better outcomes compared to those who did not.

Conclusion: The case study review prompted protocol adjustments, advocating for the use of combination bronchodilators and recommending percussion therapy post-Colistin nebulisation. In determining between monotherapy and combination antimicrobial therapy, it was concluded that monotherapy should be reserved for patients with solely positive sputum cultures and negative blood results indicative of the absence of bacteraemia or sepsis; otherwise, combination therapy is preferred. These findings contribute to optimising VAP management strategies, particularly in the context of K. pneumonia CPE infections, offering potential pathways to enhance patient care and outcomes in critical care settings.

Nightshade: Illuminating treatment protocols for organophosphate poisoning in the Vaal-Triangle Region

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Introduction: Organophosphate poisoning (OP) represents a significant medical emergency frequently encountered in the Vaal-triangle region. The primary aim of therapy is to decrease the overstimulation of nicotinic and muscarinic receptors induced by elevated acetylcholine levels at the synaptic cleft. Atropine, in conjunction with complementary therapies, is commonly administered to mitigate the excessive activity of the sympathetic and parasympathetic nervous systems. In response to the increasing incidence of organophosphate poisoning in the Vaal Triangle, Mediclinic Emfuleni initiated the development of a standardised treatment protocol.

Method: Mediclinic Emfuleni conducted a comprehensive case study review involving sixty-three patients with organophosphate poisoning treated over four years. This review included a comparative analysis of individual cases to refine and enhance the treatment protocol. Patients were categorised based on the severity of their poisoning: mild (n=27), moderate (n=12), and severe (n=24). Utilising a qualitative retrospective-prospective observational design, patients treated during 2019-2020 (n=21) with organophosphate poisoning in a retrospective review by the team to enhance the protocol, while those treated during 2021-2023 (n=42) with organophosphate poisoning were treated prospectively with the adjusted protocol and monitored for treatment efficacy. The multidisciplinary team overseeing protocol development comprised professionals from diverse fields, including pharmacy, medicine, microbiology, dietetics, physiotherapy, and nursing. Continuous monitoring of patient parameters, including vital signs, laboratory findings, complications, and treatment efficacy through regular ward rounds and an electronic health record system.

Results: Clinical data and patient response guided the formulation of a titration chart for atropine dosing across mild, moderate, and severe organophosphate poisonings. Of the forty-two patients treated prospectively using this chart, thirty-nine achieved therapeutic goals, demonstrating protocol effectiveness. However, three patients with severe liver dysfunction, impacting acetylcholinesterase synthesis, succumbed to poisoning despite treatment efforts. Retrospective analysis indicated that atropine doses exceeding 100mg/h in severe poisoning cases led to severe neurological complications.

Conclusion: The retrospective study findings led to the identification of a maximum atropine dose of 100mg/h and enhanced the importance of monitoring liver function and daily skin inspections to mitigate pressure sore risks. The prospective study reaffirmed the utility of the protocol in managing organophosphate poisoning. Patient vital signs and clinical response should dictate treatment strategies rather than relying solely on acetylcholinesterase levels.

Loading A\antimicrobials in ICU patients at the right time and in the right way

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Background: Antimicrobial therapy requires systemic plasma levels to reach target steady-state levels to treat the infection. It takes approximately 5-7 half-lives of the antimicrobial to reach a steady state.

In intensive care unit (ICU) patients, rapid therapeutic levels of antimicrobials are essential. In antimicrobials with a long half-life, a loading dose can be used to achieve therapeutic levels on the first dose. The loading dose rapidly achieves the therapeutic concentration, and maintenance doses maintain this concentration, reaching a steady state earlier.

The pharmacist identified that loading doses are either not prescribed or administered incorrectly in the ICU and initiated a quality improvement programme (QIP) on optimising of loading doses of antimicrobials in the ICU.

Method: The QIP included an observation, intervention, and implementation phase. The observation phase included retrospectively investigating ICU files of the last three months and recording the antimicrobial prescriptions where loading doses should have been administered. The intervention phase included formal training with a pre-and post-assessment, as well as the compiling of a protocol and a

poster of the different antimicrobials that require loading doses. The implementation phase involved applying the protocol within the ICU. The success of the project was measured by doing ward rounds and audits for three months after the implementation phase. A comparison of the results of the two assessments was made.

Results: There were 56 participants, which included 26 enrolled nurses, 12 enrolled nursing assistants, and 18 prescribing doctors. The average score for the pre-training assessment was 62%. All 56 participants received training focused on loading doses of antimicrobials. The post-training assessment average score increased to 86%. During the observation phase, a total of 82 prescriptions were identified. During the implementation phase, 96 prescriptions were identified. The loading dose was given correctly in 79 of these scripts, which alluded to an 82% success rate.

Conclusion: This QIP showed that the pharmacist plays an essential role in educating different healthcare professionals regarding the effective and safe administration of medication. The pharmacist can assist in the training of nurses and doctors to improve loading-dose administration and improve patients' outcomes.

Cancer care in developing countries: A flexible programme to strengthen continuing education and interprofessional collaboration among hospital pharmacists, pharmacy staff and nurses

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Background: Cancer is a growing burden in the developing world, but access to care is limited by the severe shortage of qualified healthcare workers.

Hospital pharmacists and nurses perform critical duties in the continuum of cancer care; however, in low-income countries they lack opportunities for training and continuing education.

Purpose: To address these challenges, Vennue designed a health workforce education initiative, "Advancing Pharmacy Care for Cancer Patients in Developing Countries", with a unique focus on the equitable inclusion of pharmacists, pharmacy staff and nurses.

The programme aims to strengthen the pharmaceutical knowledge, drug management, and patient counseling skills of healthcare professionals serving oncology patients and their caregivers -- specifically in low-income countries.

Methods: Vennue formed a Cancer Care Advisory Council of oncologists, hematologists, pharmacists and nurses from Yale University School of Medicine and leading institutions in the US and South Asia.

The Council provided expertise for Vennue to design and implement the programme with two partners in Bangladesh and Nepal: Ahsania Mission Cancer and General Hospital in Dhaka, and Nepal Cancer Hospital and Research Center in Kathmandu.

Baseline data informed the development of the cancer care training curriculum, producing 15 learning modules built on universal best practices and adapted for local relevance and feasibility.

Topics included Patient Counseling, Infection Prevention, Palliative care, and Pharmacovigilance, as well as Cancers in Women, Oral Cancers, Hematology, and Introduction to Immuno-Oncology. All modules shared a common foundation of patient-centered care principles with relation to oncology services in low-income hospital settings.

From 2019 to 2023, pilot projects at the two hospitals in Bangladesh and Nepal enrolled 140 healthcare professionals.

To deliver the curriculum on site at each hospital, Vennue recruited and qualified local teams of oncologists, nurses and pharmacists who collaboratively facilitated:

- 15 bilingual training sessions
- Locally relevant case studies
- Workshops to draft standard operating procedures
- Role-play activities to strengthen consultation skills
- Performance evaluation and feedback
- Access to credible, up-to-date resources

Peer Learning Circles encouraged information exchange among nursing and pharmacy staff.

Results: Quantitative and qualitative data was collected through baseline/endline surveys, pre/post-tests, course evaluations, and interviews with hospital administrators. Results included:

- 129 pharmacists, pharmacy staff, and nurses earned Certifications in Quality Cancer Care
- 33.95% average increase in knowledge of best pharmacy practices
- 65.70% average increase in Knowledge, Attitude, and Practice (KAP) – demonstrating cumulative gains across all three domains

Capstone Projects required each group to identify a goal and initiate a collaborative action plan to transfer knowledge into daily healthcare practice.

Conclusion: The pilot projects strengthened core competencies for the treatment and management of cancer in hospital settings. The programme fostered interprofessional collaboration, by bringing together oncologists, nurses, pharmacists and pharmacy staff around an interactive professional development experience.

Vennue's programme can be replicated to advance the quality of cancer care in developing countries; it improves knowledge, attitude and practice among the collective members of the collaborative cancer care team -- with a special focus on ensuring pharmacists and pharmacy staff have equitable recognition and support.

Assessment of medication-related problems in hospitalised patients at a Quatenary Teaching Hospital

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Introduction: Medication-related problems are a source of substantial hurdles in healthcare, impacting patient safety and treatment efficacy. Pharmacist-led interventions are pivotal in tackling challenges associated, especially in hospital environments characterised by intricate medication regimens.

Aim: To evaluate pharmacist-led documented medication-related problems and associated pharmaceutical care interventions at the University of Ghana Medical Centre.

Method: A retrospective review of all medication related problems documented at the facility from 1st February-31st July 2022, was conducted. Data was analysed using SPSS version 27, with findings presented as tables and graphs. Mann Whitney and Kruskal Wallis tests were employed to compare continuous variables among groups. All tests were two-tailed, with a significance level set at $p < 0.05$.

Results: A total of 425 medication related problems were documented from 282 patients who received pharmacist-led interventions during the study period. The median number of interventions per patient was 1(range 1- 13). Frequently encountered medication related problems included medication choice problems (135, 29.4%), dosing problems (132, 28.8%) and medication use problems (35, 7.6%). The predominant medication choice problems included inappropriate medication for indication (47, 34.6%) , inappropriate duplication of therapy (31, 22.8%), untreated indication (25, 18.4%). Most medication related problems occurred in females (219, 51.5%) and individuals aged 60-69 years (78, 18.4%). Interventions were predominantly made during medication dispensing (190, 44.9%), pharmacist reviews (112, 26.5%) and general ward rounds (63, 14.9%) . The majority of pharmacist interventions were fully accepted (387, 91.1%). A total of 51.3% of prescribing errors did not reach the patient while 29.5% reached the patient but caused no harm. Additionally, 0.5% of prescribing errors caused temporary harm without necessitating prolonged hospitalisation.

Conclusion: This study highlights the pivotal role of pharmacist-led interventions in addressing medication related problems at the facility. Through proactive identification and management of medication related problems, pharmacists contribute significantly to enhancing patient safety and treatment outcomes, thereby potentially reducing healthcare expenditures.

An analysis of controlled drug medication error reporting at St. Bartholomew's Hospital in London, England

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Introduction: Over 237 million medication errors are made every year in England. Controlled drugs (CD) are supplied within the National Health Service (NHS). Despite their medical use, CDs are subject to high regulation levels due to addictive and harmful effects leading to potential abuse or misuse. In 2022, over 73.8 million CD items were prescribed, costing the healthcare system £547.2 million GBP. As part of an ongoing effort to improve the safety of the institution, St. Bartholomew's Hospital in London, England is reviewing CD medication error reporting.

Objective: The purpose of this project was to evaluate provider reported medication errors involving CD in order to identify focus areas for medication safety improvement and the creation of targeted education for healthcare providers.

Method: A retrospective evaluation of a medication error report database was performed over a six-month period at St. Bartholomew's Hospital, part of the Barts Health NHS Trust. Review of incident descriptions included: molecule type, frequency, tendencies, reporting specialties/services, and medication error category, stage, and type.

Results: A total of 482 overall medication errors were reported between April and September 2023 at St. Bartholomew's Hospital. Controlled Drug Medication Errors (CDME) represented 18% of overall incidents. Of 82 CDME total incidents, 21 molecules were identified. The most frequent reports were related to oxycodone (26%), morphine (21%), fentanyl (15%), buprenorphine (6%), and midazolam (6%). Molecules reported were classified into six groups: opioids (12), benzodiazepines (1), anticonvulsants (4),

cannabis (2), parenteral nutrition supplements (1), and anaesthetics (1). Around 80% of the reports were opioid related.

Monthly reports showed an increasing tendency for CDME. Opioid CDMEs were consistently reported every month. CDMEs involved 22 hospital specialties. Cardiology, cardiac surgery, inpatient haematology-oncology, intensive care, clinical pharmacy, medicines supply, and respiratory presented the highest number of incidents, together originating 67% of the errors reported. In contrast, pain management along with breast, skin, and gastrointestinal oncology specialties presented a low number of CDMEs despite these services' frequent use of CD. A total of 13 hospital services reported CDMEs. The highest number of incidents were intervention, cardiothoracic surgery, peri-operative medicine, and haematology-oncology services comprising 56% of cases. Although all cases were reported as "low harm", two accidental overdoses were reported.

CDME incident descriptions were categorised as medication administration (21%), documentation (poor/incomplete/illegible) (18%), drugs not accounted for (17%), incorrect storage (16%), accounted for losses (spillage/breakage) (11%), dispensing (11%), prescribing (2%), faulty register/order book (2%), and incorrect register/order book storage (1%). Within the CDME categories, the database also classified incidents in terms of stage and medication error description, however, more than half of the error reports were classified as "other" (60%) preventing a better understanding of these descriptors.

Conclusion: Data identified the most frequent medication errors for CDs. Different descriptors would potentially provide specific error mitigation planning to address medication safety. This information will be used to guide CD education and training within St. Bartholomew's.

Reducing medication errors in HIV-positive patients in a tertiary hospital, Western Cape: Influence of a clinical pharmacist

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Background: HIV are one of the largest public health burdens globally. The pandemic affects an estimated 25 million people in Sub-Saharan Africa, with South Africa the epicenter,

amounting to 8.2 million people living with HIV/AIDS (PLWHA). The roll-out of antiretroviral medicines, provided patients with improved life expectancy. This resulted in more patients hospitalised for non-communicable diseases, increasing risk for medication errors (MEs). Pharmacists, through medication reconciliation, may identify and reduce MEs in this population.

Objectives: To describe the importance of a pharmacist's involvement in identifying and quantifying types of MEs.

Methods: A quantitative, observational study was conducted over 14 weeks. A pharmacist reviewed HIV positive, hospitalised patients' files, using a data collection instrument, to determine the prevalence of MEs in PLWHA. Data analysis was done by means of SPSS version 28 and reported in frequencies and percentages of MEs. Ethics approval was obtained from relevant institutions.

Results: The study population of n=180 patient-files were reviewed 453 times, identifying 466 MEs. Medication errors included incorrect medication reconciliation from history (19; 4.1%), prescription omission (17; 3.7%), duplication of therapy (10; 2.2%), missed doses (265; 57.1%), incorrect dosing (103; 22.2%), incorrect administration frequency (2; 0.4%), incorrect duration of therapy (15; 3.2%) and drug-drug interactions (18; 3.9%). More than half (58.2%) the MEs were resolved in less than 24-hours, with involvement of the pharmacist.

Conclusion: This study demonstrates the magnitude of MEs experienced in hospitalised PLWHA. It highlights the role clinical pharmacists must play in identification and resolution of MEs, to improve patient outcomes.

Impact of virtual open house sessions on post-graduate year 1 residency recruitment at a freestanding children's hospital.

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Background: Children's Hospital of The King's Daughters (CHKD) is a freestanding children's hospital in Norfolk, United States that offers two post-graduate year 1 (PGY1) Pharmacy Residency positions and one post-graduate year 2 (PGY2) Pediatric Pharmacy Residency position. Beginning with the 2022-2023 recruitment cycle, CHKD offered virtual open house sessions to increase programme awareness and enhance accessibility for candidates without the resources to attend in-person conferences. Prior to this time, all CHKD recruitment was done in person at the American Society of Health-System Pharmacists (ASHP) Midyear Clinical Meeting Residency Showcase and additional smaller showcases offered by other organisations based on preceptor availability, cost, and travel funding.

Purpose: To determine how implementation of virtual open houses impacted recruitment of PGY1 residents at a freestanding children's hospital in the United States.

Methods: This was an observational study at a single freestanding children's hospital from December 2019 to March 2024 and included six residency application cycles (2019-2020 through 2024-2025). Data from the three most recent cycles when virtual open houses were held were compared to three application cycles immediately prior to open house implementation.

Results: Virtual open house attendance grew from 11 participants during 2022-2023 recruitment to 24 participants during 2024-2025 recruitment. During the same period, overall applications to CHKD decreased, in line with the national trend. Registrant non-attendance was 15%, 20%, and 33.3%, respectively, for the three years open houses were held. At least 40% of open house attendees each year subsequently applied to CHKD, and candidates from 25 previously unrepresented pharmacy programmes applied during post-implementation cycles. All available PGY1 positions were filled in Phase 1 of the Match both before and after implementation; however, since hosting virtual open houses, despite participation not being considered when granting interviews or creating the final rank list, all matched residents have been open house attendees.

Conclusions: Attendance at virtual open house sessions increased yearly. Utilisation of virtual recruitment through open houses expanded the national reach of CHKD's recruitment efforts, as evidenced by the increased variety of schools and colleges of pharmacy from which applications were received. During a period when overall application numbers declined, open house attendees comprised a significant portion of the applicant pool and represented a broader geographical range. Interestingly, while 15 of the recent graduates or final-year students who attended open house sessions applied for residency at CHKD, only 8 of those also met with CHKD preceptors in person during the 2023 ASHP Residency Showcase. This data is not available from other years for comparison but will be collected in the future to evaluate the cost-effectiveness of in-person versus virtual recruitment events. Virtual open houses are an effective way for residency programmes to attract candidates from across the country without placing the additional burdens of costs and travel time on institutions or applicants. Additionally, these sessions allow for equal recruitment opportunities for international PharmD candidates who wish to seek residencies in the US.

Maintaining patient safety: Common prescription errors in hospital patients and improvements

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Introduction: The hospital incident reporting system plays a crucial role in patient safety. Every colleague in the hospital can use the system to report incidents, including prescription errors, patient falls, and environmental anomalies. Through the collection and analysis of incident reports, improvements and follow-ups on healthcare quality can be conducted.

Method: A retrospective analysis of medication-related incident reports at a regional hospital from January 1, 2023, to January 31, 2024, was conducted using Excel for pivot analysis and improvements were made to the hospital's prescribing system.

Results: From January 1, 2023, to January 31, 2024, a total of 418 medication-related incidents were reported, with 345 cases (82.5%) reported by pharmacists and 73 cases (17.5%) reported by other professional categories. Among the 73 incidents reported by other professions, there were 10 cases of medication administration errors by pharmacists (wrong quantity), 40 cases of medication administration by nurses (leakage), and 9 cases related to prescription orders by physicians (dose, frequency, medication name). This analysis and improvement effort primarily focused on the 345 incidents (82.5%) reported by the pharmacy department. The common prescription issues frequently identified across various departments include not administering the correct Loading dose for medications such as Remdesivir, Vancomycin, and Tigecycline, prescribing medications that should not be crushed, and failing to adjust the dosages of Levocetirizine, Famotidine, and Cefixime according to the corresponding renal function. If the authors categorise common prescription errors by department, Urology has a higher incidence of errors with Silodosin, the Emergency Department with influenza formulations and anti-Covid-19 medications, and the Hepatobiliary and Gastroenterology Department with Famotidine and Magnesium oxide + Sodium picosulfate + Citric acid anhydrous (medication used for bowel preparation) being more prone to prescription mistakes. Through analysis, it can be understood that the most frequently used medications in each department are not being utilised correctly 100% of the time. Subsequent actions include reviewing the system for improvements to the prescribing system and conducting targeted educational campaigns for each department. Overall, pharmacists conducted medication knowledge education for four departments and implemented 11 improvement measures in the prescribing system to reduce the recurrence of similar incidents.

Conclusion: Through the incident reporting system, common prescription errors can be identified and organised. It also reveals that even for frequently used medications, departments may require the support of the prescribing system and pharmacists to optimise patient prescriptions and maintain medication safety for patients.

From drug consultation room to Nephrology Health Education Center - Bringing pharmacists closer to patients

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Introduction: In 2020, Taiwan introduced its first disease-specific pharmaceutical care reimbursement under the National Health Insurance's Pre-ESRD Patient Care programme, enabling collaborative outpatient care by pharmacists, physicians, and health educators. Consequently, hospitals began training relevant professionals to provide these specialised services.

Method: The service process involves the patient taking a referral form to the medication consultation room located next to the prescription dispensing window for health education and case registration. This referral process initiated by health educators in 2022 achieved commendable results in case registration and health education, with 215 new cases receiving education and 27 cases followed up within the year. As the initial enthusiasm began to wane, the number of new cases registered in 2023 dropped to 132, with follow-ups decreasing to 22 cases. Upon analysis, it was revealed that the reduction in patient referrals by pharmacists for pharmaceutical care could be attributed to the spatial arrangement of the outpatient consultation rooms and the medication consultation room (with the renal education room situated on B1 and the pharmacists offering pharmaceutical care located on the 1st floor), coupled with a diminished willingness among patients (stemming either from prior receipt of similar services or the urgency induced by extended outpatient waiting periods). This examination underscores the impact of logistical and patient-related factors on the utilisation of pharmaceutical care services.

Results: In 2024, coordination was made with renal disease health educators to allocate one clinic session per week (3 hours) for pharmacists to be stationed directly at the Renal Disease Education Center for joint health education of cases.

From January 1 to January 16, 2024, a total of 55 cases have been registered, approximately completing 36% of the total number of health education sessions conducted last year.

Conclusion: It is believed that by reducing the geographical distance between pharmacists, the renal disease care team, and patients, pharmacists can gain a better understanding of the team's operations and care models, as well as bridge the psychological gap between pharmacists and patients, allowing pharmaceutical care to have a greater impact on patients.

Conducting a national survey to explore compounding pharmacists' perspectives in developing an automated chemotherapy compounding robot

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Background and Purpose: Manual compounding of cytotoxic drugs poses safety challenges. Many advanced countries have established standards for handling these hazardous drugs so that relevant personnel needs to execute their tasks with appropriate protection. These measures prompt interest in developing robotic devices to enhance safety and efficiency. This study employs the Technology Acceptance Model (TAM) to investigate compounding pharmacists' and pharmacy managers' perspectives on the development of an automated chemotherapy compounding robot.

Method: Based on the conclusions of the focused group discussions guided by technology acceptance theories, the authors constructed questions and created a questionnaire with a 5-point Likert scale to measure attitudes and opinions. Validity and reliability were confirmed by a panel of experts. The questionnaire was sent electronically to all medical centers and regional hospitals in Taiwan with sterile chemotherapy compounding units, asking compounding pharmacists and pharmacy managers about their awareness, feasibility, and willingness to procure compounding robots. Data analysis was performed using IBM SPSS Statistics 25.

Results: A total of 132 compounding pharmacists and pharmacy managers from 35 hospitals in Taiwan responded to the survey. Fifty-eight percent (58%) were female, and 44% were working at medical centers. The majority of respondents were from metropolitan areas (61.3%). Thirty-seven percent (37.1%) reported having experience using automated chemotherapy compounding systems. The majority acknowledged the usefulness of robots (mean=4.56), particularly in reducing incidents of occupational exposure to hazardous drugs (mean=4.85), but fewer believed that robots could reduce the demand for compounding manpower (mean=3.77). Regarding ease of use, respondents generally believed in the ease of adopting the compounding robot (mean=3.93). Despite positive attitudes towards the robotic system, much fewer agreed that hospital administrators might purchase the system (mean=3.2).

Conclusion: This research reveals pharmacists' positive attitudes towards robotic chemotherapy compounding systems. TAM insights elucidate features desired by compounding pharmacists, but the high purchase price emerges as a critical hindrance to adoption in Taiwan's hospitals.

Analysis of the effectiveness of pharmaceutical care for patients with pre-end stage renal disease in pharmacist clinic

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Introduction: Chronic Kidney Disease (CKD) is a significant public health issue, particularly prevalent in Taiwan. Patients with CKD often require complex medication regimens, necessitating pharmacist intervention and care. This study aims to investigate the effectiveness of pharmacist interventions in caring for these patients.

Method: This was a single-center retrospective study collected medical records from January 2022 to December 2023. Adult patients (aged ≥18 years) diagnosed with CKD stages 3b, 4, or 5, without dialysis. The inclusion criteria for this study are patients who meet one of the following conditions: (1) Post-acute kidney injury care. (2) Taking ten or more medications. (3) Having two or more comorbidities besides CKD. (4) Recent use of NSAIDs (Non-Steroidal Anti-Inflammatory Drugs). (5) Other reasons referred by a physician. The intervention measures analysed included improvements in patient medication adherence, medication integration, non-steroidal anti-inflammatory drugs (NSAIDs) usage and pharmacists'medication recommendations prescription appropriateness assessment before and after intervention.

Results: A total of 87 patients who had at least two clinic visits were included in the study. The cohort comprised more males 50(57.4%), with an average age of 68.5±10.9 years. In terms of renal function at enrollment, CKD Stage 4 was most common, accounting for 46(52.9%) of the cases, followed by stage 3b at 30(34.5%).

Regarding medication, the median number of currently used prescription drugs was nine (range 2–20), with 76 (87.4%) patients taking five or more different medications, and 40 (45.9%) patients taking 10 or more different medications. In the previous three months of 19(21.8%) patients had used NSAIDs, 28 (32.2%) patients had used nutritional supplements, 8 (9.2%) patients had used Chinese herbs.

Regarding patient education effectiveness, the average pre-test score for those with adherence issues was 18.18 ± 6.55, which decreased to 15.63 ± 4.27 in the post-test ($p < 0.001$). After pharmacist intervention, approximately 77(88.5%) of cases showed improvement in post-test scores. The main factors affecting medication adherence were patients modifying unclear medication purposes lead to self-adjustment and forgetting to take medicine due to high frequency of doses. The usage rate of NSAIDs is declining from 19 (21.8%) to 17 (19.5%). There were 42 prescription appropriateness assessment recommendations, including 21 instances of prescription integration.

The most common categories category was recommendations are medication contraindications (including allergic history) (20%) and indications-related issues (20%), followed by suggestion of more appropriate medication (19%).

Conclusion: The involvement of pharmacists can effectively Provide pharmaceutical care services for patients with CKD can improve medication adherence.

Using cloud-based medication history to gain insights into all medications taken by patients, including non-prescription drugs, herbal remedies, and dietary supplements, facilitates prescription decision-making integration, thereby preventing medication therapy problems and adverse reactions.

Effectiveness of pharmacist-led diabetes clinic in improving medication adherence and glycemic control among diabetes patients in Taiwan

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Introduction: The prevalence of diabetes in Taiwan has been increasing, rising from 8.5% in 2005-2008 to 11.3% in 2017-2020. In 2018, the achievement rate of HbA1C<7% was only 44.1% in Taiwan. Notably, medication non-adherence is the main cause of poor glycemic control, subsequently elevating the risks of complications and mortality. Pharmacist-led educational interventions could enhance medication adherence, leading to better disease control. This study aims to analyse the effectiveness of pharmacist-led diabetes clinic in improving medication adherence and glycemic control among diabetes patients in Taiwan.

Method: The study was conducted in the pharmacist-led diabetes clinic from October 2020 to December 2023 in Taipei Medical University Hospital in Taiwan. Patients enrolled from October 2020 to August 2022 were primarily from family medicine with diabetes. From September 2022 to February 2023, patients were enrolled mainly those with diabetes in stage 3b.4 of chronic kidney disease. From March 2023 to December 2023, patients were enrolled those with diabetes in the cardiology department using insulin and/or glucagon-like peptide-1-receptor agonist (GLP-1 RA). Other reasons for

enrollment included physician referrals and self-registration for consultation. In Pharmacist-Led Diabetes Clinic, pharmacists provide disease and medication education, comprehensive medication management, and give medication recommendations to physicians. Intervention measures comprised a medication adherence survey, monitoring of laboratory values, and pre-and post-assessment utilising a diabetes knowledge questionnaire.

Results: A total of 118 patients were enrolled, comprising 55.9% males and 44.1% females, with an average age of 66.2 ± 13.3 years. The duration since the diagnosis of diabetes was less than 5 years for 27.7%, 5-9 years for 13.4%, and 10 or more years for 58.9%. Fourteen patients (11.8%) concluded the programme after reaching care goals, while 15 patients (12.7%) concluded due to lost follow-up. Medication adherence was assessed 186 times, medication adherence increased from 55.4% to 74.7%. The cumulative achievement rate of HbA1C<7% was 47.7%, 50.5%, and 50.1% in 2021, 2022, and 2023, respectively. The diabetes knowledge questionnaire was administered to 111 patients, yielding an average pre-test score of 9.8 ± 2.8 and post-test score of 11.7 ± 1 (maximum score: 12).

Conclusion: In the pharmacist-led diabetes clinic, medication adherence improved by 19.3% after pharmacist intervention. The achievement rate of HbA1C<7% exhibited improvement in 2022; however, it slightly decreased in 2023, attributed to the inclusion of patients with more severe medical conditions. Nevertheless, the rates of achieving HbA1C<7% after pharmacist intervention remained higher than the average among diabetes patients in Taiwan. Additionally, the knowledge of diabetes demonstrated significant improvement, leading to increased awareness among patients with diabetes. Overall, this study highlights the positive effect of the pharmacist-led diabetes clinic on both medication adherence and glycemic control.

Explore the status of rural medical outreach programme in a regional hospital in central Taiwan

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Introduction: This rural medical outreach programme has been implemented by Taiwan's Ministry of Health and Welfare for years. Show Chawn Memorial Hospital is liable for two local towns.

The initiative comprises 2.5 hours' weekly clinic at fixed locations serves consultation, blood drawing, medication administering, and a mini compact medication trolley containing around 100 diverse medications, encompassing both general and tailored formulations.

Pre-trip medical consultations are conducted, where pharmacists promptly advise on drug selection and deliver personalised health education during consultations.

The study investigates the current status of the programme and intends to find potential for expansion or development.

Method: Researchers employed retrospective data analysis to examine prescription data from January 1, 2022, to December 31, 2023. The study analysed prescriptions by total visits, prescription duration, dosage form, pharmacological classification, numbers of blood test, and the patient's residence.

Estimated transportation time of round trip from the fixed locations to the hospital is 1-hour self-driving and 2-hour public transportation by Google map.

Results: The dataset consisted of 860 visits, including 187 blood tests. Prescriptions varied with 44.9% lasting 7 days, 29.7% lasting 28 days, and 15.1% lasting 14 days.

Examining prescriptions by pharmacological classification and dosage form revealed the top three categories as respiratory medicines, anti-inflammatory medicines, and gastrointestinal agents. Oral use accounted for the largest percentage at 78.8%, followed by injection at 21.36%, and external at 18.1%.

Residents within walking distance to fixed locations constituted 64% of the visits.

Conclusion: Due to space and time constraints, oral treatments are primarily provided. However, the weekly schedule proves beneficial for managing acute respiratory and skin diseases, minimising patient commute between hospital departments and their homes.

The greater advantage is that the close connection between the patients and the medical staff cannot be measured. More resources will be devoted for enhanced medical care for the programme.

Effect of amantadine with severe traumatic brain injury: A case report in a regional hospital in Taiwan

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Background and Objectives:

Traumatic Brain Injury (TBI) is the most common cause of death and disability. Amantadine sulfate has been used as a neuroprotective drug. In this study, the authors aim that amantadine treatment effects positively in patients with a severe head injury on conscious recovery.

Methods: It's a single retrospective case report of a 56 year-old male with Severe Traumatic Brain Injury. The authors surveyed this case according to the medical record in E-Da hospital since Feb. 16 to Mar. 05.The primary outcome was the rate of improvement in the Glasgow Coma Scale,Muscle Power, duration of treatment and adverse events.

Case Presentation

This 56-year-old male suffered a motorcycle accident without wearing a helmet with resultant traumatic brain injury (TBI) on 02/16 afternoon.His medical history revealed alcoholism.The patient's initial Glasgow Coma Scale score (GCS)was 3(E1V1M1), with pupils sized 7(-) on the right and 4(-) on the left. He had lacerations on both lips, dislodged upper incisor teeth, and otorrhea and rhinorrhea were also observed. Intubation was performed. Imaging revealed: Diffuse subarachnoid hemorrhage (SAH) and right intraventricular hemorrhage (IVH), Right femur fracture ,Right lung contusion showing prolonged consciousness disturbance. After the ICP monitor insertion the patient was admitted to the ICU for close monitoring and treatment.On hospital day 10, the patient received his first dose of amantadine100mg twice daily.After 23 days at the acute care hospital, the patient was admitted to inpatient rehabilitation service.

Results: Assess the change at 10 day in course of therapy Glasgow Coma Scale (GCS) score after amantadine initiation. As an only important finding, after amantadine treatment an important rise between the first and the tenth day (GCS3 to GCS10), Muscle Power is improve .He did not experience any adverse events related to amantadine use.

Conclusion: Amantadine was activated dopamine in the brain by enhancing the neurotransmission of dopamine in the brain.that deficiency of dopamine, a mediator in the brain, is involved in prolonged consciousness disturbance and after TBI.

The results from this study demonstrated that amantadine might improve the speed of functional ability improvement in severe TBI patients,and is also well tolerated .However, the long-term effect of amantadine in cognitive recovery is not well defined and further large randomised clinical trials to determine the appropriate time and GCS score to initiate amantadine along with the optimal dose in the inpatient setting.

Inter-professional education in antimicrobial stewardship, a collaborative effort

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Background: Antimicrobial stewardship (AMS) education and inter-professional collaboration are integral to the success of a stewardship programme. An interactive inter-professional AMS workshop, designed to encourage workplace inter-professional collaboration was piloted in a tertiary hospital.

Purpose: To obtain feedback to determine the suitability and sustainability of an inter-professional AMS workshop.

Methods: Feedback was elicited through a predesigned questionnaire containing both open and closed-ended questions on the content and structure of the workshop.

Results: The survey had a 70% (n=16) overall response rate. All participants agreed that the goals of the workshop were met and that the knowledge and skills gained from the workshop would help them in their AMS roles. All participants indicated that the workshop content and the level at which it was pitched, met their expectations and that it had improved their knowledge and skills. All agreed that they found it advantageous and enjoyed learning as an inter-professional group

Open feedback showed that the workshop was found useful and would potentially result in improved patient care, dissemination of knowledge, improved teamwork and organisational culture.

Conclusion: The positive feedback and changes made following the workshop demonstrated that a targeted AMS educational workshop adds value to an antimicrobial stewardship programme.

Steps towards building an AMS model for a public sector hospital: A pre-implementation study

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Background: Antimicrobial resistance (AMR) is a major global public health risk, associated with increased mortality, morbidity, and health care costs. This places an increasing strain on existing healthcare systems. Antimicrobial Stewardship (AMS) involves a coherent set of processes that promote the rational use of antimicrobials.

Purpose: This study aimed to assess the readiness of a tertiary healthcare facility and staff towards implementing an antimicrobial stewardship programme (ASP).

Method: A SWOT analysis was conducted based on (1) a survey on attitudes and perceptions of pharmacists, clinicians, and nurses towards AMR and AMS, and, (2) a situational analysis on the readiness of the facility to conduct AMS.

Results: The questionnaire which was available for completion between 14 December 2021 and 31 December 2021 was sent to a total of 3100 healthcare professionals (HCPs). Thirty-two (1.0%) HCPs comprising of 2 pharmacists, 16 clinicians, and 14 nurses completed the questionnaire. Of the total participants, 31 (96.9%) viewed AMR as a problem in South African hospitals, and 29 (90.6%) perceived AMR as a problem at their facility. The majority (n=29, 90.6%) of the participants were familiar with the term AMS, and 26 (81.3%) participants agreed to willingly participate in any initiatives involving antimicrobial use at the facility.

The situational analysis depicted existing strengths in terms of AMS structures such as the formation of an AMS committee, and the availability of information and technology (IT) systems. Weaknesses included the limited number of AMS activities being carried out and poor participation from HCPs within the AMS team.

Conclusion: A pre-implementation phase in the building of an ASP can greatly assist in finding gaps for improvement, which can then be addressed in the implementation phase. Furthermore, it provides a baseline to measure improvements once the implementation phase has been instituted.

Treatment response to osimertinib following EGFR TKI failure in NSCLC: A retrospective cohort study (2018-2023)

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Introduction: The development of resistance against epidermal growth factor receptor (EGFR) tyrosine kinase inhibitors (TKIs) poses a significant challenge in the management of non-small cell lung cancer (NSCLC). This study retrospectively assesses the efficacy of osimertinib (Tagrisso) in NSCLC patients who experienced progression after EGFR TKI treatments within a single medical system over five years, with a focus on various factors influencing therapeutic outcomes.

Methods: The authors retrospectively analysed records of NSCLC patients treated with osimertinib following failure of EGFR TKIs (gifitinib, afatinib, erlotinib) from 2018 to 2023, with data collection occurring from 2013 to February 2024. Exclusions were made for patients with other concurrent cancers, those who discontinued osimertinib due to adverse effects, those using osimertinib in combination therapies, and deaths not related to cancer progress. The study carefully reviewed baseline demographics, complex gene mutation profiles, and the presence of brain metastasis prior to osimertinib treatment, among other factors. Statistical analyses employed Kaplan-Meier survival curves, Cox proportional hazards models for time-to-event data, and Pearson correlation coefficients.

Results: The cohort comprised 169 NSCLC patients with a median age of 64.5 years, of whom 62.7% were female. This analysis highlighted the role of complex gene mutation profiles in influencing the duration of osimertinib therapy.

Particularly, patients with the Exon 19 Deletion combined with Exon 20 T790M, and those with Exon 21 L858R plus Exon 20 T790M mutations, exhibited varying treatment durations, suggesting differential responses based on genetic backgrounds. Furthermore, the absence of brain metastasis before osimertinib treatment was associated with longer treatment duration (mean 469 vs. 297 days for those with metastasis). The median progression-free survival (PFS) post-osimertinib initiation was 14 months, with the duration of prior EGFR TKI therapy weakly correlating with the length of osimertinib treatment.

Conclusion: Osimertinib offers significant benefit to NSCLC patients following failure of EGFR TKI therapies, with the efficacy substantially influenced by unique gene mutation combinations and the presence of brain metastasis. These insights support the need for personalised treatment strategies and highlight the importance of comprehensive genetic profiling in enhancing outcomes for patients resistant to EGFR TKIs, thereby reinforcing the imperative for further research into tailored therapeutic approaches.

Chemotherapy cancer care and cyberattacks: ensuring the continuity of the pharmaceutical process offline

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Background: In French hospitals, pharmaceutical processes are digitalised and more and more activities are automatised. In that context, a majority of workflows for systemic anticancer treatment, also called chemotherapy, are digitalised. From the prescription and manufacturing preparations to administrative tasks, workflows rely on institutional networks and are entirely server based. Ransomware cyberattacks are one of the more significant cyber-threats to the health sector. When a ransomware infects the IT system of a hospital, the latter is forced to shut down its information system to isolate and remove the software, paralysing all the chemotherapy workflows. While the full ransomware recovery phase can extend over weeks to months, chemotherapy infusion appointments must be maintained with the same safety and quality health service standards for patients.

Purpose: Included in a Clinical Continuity Plan, the authors developed a degraded mode to maintain the oncologic care of patients (from prescription to administration of chemotherapies) in case of a cyberattack or network shutdown.

Method: Firstly, the chemotherapy software was analysed which led to a selective extraction of the database. Dozen tables containing various information (drugs reconstitution and stability, medical protocol, administration schedule) were processed with PowerQuery (Microsoft) in one Excel file. This offline file combines all the stages of the chemotherapy workflows: prescription, administration plan, fabrication data sheets, nominative infusion bag labels. This standalone solution is stored in a folder with the extracted data tables in the hard drive of the pharmacy computer. Data tables are updated monthly by extraction. In case of the cyberattack, the file is transferred to physicians with a secured device. Thus, physicians could generate the prescription and the administration plan. Without access to the network, the physician would have to send safely the file to the pharmacy. With this same file, the pharmacist would generate and print the fabrication of the datasheet for the prescribed chemotherapies.

Results: For now, the standalone solution is completed and need to be tested in simulation exercises such as a false network shutdown. In near future, different exercises are planned: False prescriptions by physicians leading to fabrication data sheets generated by pharmacist and preparations of chemotherapies by technicians.

Conclusion: In a case of cyberattack, paper-based system is not recommended for chemotherapy prescription due to the complexity of itself (protocol choice, therapy cycle, dose calculation, dose reduction, patients physical and biological features). Moreover, chemotherapy preparations are a high-risk stage and ought to be done in secured way in a centralised reconstitution unit. This standalone solution could support medication safety and the whole process of compounding. However, results of simulation exercises are crucial to refine the degraded solution.

New good manufacturing practices for innovative medicines in France

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Background: The Good Manufacturing Practices (GMP) that all pharmacists must follow were modified in September 2023 in France.

Purpose: They focus on the quality and safety of preparations made in hospitals, in particular for medicinal products of biological origin and medicinal products composed in whole or in part of Genetically Modified Organisms (GMOs), including when they are Advanced Therapy Medicinal Products (ATMPs).

Method: Specific premises, facilities and equipment are reserved for them. The facilities were audited by the French Chamber of Pharmacists before December 2023 as part of the authorisation process for high-risk activities.

Results: Specific processes have been developed to deal with the particular risks associated with handling these products and their fragility, such as certain ATMPs or, more recently, autologous serum eye drops fortified with growth factors, the preparation of which will be described in the short oral presentation or poster in order to demonstrate the precision and special nature of these preparations.

Conclusion: These preparations are highly targeted and made for a specific patient. They therefore enable healthcare establishments to care for patients who require personalised treatment.

Using AI to analyse prescriptions (example of Lille University Hospital)

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Background: As AI is revolutionising the practice of pharmacy, the authors will see in this presentation how it is developed to support decision-making of hospital pharmacists in particular with the concrete example of the Lille University Hospital in the North of France.

Purpose: The aim of this presentation is to explain the current approach in hospital pharmacy to developing artificial intelligence platforms to facilitate and secure the analysis of prescriptions.

Results: In these instances, artificial intelligence is used to:

-Identify prescriptions to be prioritised according to the patients, their pathology and potential or proven iatrogenic risk;

- Dynamically analyse prescriptions according to patients' biological parameters, their real-time monitoring and their therapeutic environment;

- Enable analysis according to the specific rules of a particular establishment (e.g. drug formulary);

- Integrate this analysis into the entire process aimed at ensuring optimal drug delivery

- Develop pharmaceutical telecare as part of dispensing to outpatients and cooperation with other healthcare professionals.

As a result of the development of the use of AI in the university hospital of Lille, the iatrogenic risk has been reduced and the dispensing process has been secured.

Conclusion: The role of the hospital pharmacist is becoming increasingly important in the analysis of prescriptions in a dynamic patient care environment, enabling better prevention of iatrogenic risks for patients.

A new training programme designed to prepare pharmacists for the Portuguese Residency Programme's Access Exam

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Introduction: In 2020, the legal framework for acquiring the title of specialist in hospital pharmacy, genetics, and clinical biology changed in Portugal, with the introduction of a 4-year residency programme that includes an access exam. The first exam took place in 2022 with more than 300 applicants for 183 residency positions. In line with this, the South and Autonomous Regions Branch (SARB) of the Portuguese Pharmaceutical Society (PPS) recognised the importance of creating a training programme designed to prepare pharmacists for the Pharmacist Residency Access Exam (PRAE).

Goal: The purpose of this study is to describe the development of a training programme to support candidates in their preparation for the 2023 PRAE and to analyse the results of the first edition.

Method: First, the educational needs of the 2022 candidates were assessed by an online survey disseminated via electronic mail. Then, a framework for the programme was conceived by the PPS team and then implemented based on the responses to the survey and the pre-defined subjects that will be evaluated at the PRAE. In the final stage, the lists of residency applications and positions were consulted and compared with the participants of the training programme to evaluate the results of the implementation.

Results: The training programme covered 16 different clinical areas. Each area included a 4-hour lesson with specialised pharmacists that included discussion of clinical cases, a study guide, support slideshow for studying, and a question pool. Lessons were recorded for later viewing. The first edition was launched in July 2023, and a total of 100 pharmacists registered in the programme. Of the 100 participants, 87% (n=87) took the 2023 PRAE, and of those, 55% (n=55) entered the residency. Of those who entered the residency, 70% (n=39) chose hospital pharmacy, 22% (n=12) chose clinical biology and 7% (n=4) of them went to the genetics residency programme. Of the students who were ranked in the top 20 of the PRAE, 70% (n=14) took part in the training programme.

Conclusion: SARB's training programme assisted 100 pharmacists in their preparation for the PRAE, promoting the professional development of the pharmacist career.

Hospital pharmacy in French-speaking Africa: Challenges, opportunities and future prospects

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Objectives: Hospital pharmacy plays an essential role in the quality of care and patient safety. Within French-speaking Africa, the development of this discipline is characterised by a spectrum of challenges and opportunities. To gain a comprehensive understanding of these dynamics, a survey has been conducted to assess the present state of hospital pharmacy in the region.

Methods: Between June and September 2023, an online questionnaire was distributed to selected hospital pharmacists in 23 French-speaking African countries. The survey encompassed questions related to the number of hospital pharmacists, educational opportunities including pre-graduate, post-graduate, and ongoing education in the field, existing competency and legislative frameworks, and country-specific challenges and opportunities.

Results: Nineteen countries (83%) participated in the survey including Algeria, Benin, Burkina Faso, Burundi, Cameroon, Chad, Democratic Republic of Congo, Djibouti, Guinea, Ivory Coast, Madagascar, Mali, Mauritania, Morocco, Rwanda, Senegal, Togo, Tunisia, and Union des Comores.

Findings revealed significant disparities in the number of hospital pharmacists with a median of 6 pharmacists per million inhabitants [range: 0.1-34/million inh] and a median of 1 pharmacist per public hospital facility [range: 0-3.25]. Regarding training, out of the 16 countries with a Faculty of Pharmacy, 10 offered a pre-graduate programme in hospital pharmacy (median teaching hours: 30h [range: 18h-51h], 6 had a post-graduate specialisation (master's degrees or residency programmes) and 6 provided continuing education courses. On the regulatory front, 12 countries had a hospital pharmacy legislation, and 4 possessed a competency framework. The main challenges to the development of hospital pharmacy were identified as the weakness of regulatory frameworks and the lack of resources (human and material) in hospitals. The commitment of authorities and the presence of qualified pharmacists were recognised as dual challenges and opportunities, depending on the country.

Conclusion: The observed diversity in hospital pharmacy practices and regulations across French-speaking Africa emphasises the critical need of regional collaboration to harmonise and support specific countries in developing this specialisation.

The prevalence of bacterial pathogens in secondary healthcare facilities in Ghana: A multi-centre study

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Introduction: Globally, infectious diseases remain a substantial source of morbidity and mortality. In Ghana, both community-acquired and hospital-acquired infections are major public health issues. Managing infectious diseases is very challenging, especially in sub-Saharan Africa, where most countries are either Low Income or Low-to-Middle-Income Countries. Most healthcare facilities are as a result resource-limited and lack the appropriate infrastructure to manage infectious diseases. Even when these infrastructures exist, financial challenges may prevent patients from fully accessing these facilities due to their inability to pay. The management of infectious diseases is, therefore, empirical rather than targeted in most healthcare facilities. For empirical antimicrobial therapy to be effective, an idea of the commonly encountered pathogens is important. We, therefore, set out to determine the prevalence of bacterial isolates from different samples obtained from routine culture

and sensitivity tests at two secondary healthcare facilities in neighbouring towns in the Volta Region of Ghana, i.e., Margaret Marquart Catholic Hospital in Kpando and Volta Regional Hospital in Hohoe.

Method: Samples collected, processed and analysed in the microbiology unit of these hospitals were considered. Data from January to December 2023 were extracted from the hospital's health information management system, Lightwave Health Information Management System (LHIMS). Bacterial isolation and identification briefly involved, obtaining samples (urine, sputum or blood) or swabs (wound, vagina) from patients. Bacterial isolates were then identified by routine biochemical tests after which bacterial isolates identified in these samples were recorded in the LHIMS.

Results: A total of 293 isolates were obtained for both facilities during the period. Staphylococcus aureus was the most isolated microorganism (23.9%). Escherichia coli also had a relatively high prevalence (21.2%). The remaining 161 organisms had a prevalence of less than 10%. The sample that yielded the most bacterial isolates was urine, representing a percentage of 35.8%. It was observed that 11.3% of the total samples with bacterial isolates were from blood while the sample that yielded the least number of isolates was from the respiratory tract (1.4%). An analysis to determine the top three bacterial isolates in the different samples was also determined. It was observed that for urine samples, these were E. coli (35.2%), Klebsiella oxytoca (13.3%) and S. aureus (9.5%). Samples from the genitals were mainly infected with S. aureus (34%), E. coli (14%) and Streptococcus pyogenes (12%). For soft tissue, these were S. aureus (30.3%), S. saprophyticus (15.2%), K. oxytoca (12.1%). The most predominant microbes in bloodstream infections were S. aureus (30.3%), S. saprophyticus (15.2%) and K. oxytoca (12.1%).

Conclusion: These data give an idea of the likely organisms a clinician in this catchment area will likely encounter based on the source of the sample to guide empiric antibiotic therapy. The data can also help stakeholders have targeted public health interventions regarding infectious diseases in the locality.

Comparative analysis of antimicrobial usage in a clinical hospital for infectious and tropical diseases pre and post COVID-19 pandemic

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Background: Current concern about antimicrobials use and bacterial resistance, exacerbated by the recent pandemic with COVID-19, highlights the importance of this topic. Furthermore, antimicrobials represent a substantial financial cost to hospitals.

Purpose: The aim was to assess the trend in antimicrobial prescriptions in a Clinical Hospital for Infectious and Tropical Diseases both before and after the Covid-19 pandemic.

Method: The consumption of antibiotics using the WHO ATC/DDD methodology before (2019) the COVID-19 pandemic and after (2023) that was compared in a retrospective study conducted in January 2024 by clinical pharmacists, alongside residencies in this specialty. Using the computer software available at the hospital pharmacy, the authors conducted an analysis of the Defined Daily Dose per 100 patient-days for systemic antibiotics, antivirals, antifungals and antimycotics for the years 2019 and 2023.

Results: Following the pandemic, there was a notable 7.38% increase in the consumption of antimicrobials, resulting in a Defined Daily Dose per

100 patient-days measure of 772.96 (2019) and 830.01 (2023). The pandemic may be regarded as a substantial contributing factor to the amplified utilisation of antimicrobials and the development of drug resistance. A majority of patients diagnosed with Covid-19 have encountered complications associated with superinfections. In addition, this rise was observed despite a decrease in the number of patients by 18.96%, with 17163 patients prior to the pandemic and 13909 in the post-pandemic period of 2023.

In the category of antibiotics, as classified by AWaRe criteria, a consistent preference "Watch" antibiotics was evident across both years, followed by those categorised as "Access" and subsequently "Reserve". In 2023, a decrease of 6.14% in "Watch" antibiotics was observed, accompanied by an increase of 18.6% among those categorised as "Access". Antimicrobial resistance is evidenced by the 37.24% increase in antibiotics classified as "Reserve".

In the antifungal class it was an increase of 221.54% in 2023. The value of the Defined Daily Dose per 100 patient-days was 20.71 in 2019 and 66.59 in 2023 in the antifungal class.

Examining antimicrobials financial expenditure, a substantial rise of 215.15% was documented in 2023. This increase can be attributed to heightened usage of antimicrobials alongside the elevated prices of specific pharmaceuticals.

Conclusion: The significance of antimicrobials consumption presents a notable concern, given the escalating prevalence of antibiotic resistance, which impacts both individual health outcomes and costs. Furthermore, Romania's notable position atop the list of European nations in antibiotic consumption, achieving the foremost rank in 2021, highlights the gravity.

Pharmacy students taking best possible medication histories: The patients' perspective

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Introduction: Obtaining a best possible medication history (BPMH) is an effective strategy to support medication continuity for patients upon hospital admission. However, it is a time-consuming process, and pharmacy students undertaking clinical placements may represent an efficient alternative to obtaining BPMHs. This shifts students from observers to participants, allows more meaningful placements and bridges the theory-practice gap. However, there is limited literature on the perspective of patients and their acceptability of this interaction with pharmacy students. As the recipients of the clinical service, the patient perspective is necessary for the effectiveness of an intervention. Therefore, the objective of this study is to explore the perception of patients on pharmacy students obtaining their medication history in a hospital setting.

Method: One pharmacist conducted semi-structed interviews for participants (admitted patients or carers) who had the medication history obtained by a pharmacy student. The interviews were audio-recorded and transcribed. Following transcription, the interviews were analysed using inductive thematic analysis.

Results: A total of 32 interviews were conducted across two tertiary hospitals. This included 28 patients and 4 carers. Thematic analysis identified three overarching themes: (1) Teaching Environment, (2) Student Interaction and (3) Patient Acceptability. Overall, these revealed that participants understood that they were in an academic environment and the importance of experiential learning. Participants noted that professional bedside manner and effective communication were factors that positively impacted the interaction. Overall, participants were accepting of students obtaining their medication history with minimal concerns, such as timeliness, information storage, and the gender of the student inquiring about potentially sensitive information.

Conclusions: Participants, both patients and carers, are accepting of hospitals utilising pharmacy students undertaking educational clinical placement to obtain BPMHs. This stems from research indicating that patients' self-worth rises when they play a role and can support in student learning in a practical setting. Literature confirms that this heightened sense of purpose, derived from aiding others, ties back to the theory of social exchange and the principle of reciprocity.

Consequently, hospitals and educational institutions, have the responsibility to facilitate high-quality student training and appropriate onsite supervision to ensure a meaningful experience for both the students and the participants. Students deemed positive and professional, can support medication continuity upon hospital admission by obtaining BPMHs during placement, which can ultimately bridge the theory-practice gap.

A review of artificial intelligence in drug repositioning in the post-COVID19 era

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Background: Drug repurposing offers a promising strategy for accelerating new treatment development and cost reduction. However, significant challenges persist, including the need for large, high-quality datasets, interpreting artificial intelligence (AI) model results, and conducting rigorous clinical trials. Hospital pharmacists may play a crucial role in drug repurposing as they possess extensive knowledge of medication properties, interactions, and patient outcomes. Their expertise in medication management and understanding of patient needs can facilitate the identification of potential drug candidates for repurposing, ensuring safe and effective treatment options for patients.

Purpose: To identify current trends in drug repositioning literature, especially post-introduction of artificial intelligence tools.

Method: A bibliographic review on drug repurposing was conducted, focusing on PubMed. Search terms included drug repurposing, therapeutic benefits, and regulatory/financial authorities. Inclusion criteria targeted articles discussing therapeutic advantages, regulatory challenges, and AI usage, published since 2011. Studies were selected to evaluate benefits, challenges, ethical and regulatory implications, and safety and efficacy strategies for reused drugs.

Results: The search yielded 18 studies. After screening, 2 articles were discarded as duplicates, and 7 for lack of relevance. Additionally, 3 did not meet inclusion criteria. Ultimately, 6 studies underwent final evaluation, covering perspectives from medicinal chemistry, academia, COVID-19 treatment, and cancer therapy, utilising scientific literature analysis, mixed methodologies, and AI. Drug repositioning aims to streamline drug development, leveraging AI across diverse sectors, involving collaborations among academic, research, and pharmaceutical institutions to overcome obstacles and expedite therapy development.

Conclusion: AI, particularly machine learning and neural networks, proves valuable in drug repositioning across oncology, neurodegenerative, and infectious diseases, facilitating economical and effective drug development and potentially reducing clinical trial failures. Challenges include appropriate indication identification, dose optimisation, and regulatory and financial barriers, despite AI's potential to predict therapeutic structures. Future research should focus on addressing these challenges and exploring AI's role more effectively.

Access models for innovative therapies: value-based purchasing framework in oncological treatments: A literature review

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Background: Value-based payment models for medications present an opportunity for healthcare stakeholders to enhance patient outcomes and efficiency. These models focus on measuring outcomes and efficiently allocating resources, impacting technology adoption and healthcare innovation.

Purpose: This study aims to identify and classify Managed Entry Agreements (MEAs) for innovative lung cancer therapies.

Method: A literature review was conducted to identify relevant articles providing a detailed introduction to innovative therapies, their current relevance, and associated challenges in healthcare access systems. The review examined various selected studies, focusing on value-based negotiations (MEA) as a starting point for developing the negotiation framework. Innovative therapies for lung cancer treatment were specifically selected as a representative example to illustrate the application of the developed negotiation framework. Scientific articles related to these topics were included, using search terms such as "negotiations," "MEA," "managed entry agreements," "risk sharing," "drug access," "pay for performance," and "lung cancer" in PubMed databases.

Results: Initially, 1086 articles were identified on PubMed, with 1050 excluded due to irrelevant titles. After screening, 30 promising articles remained, reducing to 24 after eliminating duplicates. Fifteen more articles were excluded in the abstract review, resulting in 3 articles meeting inclusion criteria after full-text assessment. Two result tables were generated, and a systematic literature search inclusion flowchart is provided.

Value-based Payment Models: Value-based purchasing considers various factors beyond drug prices to efficiently allocate resources, aiming to prioritise therapies offering greater clinical value.

Comparison of Managed Entry Agreements: Three types of articles were compared, presenting seven identified managed entry agreement types and descriptions.

Article Analysis: Analyses revealed cost reductions for certain therapies, such as erlotinib and pemetrexed/platinum, with shared risk agreements. Outcome-based payments for gefitinib showed positive results, demonstrating cost reductions compared to traditional procurement.

Conclusion: Managed entry agreements aim to enhance access to lung cancer therapies while controlling costs and ensuring positive outcomes. Successful implementation requires collaboration among stakeholders. Further research is needed to optimise these agreements in oncological care.

Identification of key elements for the design of risk-sharing agreements to facilitate access to pharmacological innovations in Alzheimer's Disease

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Background: Alzheimer's disease (AD) is a progressive neurodegenerative condition characterised by the gradual deterioration of memory and cognitive function. The development of effective risk-sharing agreements (RSAs) has arisen as a promising approach to guarantee fair and equitable access to innovative drug therapies, especially as AD biological treatments are on the horizon, raising concerns regarding drug accessibility and the sustainability of healthcare systems.

Purpose: To identify critical factors and best practices for the successful implementation of an RSA framework in AD.

Method: A comprehensive literature review was conducted, utilising PubMed to identify peer-reviewed articles, research papers, and pertinent reports. The search terms were carefully chosen to encompass various facets of agreements associated with Alzheimer's Disease, encompassing both financial-based and outcome-based agreements. The search was confined to articles published over the last decade, with a search date range spanning from January 1, 2013, to May 30, 2023.

Results: Based on the findings of the literature review, data from 7 pertinent publications were compiled and analysed. The identified factors encompassed a wide range of aspects, including age, genetic factors, cognitive impairment, disease progression, treatment effectiveness, treatment adherence, AD prevalence, biomarkers and diagnostics, pharmacoeconomic implications, effects on individuals and caregivers, collaboration among stakeholders, risk-sharing mechanisms, outcome metrics, data collection and analysis, ethical considerations, and ongoing evaluation and enhancement.

Conclusion: The adoption of Patient Benefit Risk-Sharing Agreements (PBRSAs) in AD shows potential for enhancing patient outcomes, ensuring fair access to treatments, and supporting the sustainability of healthcare financing amid the increasing challenges posed by Alzheimer's Disease. Ongoing research and collaborative efforts are imperative to fully harness the benefits of PBRSAs in Alzheimer's Disease management.

Association between statin therapy and all-cause mortality in dialysis patients: a systematic review, meta-analysis and meta-regression of observational studies

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Background: The effects of statin therapy in end-stage renal disease (ESRD) patients undergoing dialysis remain controversial. Current evidence from large-scale observational studies suggests a potential correlation between statin use and reduced mortality rates in dialysis patients, which contradicts findings from previous randomised controlled trials (RCTs).

Purpose: This systematic review aims to evaluate the effectiveness of statin use on all-cause mortality among dialysis patients in real-world settings.

Method: A systematic search was performed in PubMed and Embase from inception to April 7, 2023, without language restriction to identify cohort or case-control studies investigating the effectiveness of statin therapy in dialysis patients regarding all-cause mortality. The quality assessment of each included study was conducted using the Newcastle-Ottawa scale (NOS). Noticing the potential immortal time bias derived from the study setting of the comparison between statin users and non-users, controlling for immortal time bias was included as a criterion within the NOS scale. Studies with NOS scores of 7 to 9 were considered as having a low risk of bias, scores of 4 to 6 as moderate risk, and scores of 3 or less as high risk. A random-effects model was used to synthesise the pooled hazard ratio (HR) of each outcome.

Results: In total, 20 cohort studies involving 288,302 patients were eligible for inclusion. The overall synthesis result revealed that dialysis patients receiving statin therapy were associated with reduced all-cause mortality (HR, 0.74; 95% CI, 0.66-0.82; *P* <0.001). Subgroup analyses indicated that studies with NOS < 7 (5 studies; HR, 0.48; 95% CI, 0.46-0.50) tended to yield more significant research outcomes compared to those with NOS >= 7 (15 studies; HR, 0.83; 95%

CI, 0.78-0.89). Also, the pooled result from studies without controlling for immortal time bias (7 studies; HR, 0.57; 95% CI, 0.39-0.82) had a larger effect size compared to the result from studies controlling for immortal time bias (13 studies; HR, 0.82; 95% CI, 0.76-0.89). In meta-regression analyses, the effect of statin therapy was significantly affected by NOS < 7 (β=-0.50, 95% CI, -0.67 to -0.34) and without controlling immortal time bias (β=-0.33, 95% CI, -0.53 to -0.12).

Conclusion: This systematic review suggested a potential association between statin use and decreased mortality rates among dialysis patients. However, given the inherent limitations of the non-active comparator study design and the observational nature of the studies, a cautious interpretation of the study results is warranted.

Apply automatic dispensing cabinet to management of controlled drugs

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Background: Automated dispensing cabinet (ADC) is a drug cabinet controlled by a computer and can provide and stroge medicines nearby. Controlled drugs is not only about safety of patients but also the government has more regulations for these drugs, for early operating mode is a long and laborious task and not environmentally friendly too. Furthermore for pharmacists and nurses workload is heavy.

Purpose: Anesthesiology is the most used controlled drugs department in this hospital. So the ADC how to make the process easier for them and us is a crucial issues that the authors need to consideration. The authors hope ADC can ease the workload and improve work efficiency of pharmacists and nursing staffs.

Method: According to anesthesiology demand, the authors designed many drawers of different sizes to store controlled drugs. Face recognition is used when nursing staffs want to get the drugs and all of drug usage records will be fully recorded and monitored for all day. in addition ADC also provides information about the drug Inventory in real time, so pharmacists can remotely check and replenishing of medicines on time that can greatly improve management efficiency and safety. It is hoped that this can reduce the workload of pharmacists and nursing staffs and improve work efficiency. Overall ADC can conjunction with hospital related controlled drug management procedures and simplification of drug collection, shifting, auditing, replenishment, and redemption processes for ward controlled drugs, reducing the time for repeated writing of materials and reducing paper waste. Finally, fish bone diagram and decision matrix is used to analyse of drug replenishment and administration times, medication error rates, and the satisfaction of staffs.

Result: This study found that the introduction of ADC, saving 5.3 hours/day (p <0.05) in the drug-receiving portion, administration time fell from 121.5 ± 97.3 to 5.6 ± 2.4 minutes (p < 0.001), medication error rates of reduced by 90.1%. Finally in satisfaction survey showed that over 90% of staffs are satisfied with the ADC.

Conclusion: ADC significantly not only decreased drug replenishment and administration times, but also reduced medication error. It makes the dosing process more smooth and safe, and easier for nursing staffs to obtain medicines.

Efficacy and safety of sodium-glucose cotransporter-2 inhibitors (SGLT2i) in heart failure patients with or without diabetes

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Background and Purpose: Sodium-glucose cotransporter-2 inhibitors (SGLT2i) have been shown to be effective in heart failure. This study assessed the efficacy and safety of SGLT2i for the treatment of patients with heart failure with or without diabetes.

Method: The retrospective study conducted at Taipei Tzu Chi Hospital, using electronic medical records of heart failure patients who received SGLT2i treatment from January 2020 to February 2023. Inclusion criteria were as follows: left ventricular ejection fraction (LVEF) less than 55%, taking SGLT2i for at least 28 days, and receiving medical care in a cardiology department. The authors analysed mean changes from baseline to follow-up in laboratory results, including LVEF, N-terminal pro-brain natriuretic peptide (NT-proBNP), estimated glomerular filtration rate (eGFR), and hemoglobin A1C (HbA1c). The authors also assessed the incidence of hospitalisation for heart failure and cardiovascular events and the incidence of adverse events.

Results: A total of 42 patients were included in the study. The average age was 64.3 ± 13.7 years old and 71.4% were male. 19 (45.2%) had diabetes, and most patients had cardiovascular comorbidities such as hypertension (76.2%) and coronary artery disease (66.7%). Regarding the type of SGLT2i, 35 (83.3%) patients received dapagliflozin, 5 (11.9%)

patients received empagliflozin, and another 2 (4.8%) patients underwent drug switching. Most patients were taking medications other than SGLT2i to treat heart failure, such as beta-blockers (81.4%) and mineralocorticoid receptor antagonists (51.2%).

For overall patients, LVEF had significantly increased and NT-proBNP had significantly decreased after taking SGLT2i (all $p < 0.01$), and there was no significantly change in HbA1c and eGFR (all $p > 0.05$). As for diabetes status, SGLT2i reduced NT-proBNP consistently in patients with or without diabetes ($p = 0.007$ in diabetes, $p = 0.019$ in non-diabetes). Effects of change in HbA1c and eGFR were also consistent in patients with or without diabetes. There was no significantly change in HbA1c and eGFR in patients with or without diabetes. However, SGLT2i improved LVEF with a greater magnitude in those with than in those without diabetes (mean LVEF change: 29.3 to 46.9 in diabetes, p value = 0.0028; 33.4 to 36.7 in non-diabetes, p value = 0.37). The incidence rate of hospitalisation for heart failure was 7.1% within six months, and the rates of hospitalisation for cardiovascular events were 2.4% within one year and 2.4% after one year. The rates of any adverse events was 14.2%, including occurrence of nausea (2.4%), diarrhea (2.4%), tea urine (2.4%), and other unknown events (7.1%).

Conclusion: The result of this study shown the beneficial effects of SGLT2i on heart failure irrespective of diabetes status.

Medication use evaluation at different strengths of antibiotic – Curam

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Introduction: In the post-pandemic period of Covid-19, the global supply of medicines remains unstable. In particular, antibiotics are irreplaceable in the treatment of infectious diseases. The stability of supply and the availability of alternative drugs are considerable emphasis for pharmacists.

Curam is an antibiotic containing amoxicillin and clavulanic acid. It is used to treat infections caused by Staphylococcus, Streptococcus, Pneumococcus, Meningococcus and other bacteria. Currently, there are two strengths of 625mg/Tab and 1g/Tab on the Taiwan market. Due to supply and distribution issues, hospitals can only order and use the strengths provided by pharmaceutical manufacturers.

The issue that this paper would like to explore is whether the therapeutic dosage is sufficient or not when the antibiotics shifts between the two different strengths.

Method: This retrospective study selected prescriptions of outpatients for oral antibiotic-curam from Jan 2023 to Dec 2023 in a regional hospital in Taiwan. According to the curam-utilising data from medication records, the average dose of amoxicillin per person per day can be calculated. Moreover, based on WHO DDD 1.5gm as the reference value, the research can observe the adequacy of the dosage of the antibiotic by prescribing different strengths, which is 625mg/Tab or 1g/Tab of curam.

Results: During the year 2023, there were 5,370 patients who took “curam”, their ages are over 12 years old. Among these patients, the top 3 infectious diseases treated with this drug are Sinusitis (Chronic & Acute), Fever and Acute Tonsillitis, Cellulitis and Abscess.

Observing the utilise of “curam” at different strengths in individual months from January to December 2023. For the patients who use 625 mg/Tab, the average dose of amoxicillin per person per day was 1480.9 mg, while for patients who use 1 g/Tab, the average dose of amoxicillin per person per day was 1724.2 mg.

Discussion and Conclusion: The results show that regardless of the months of using 625 mg/Tab or 1g/Tab separately, or the months of using both 625 mg/Tab and 1g/Tab, the average dose of amoxicillin in patients using 625 mg/Tab was lower than 1.5gm, and the patient using 1g/Tab was higher than 1.5gm, reaching the WHO DDD reference dose. This study shows that it is possible to fail to pay attention in the strength of drug, leading to underdosing.

In addition, whether it is 625 mg/Tab or 1 g/Tab, the content of clavulanic acid is 125mg in each tablet. Therefore, if we want to achieve a sufficient amoxicillin dose when using curam 625 mg/Tab, the dose of clavulanic acid will also be higher, and the adverse events of nausea, vomiting and diarrhea may also increase. Perhaps concerns about adverse events, the dose of amoxicillin will be relatively insufficient when using curam 625 mg/Tab.

When the supply of medicines is unstable, pharmacists should remind the medical team to pay attention to the therapeutic dosage. When there are frequent changes in alternative medicines or strength of drugs, ensure all patients receive effective and safe treatment.

Pharmacologic intervention for leukopenia due to tazobactam/piperacillin in the postpartum period

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Introduction: Tazobactam/piperacillin (TAZ/PIPC), indicated for pneumonia and intra-abdominal abscess in Japan, is recommended as a single-drug therapy, together with carbapenems, in the guidelines for intraabdominal infection published by the American College of Surgeons and Surgical Infection Society in 2010 in the United States. The authors observed the case of a postpartum woman who had leukopenia caused by TAZ/PIPC used for intraabdominal infection.

Methods: A 32-year-old woman had continuous bleeding due to placental abruption after a normal delivery and underwent total hysterectomy. On Day 9, as Bacteroides fragilis was found in a blood culture and was suspected to be caused by intraabdominal infection, TAZ/PIPC was initiated. A reduced white blood cell count persisted following the start of the therapy, with leukopenia reported (1450/μL) on Day 22. As leukopenia was considered to be caused by TAZ/PIPC, the authors proposed discontinuation of the drug and the use of meropenem as an alternative. Leukopenia and intraabdominal infection improved after switching to meropenem. On Day 30, meropenem therapy was completed.

Results: This patient had leukopenia on Day 14 of treatment with TAZ/PIPC and her white blood cell count increased after drug discontinuation. The authors considered this event an adverse drug reaction caused by TAZ/PIPC, based on a previous report in which patients develop leukopenia, on average, on Day 15 of TAZ/PIPC treatment.

Conclusion: For patients treated with TAZ/PIPC, pharmacists not only need to check the dosage and administration, but should be actively involved in the proposal of blood tests and the assessment of test results, to try to avoid serious adverse drug reactions such as leukopenia.

Medication prescribing and factors influencing COVID-19 treatment in a private hospital in Johannesburg, Gauteng, South Africa

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Background: Since the first reported and confirmed case of COVID-19 in South Africa (SA), treatment options for hospitalised patients have evolved. Prescribing patterns and pharmacological treatment for hospitalised patients diagnosed with COVID-19, as well as factors influencing prescribing, are not well known. Treatment guidelines have been developed by the World Health Organisation (WHO) and updated regularly however; it is unclear whether these guidelines have been followed.

Purpose: The objectives were to determine medicine prescribing patterns, oxygen requirements, and length of stay (LOS) of the patients in the hospital per hospital ward; the patient- and treatment-related factors that contributed to the successful treatment; and to compare the prescribing patterns of treatment for COVID-19 with the WHO treatment guidelines for prescribing.

Method: A retrospective observational, quantitative cohort study design was used and included data from 248 patients admitted in either the general ward, high care, or intensive care unit of a private hospital in Gauteng, SA. Medication data from the hospital database was evaluated for each patient and compared with recommended treatment guidelines of the WHO.

Results: The top three classes of medication used to treat patients diagnosed with COVID-19 were anticoagulants, corticosteroids, and the antibiotic, ceftriaxone. Patients diagnosed with three or more comorbidities, and/ or those within the age group 51 ≤75 years, and/ or those patients who required mechanical ventilation and/ or were hospitalised for more than 21 days had a higher death rate.

Patients with a confirmed diagnosis of COVID-19 were treated with medications included in the WHO living treatment guidelines. The number of medications prescribed to the patients was not influenced by sex, age, or number of comorbidities. The prescriptions differed compared to the different oxygen requirements and the LOS of the patient.

Conclusion: The patients had received various treatments throughout the COVID-19 pandemic influenced by new clinical studies, with the outcome of the hospital stay being influenced by patient and treatment-related factors. Factors that affected the number of medications prescribed displayed significant variances between categories of patients with different oxygen requirements and patients with different

LOS. Patients admitted received treatment in accordance with the treatment guidelines of the WHO; however, updates of the guidelines were not strictly adhered to. Since the study setting is part of a larger hospital group, it will add value if more hospitals within the group, and from different geographical regions are included in future studies.

Establishment of medication appropriateness and medication use evaluation unit in Egypt healthcare authority

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Background: The escalating complexity of healthcare delivery necessitates the creation of a specialised Medication Appropriateness and Medication Use Evaluation (MA-MUE) unit within the Egypt Healthcare Authority. This initiative is designed to fortify patient safety, optimise medication therapies, and cultivate a culture of continual improvement in medication management practices.

Methods: The MA-MUE unit will execute systematic reviews of medication appropriateness, accounting for patient-specific factors, and conduct rigorous evaluations of medication utilisation patterns across healthcare facilities. The strategy involves collaborative efforts with healthcare providers, robust data collection and analysis, and a commitment to continuous quality improvement processes.

Unit Objectives:

- Ensure appropriate, effective, and safe medication use.
- Develop proactive strategies to prevent and monitor medication errors and adverse effects.
- Establish an integrated system for the safe and effective use of medications.
- Improve communication among healthcare service providers.

Strategy:

- Establish committees in each healthcare facility to evaluate medication appropriateness.
- Provide comprehensive training for healthcare teams to ensure high-quality performance.
- Develop policies and procedures for medication evaluation and distribution.
- Identify and evaluate high-risk medications and those with serious side effects.
- Enhance access to information on high-risk medications.
- Standardise medication management and safety processes across all health facilities.

Unit Field of Work:

Focus on high-risk medications, those with side effects above the normal range, drugs with a narrow therapeutic index, medications used extensively without optimal use consideration, and new medicines, especially for specific beneficiary categories.

Unit Tasks:

Tasks include ensuring adherence to optimal medication use principles by doctors, pharmacists, and nurses, forming subcommittees, addressing complaints about medication effectiveness and safety, monitoring and setting standards for each drug, providing recommendations, and presenting monthly reports to regulatory bodies.

Results: Implementation of evidence-based interventions aims to enhance patient outcomes and optimise medication therapies, contributing to streamlined processes and fostering a continuous learning culture within the healthcare system.

Unit Performance Indicators:

Key indicators include the percentage of medications evaluated, the rate of recommendation issuance and implementation, compliance with corrective measures, the success of training programmes, adherence to guidelines by the health team, and compliance with corrective action schedules.

Conclusion: The establishment of the MA-MUE unit signifies a transformative leap in ensuring the safe and effective use of medications in Egyptian healthcare. Aligned with international standards, this initiative promises to elevate healthcare services, prioritising patient safety and instilling a culture of continual improvement in medication management practices

Improving electronic prescription implementation workflow for efficiency and safety

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Introduction: Electronic (e-) paperless prescriptions was rolled out at KK Women's and Children's Hospital in August 2023. With the new roll out of e-paperless prescriptions, the prescriptions processing time exceeded the key performance indicator (KPI) of >90% with waiting time of less than 60 minute and with 6 cases of labels of "given in ward" medications was packed wrongly during the trial parallel period before the full roll out. The aim is to meet prescription processing time KPI and to reduce packing errors on prescriptions due to "given in ward" labels.

Method: The team gathered and identified a few root cause and implemented solutions identified in the improve phase which includes updated clear guidelines on troubleshooting and different search patient function in training slides; regular training and communication channels was established to review and address any emerging issues; a feedback mechanism was established to gather insights from pharmacy staff regarding the effectiveness of the changes; standardisation of process to include default system settings; revamping workflow distribution and workflow in processing "given in ward" medications.

Results: KPI of >90% with waiting time of less than 60 minutes were able to be achieved for most days after the brainstorming session. Average per week % of discharge medications dispatched within 60 min improved as well although there were some dips due to manpower crunch. Near misses of "given in ward" label was also reduced from 6 in the month August to 0 after since the system go live in September which overall reduced medication errors and prescription processing time of rework.

Conclusion: More cross trainings could be done for the future especially for non routine sectional staff. The team undergoes monthly huddle sessions to ensure improvement in processes and refinement in the workflow of prescription processes. Monthly reports were generated to update pharmacy management on the sustained improvements in prescription processing efficiency.

Levetiracetam compared to sodium valproate use in an elderly patient post status epilepticus: evidence-based medicine approach

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Background: An encounter with a 72-year-old male patient who required continuous management post-status epilepticus led to a clinical inquiry regarding pharmacotherapy to terminate seizures, while limiting polypharmacy and reducing pill burden. The current management consisted of levetiracetam, sodium valproate and phenytoin. The inquiry centres on comparing the efficacy and safety between levetiracetam and sodium valproate in elderly patients with established status epilepticus.

Purpose: The primary aim is to discern whether levetiracetam or sodium valproate proves more efficacious and safer in terminating seizures in patients with status epilepticus. This inquiry is motivated by the need for evidence-based decision-making to tailor treatment for the specific patient, emphasising both efficacy and safety considerations.

Methods: An evidence-based medicine approach was followed to answer the following clinical question, "In patients with status epilepticus, how does the efficacy and safety of levetiracetam in terminating seizures compare to valproate in the management of status epilepticus?" Utilising keywords derived from the question; a PubMed search strategy was employed such as "levetiracetam", "sodium valproate", and "status epilepticus".

Results: The selected article for addressing the clinical inquiry is a 2023 systematic review and meta-analysis by Wang et al. This article was used together with the Standard Treatment Guidelines and other evidence-based resources to formulate an answer. The evidence-based answer from the meta-analysis indicated that levetiracetam and valproate exhibit comparable efficacy in managing status epilepticus across all age groups. No superiority of levetiracetam over valproate in terms of efficacy or safety was observed. In adults older than 18 years it would potentially have similar responses to either treatment drug. The review has a strength of recommendation B and level of evidence 2.

Conclusion: The clinical inquiry led to an evidence-based answer that shows levetiracetam and sodium valproate are similar in efficacy among all age groups and either could be used. However, a conscious decision needs to be made based on the safety of the medicines and the adverse effects a patient may experience. Based on the risk of bias of the included trials and limitations of the review, more studies are required to make definite conclusions. Together with other evidence-based resources and guidelines, careful considerations were made when providing necessary recommendations in optimising the patient's treatment. The main solutions were to continue the phenytoin, optimise the sodium valproate dosing and stop the levetiracetam. This was decided based on these South African guidelines, to ensure safety and limit polypharmacy.

Engagement of hospital pharmacists in evaluation of drug utilisation, management of antimicrobial programmes and shortages during COVID -19 pandemic in the Republic of North Macedonia

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Introduction: As part of an interdisciplinary team, hospital pharmacists (HPs) are kay factors in implementation of healthcare services and are responsible for evaluation of drug utilisation, management of antimicrobial programmes and shortages. During the COVID-19 pandemic pharmacists were engaged in additional activities in order to obtain the best care in hospitals that were overloaded with patients.

Aim: The aim of this study was to evaluate attitudes and consequences of COVID-19 pandemic on everyday practice of HPs and to assign their engagement as front-line workers in this period in the Republic of North Macedonia.

Methods: Questionnaire based research was performed among HPs in the RN Macedonia during July 2022. Obtained data were computed and consequently evaluated using statistical software STATGRAPHICS Centurion XVI evaluation (StatPoint technologies Inc., USA).

Results: The survey was completed by 35 HPs (representing almost 50%) of whom 96% were females. The average age was 45.4±12.9 years, more than 40% have over 20 years practical experience and almost 70% of the respondents are working in public hospitals. Over 50% of the respondents have been working in hospitals with 101-250 beds, and 32% in hospitals with over 250 beds that were transformed in COVID centers during the pandemic. More than 64% of the facilities (hospitals) have 24/7 available pharmacist and in 24% only 1 HP was employed. Evaluation of the engagement of HPs in COVID-19 pandemic presented that 13% strongly agreed, 21.7% agreed, 26.1% partly agreed, and 34.8% disagreed that were actively engaged in treatment of hospitalised COVID-19 patients. Additionally, 22.7% strongly agreed and 28.7% agreed that they were asked for guidelines for off-label use of drugs. This survey has also confirmed that HPs were not fully engaged and only 21.7% strongly agreed that they participated in antimicrobial treatment management and 13% were referred for the use of the antibiotics during pandemic. Additionally, only 8.7% strongly agreed that were consulted for advice on replacing intravenous with oral antibiotics and 17.4% participated in the education or advising for rational use of antibiotics. More the 52% of the respondents confirmed that have faced shortage of antibiotics during pandemic, and 40% strongly agreed that were consulted for appropriate replacement of a certain antibiotic when shortage occurred. The respondents have confirmed the shortages of personal protective equipment (PPE), antiseptics, antiviral drugs, corticosteroids, as well as monoclonal antibodies. Conducted study confirmed high engagement of HPs in estimating the quantity and preparation of plans for availability of essential medicines, materials, equipment and PPE needed during the pandemic (almost 70% strongly agreed), and more than 50% of them strongly agreed that they have participated in creating lists of alternative suppliers for essential medicines and medical devices.

Conclusion: Obtained results confirmed the pivotal role of HPs, in the RN Macedonia during the COVID 19 pandemic, in management of drug, medical devices and PPT shortages, but their expertise in rational drug utilisation as well as conducting of antimicrobial programmes should be recognised by other healthcare professionals in order to obtain best patient care in hospitals.

Exploring methods for Identification of medication-related hospital admission/readmission: A systematic review

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Background: Medication related hospital admissions and readmissions are a common occurrence. Pharmacist interventions can be targeted towards these admissions to reduce further readmissions, however there is no clear consensus on how to identify a medication related admission/readmission.

Purpose: This systematic review aims to summarise published evidence on the different tools employed to identify medication related admissions/readmissions.

Method: Scopus, PubMed and Embase Ovid database searches were conducted to collect articles for this systematic review. Full text articles in English were included if they were published in the past ten years and focused on the development of a tool for identification of medication related hospital admission/readmission. Articles were excluded if they were systematic reviews, conference papers, editorials or commentary, or described the use of an existing tool or consensus.

Results Twenty-two studies were identified that described unique methods for identifying medication-related admissions. These methods included trigger tools and indicators (n=8), questionnaires (n=4) and author-selected ICD-9 or ICD-10 codes (n=10). QUDAS-2 was employed to evaluate the risk of bias in tools that described both an index

assessment using the tool and compared that to a reference standard, primarily expert opinion or consensus (n=4).

Conclusion: Of these four tools, three were considered suitable for use by clinical pharmacists in identifying medication related admissions/readmissions. The fourth tool was a computerised algorithm which the authors do not have access to use for replication. Future research could be focused on validating a tool for use in the general population as all tools were validated in either a geriatric or paediatric population.

Development, implementation, and analysis of Clostridioides difficile infection training materials for healthcare workers in the public sector of the Western Cape province, South Africa.

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Introduction: Clostridioides difficile infection (CDI) is a worldwide infectious disease associated with increasing incidence, high costs, readmissions, and mortality, with complex diseases further augmenting this phenomenon. The investigators previously identified a critical need for improved healthcare provider knowledge of CDI and gaps in quality of care provided. Previous studies on health system interventions regarding health professional knowledge on CDI have called for interprofessional collaboration within the public health sector. This research further incentivises additional study of how training health professionals on the risk factors, signs and symptoms, and bacterial characteristics of CDI can be executed at the community level. This study aims to identify healthcare provider knowledge gaps about CDI, develop targeted training materials, and analyse the training intervention to see how future instruction could be implemented to improve CDI vigilance and patient care.

Method: A prospective multicentre study will be conducted in secondary level hospitals and primary care clinics within government healthcare facilities in the Western Cape, utilising pre- and post-surveys. The investigators applied a community participatory approach to work with the local department of health and academic partners to develop and implement a scalable CDI training package for healthcare providers between knowledge assessments. Facility staff, including nurses, nursing managers, physicians, pharmacists, laboratory, infection control personnel, and temporary healthcare staff will be trained on CDI as well as assessed before and after CDI training. Assessment data will then be used to determine whether the training intervention elicited a change in healthcare knowledge status and quantify the perceived impact of the intervention on CDI treatment.

Results: This multi-sector partnership has resulted in scalable training materials for healthcare providers. The new training materials include CDI background, infection prevention and control, diagnostics, and management of active or recurrent infection. These modules were constructed based on the Department of Health Republic of South Africa guidelines. The training package leverages strategies for healthcare provider education already known to be scalable and well-received by the local community. Specifically, the training materials will be a highly engaging PDF with artwork added by a local illustrator to depict CDI management. The evaluation of the training will include results from the surveys to be completed. The structured surveys will be coded for major themes in knowledge regarding treatment, protocol, and identification of CDI at the healthcare facilities. These themes include 1) facilitators of CDI prevention (e.g., infection control practices), 2) identifying CDI symptoms in patients, 3) CDI treatment regimens (e.g., antibiotic use), and 4) staff protocol for diagnosed CDI patients (e.g., PPE, patient identification). Training will occur in partnership with the Western Cape Department of Health to maintain consistency with current CDI guidelines and protocols in South Africa.

Conclusion: The four domains of CDI training and assessment are expected to change the knowledge and care demonstrated by healthcare providers in the Western Cape. CDI is an expanding burden on patients, providers, and effective antimicrobials, necessitating additional training across South Africa to set protocol standards for CDI management.

Analysis of prescription patterns in palliative care units and the effectiveness of pharmacist interventions

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Introduction: The aim of this study is to analyse the prescription patterns in palliative care units and evaluate the effectiveness of pharmacist interventions. Palliative care units provide specialised care for patients with life-limiting illnesses, focusing on relieving symptoms and improving quality of life. Pharmacists play a crucial role in optimising medication therapy in these units.

Methods: A retrospective analysis of prescription data was collected from a teaching hospital's palliative care units between January 2023 and December 2023. The prescription patterns were analysed in terms of diagnosis, hospitalisation days, medication, dosage forms, and frequency of use.

Pharmacist interventions, such as medication reviews, therapeutic substitutions, and dose adjustments, were documented.

Results: During the study period, a total of 219 cases were enrolled, resulting in 243 hospital admissions. The male-to-female ratio was 103:116, and there were 178 deaths among the hospitalised patients. The average length of hospital stay was 21.73±19.30 days. The most common primary diagnosis was malignant tumors, accounting for 42.98% of cases, followed by infectious diseases at 13.64%. The top medication categories used during hospitalisation were "Oral Narcotic Analgesics" (61.19%), "Nutritional Agents" (59.36%), "Mucolytic Agents" (58%), and "Laxatives" (57.08%). Benzodiazepines were used by 38.81% of the cases, and 32.42% had received treatment with Anti-infectives. Additionally, 18.27% of the cases had used Prokinetic Drugs for treatment. According to the 18 pharmacist intervention records, 8 cases required further observation and follow-up, 7 cases involved unnecessary medication treatment, and there were instances of medication duplication, inappropriate dosage forms, and excessive dosage, each occurring once. These pharmacist interventions were fully accepted, with a 100% acceptance rate.

Conclusion: The analysis of prescription patterns revealed a diverse range of medications used in palliative care, including opioids for pain management, antiemetics for nausea and vomiting, and sedatives for anxiety and restlessness. Pharmacist interventions were found to optimise prescription patterns and ensuring appropriate medication use in the context of palliative care. Further research and collaboration between healthcare professionals are needed to enhance the role of pharmacists in palliative care settings and maximise patient benefits.

A case report of suspected ceftriaxone-induced thrombocytopenia

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Background: Ceftriaxone-induced immune thrombocytopenia (DITP) is a rare, but potentially fatal cause of isolated thrombocytopenia with a cited incidence of 10 in 1,000,000 cases. Two DITPs occurred in 2022 and Ceftriaxone-induced DITP are reversible. Timely deactivation of induced drugs is the key solution and prevention of serious complications including gastrointestinal and intrapulmonary, intracranial hemorrhage risks.

Case

A 79-year-old male with past medical history of hypertension, diabetes, Alzheimer's disease, stroke, seizure, coronary artery disease, colon cancer, long-term use of valproic acid to control epilepsy (since 2021/8/13). On March 11, 2022, due to shortness of breath, low blood pressure, high blood sugar, and altered consciousness for two days, he was sent to the emergency department of this hospital for medical treatment. After being diagnosed with hyperglycemia and hyperosmolarity, severe hyponatremia, and sepsis (suspected to be community-type pneumonia), he was admitted to the department of nephrology for treatment. Empiric antibiotic ceftriaxone 1g Q12H IVF was given from the emergency department. After admission on the 1st, and 4th day of therapy, the platelets dropped to 105K/μL and 44K/μL, respectively. However, there were no bleeding manifestations. After evaluation on 3/15, ceftriaxone was suspected to cause thrombocytopenia, and the antibiotic was adjusted to piperacillin/tazobactam 3.38g Q6H. Platelet rises were 47K/μL, 65K/μL, 123K/μL and 197K/μL on the 1st, 3rd, 5th, and 9th day after changing antibiotics.

Discussion: In addition to ceftriaxone, the possible cause of the patient's platelets may also be caused by co-aggravating factors such as sepsis and taking valproic acid (old age is one of the risk factors, and the possible occurrence time is 8 days to 16 months after treatment).On 3/17, the neurology department evaluated the medication and suggested changing valproic acid to levetiracetam 500 mg BID. Thrombocytopenia and infection symptoms were improved on 3/23.

Conclusion: DITP should be suspected in special populations such as the elderly, in patients with thrombocytopenia during acute illness or in the hospital. Timely discontinuation of medication and use of alternative medications to avoid more serious injuries.

Analysis of tocolytic oral indomethacin for premature labor

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Purpose: Clinically, indomethacin is often administered orally or anally at 25 mg every 4 to 6 hours. It is used as the first-line tocolytic drug for pregnant women to suppress uterine contractions in the hope of delaying the delivery of the fetus for 48 hours. In order to provide prenatal corticosteroids to promote fetal lung development time.

Method: This study retrospectively evaluated hospitalised pregnant women who used oral indomethacin for tocolysis from May 2022 to June 2023.

Results: A total of 19 people with an average age of 31 years old, Assess gestation weeks one person (5%) with a gestation

period of 19 weeks, 18 people (95%) with a gestation period of 20 to 30 weeks. The dosage is administered by 15 people (79%) every 4 to 6 hours, while 4 people (21%) only administer it once. The course of treatment was within 24 hours for 4 people (21%), within 24 hours to 48 hours for 5 people (26%), within 48 hours to 72 hours for 2 people (11%), and more than 72 hours for 8 people (42%). Evaluated before and after use, liver and kidney functions were normal, platelets or coagulation were normal. Only one person with a history of NSAIDs allergy switched to nifedipine.

Conclusion: For more than 72 hours, 8 people administered indomethacin and nifedipine alternately. Closely monitor and record the status of the fetal and amniotic fluids, regardless of the course of treatment, to ensure that no adverse reactions occur. However, considering the possibility of premature closure of the fetal ductus arteriosus and the side effects of oligohydramnios, it is generally not used for more than 72 hours. If used for more than 48 hours, ultrasound monitoring is required. Pregnancy above 30 weeks may lead to the risk of premature closure of the fetal ductus arteriosus. Treatment should be limited to the lowest effective dose and to the shortest duration possible between 20 and 30 weeks of pregnancy. Indomethacin use should be discontinued and clinical symptoms should be monitored if pregnant women experience oligohydramnios. After discontinuing use, the amniotic fluid volume typically returns to normal within 3 to 6 days.

Capecitabine as a cause of hoarseness

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Introduction: Capecitabine is widely used in the treatment of breast cancer, colorectal cancer and gastric cancer. According to its label, the adverse reactions mainly include hematological, skin, and gastrointestinal reactions. This study explores the correlation between hoarseness and capecitabine to assess the potential of capecitabine-related hoarseness.

Case presentation: The authors report a case of a 59-year-old female diagnosed with advanced gastric cancer accompanied by osteoporosis. The patient was taking capecitabine as a maintenance therapy followed by the SOX regimen and albumin-bound paclitaxel combined with Tislelizumab. During the second cycle of capecitabine treatment, the patient began to experience hoarseness; the symptom was initially mild, and then worsened over time, eventually severe to the extent that the voice could not be heard from 2 meters away. It was not accompanied by fever, cold, cough, etc., and her blood tests showed no abnormalities. As the patient didn't experience any other adverse reactions, the medication was not immediately stopped. Following the completion of the medication course, the hoarseness symptom significantly improved. When the patient resumed taking capecitabine, hoarseness occurred immediately, with no other adverse effects noted. Considering hoarseness as an adverse reaction to capecitabine, it was recommended to monitor the patient for symptoms of voice loss and discontinue treatment if intolerable.

Discussion: The authors utilised WHO-UMC causality criteria firstly to assess the probability of capecitabine-related hoarseness, and the answer was certain. Then the authors used the adverse drug reaction probability scale (Naranjo) to evaluate whether hoarseness was a side effect of capecitabine, the score was 8, indicating a highly likely association. Capecitabine's label mentioned that fluorouracil might induce difficulty in speaking with an incidence rate of less than 5%. A search on PUBMED did not reveal any previous reports of capecitabine causing hoarseness. Only in the Mayo Clinic Manual's section on capecitabine adverse reactions, the authors found its rare adverse effects of capecitabine including cough or hoarseness (accompanied by fever or chills).

Conclusion: The authors found that capecitabine can cause hoarseness, which is a relatively rare adverse reaction but should be noted by the medical team and patients. For this patient, only hoarseness occurred during the medication process, without symptoms such as loss of voice, but the possibility of such a situation cannot be ruled out. It is recommended that during the patient's medication, in addition to monitoring hematologic and skin toxicities, attention should also be paid to neurological function status such as hoarseness.

Enhancing pharmaceutical care for patients with Chronic Kidney Disease: A study in a district hospital in Taiwan

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Introduction: The National Health Insurance Administration (NHIA) of Taiwan launched a care programme in 2021 targeting patients with chronic kidney disease (CKD) stages 3b-5 or exhibiting proteinuria. This nationwide initiative aims to enhance medication adherence and minimise the unnecessary use of non-steroidal anti-inflammatory drugs (NSAIDs) by involving pharmacists in patient care. Conducted at a district hospital in Taiwan, this study evaluates the effect of pharmacist interventions on the Adherence to Refills and Medications Scale (ARMS) scores and NSAIDs usage among patients who received care twice.

Method: A retrospective analysis was conducted on patient data from January 2022 to March 2024, spanning over two

years. The study specifically focused on 64 patients who were cared for twice during this period, analysing changes in their ARMS scores, which range from 12 to 48, with lower scores indicating better medication adherence, and NSAIDs usage between their first and second engagements. Pharmacists recorded the data in Excel, and further processing and analysis were performed using Excel and ChatGPT.

Results: The analysis of the 64 patients who received care twice showed a modest improvement in medication adherence, as evidenced by the decrease in the average ARMS score from 12.85 to 12.42, indicating enhanced adherence. The proportion of patients with ARMS scores greater than 12, suggesting potential non-adherence, decreased from 39.06% at the first visit to 23.44% at the second visit. The analysis revealed a stable pattern of NSAIDs use, with the proportion of patients who did not use NSAIDs remaining fairly constant, approximately 80.7% at the first visit and 78.6% at the second. However, there was a notable simplification in NSAIDs usage patterns by the second visit, with the proportion of patients assessed as using both "prescribed and other sources of NSAIDs" dropping from 3.125% to 0%.

Conclusion: These findings highlight the effectiveness of pharmacist-led interventions in improving medication adherence among CKD patients, as evidenced by the ARMS score improvements from the first to the second visit in the study cohort. The stable NSAIDs usage and the simplification of NSAIDs consumption patterns align with the programme's objectives to minimise unnecessary NSAIDs use and support medication adherence. This study emphasises the pivotal role of pharmacists in the CKD care programme and showcases the potential of data-driven approaches to improve patient care. Employing Excel for data management and ChatGPT for analysis enabled these insights, underscoring the value of ongoing engagement and assessment in managing chronic diseases. Further research is advocated to explore the broader impacts of pharmacist interventions on medication adherence and patient outcomes in CKD management.

Fall risk analysis in elderly inpatients using atypical antipsychotics agents: A cohort case control study

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Background: Atypical antipsychotic medications are sometimes given to older adults to help manage behavioral and psychiatric problem. However, the authors don't have definite information about how these drugs compare in terms of fall risk for elderly patients. In other words, we're not sure which one might be riskier than the others when it comes to causing falls. It's an area where more research is needed.

Purpose: This aim in the study was to evaluate the fall event associated with atypical antipsychotics drugs in elderly inpatients.

Method: This was retrospective case control study. The authors included 120 elderly inpatients who received atypical antipsychotics drugs during the period from January to December 2023, except for those age <65 years of the age. Patients were followed up until fall event or the end of the study period.

Data were retrospectively collected from medical record. The use of atypical antipsychotic was confirmed, i.e quetiapine, risperidone, paliperidone, olanzapine, clozapine, aripiprazole and brexpiprazole which are recommended for use at the hospital. Comparison of categorical data between these drugs were performed using the chi-squared test with Yates' correction. Analyses were performed by SPSS version 22 (IBM), using a two-sided significance level of 0.05.

Result: In total of 120 elderly inpatients with atypical antipsychotics drugs were including 71 females and 49 males with average age of 70.1 years. The adjusted odds ratios (OR) with 95% confidence intervals for quetiapine was 3.33 (1.48-7.49, $p < 0.05$) , risperidone was 1.22 (0.42-3.5) , paliperidone was 1.06(0.31-3.65), olanzapine was 0.17(0.02-1.35), clozapine was 0.66(0.17-2.49),aripiprazole was 1.17(0.43-3.15) , brexpiprazole was 0.91(0.23-3.59).

Conclusion: Future studies are needed to investigate more patients and the relationship between combined drugs , comorbidities and fall events, possibly by adding further risk factors as variables.

The authors need more research to enhance the safety of the elderly patients in the future.

A pharmacist-led opioid tapering service before total hip or knee arthroplasty: Qualitative analysis of patient counselling sessions

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Background and Aims: Currently, no literature on patients' experiences with opioid tapering before surgery has been published. Tapering opioids before total hip or knee

arthroplasty improves post-surgical outcomes similar to opioid naïve patients. Addressing pre-operative opioid use through tapering may have the potential to improve surgical outcomes and patient well-being. This paper aims to qualitatively analyse consultation sessions of patients receiving a pharmacist-led opioid tapering service before total hip or knee replacement surgery to understand their experiences and attitudes.

Methods: A qualitative study was nested within a randomised trial to evaluate a pharmacist-led opioid tapering service before total hip or knee replacement surgery. Participants were recruited from seven hospitals between December 2021 and September 2022. Eligible participants in the present study were undergoing the pharmacist-led opioid tapering intervention of the randomised trial. Consultations of participants with the pharmacist were audio-recorded and transcribed verbatim. Consultation data underwent inductive thematic analysis and attitudinal analysis.

Results: Among 20 participants, three major themes including motivations to taper, knowledge and beliefs, and psychosocial context were identified. Attitudes were identified as 'optimistic', 'hesitant', and 'resistant'. Awareness of the surgery date appeared to be a key motivating factor to taper opioids, regardless of the dose of opioids. Pharmacists played a foundational role in shaping patients' attitudes and optimisation of pain management strategies.

Conclusions: Exploring the experiences of patients with osteoarthritis in a pharmacist-led opioid tapering service before elective surgery revealed that external motivations, such as knowledge of a surgery date, play a crucial role in successful opioid tapering. Patients were more likely to taper if they knew their surgery date. Attitudes towards opioid tapering were identified as a modifiable factor, with patients displaying an optimistic attitude being more likely to taper. Further research is needed to identify diverse tapering experiences to tailor effective opioid tapering plans.

Opioid tapering before hip and knee arthroplasty: A qualitative interview study to examine general practitioners' understandings, beliefs, and support needs

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Introduction: Total hip and knee arthroplasties are common in aging populations. While awaiting surgery, many patients are prescribed opioids for pain relief against clinical guidelines and optimal post-surgery outcomes. In patients prescribed opioids, pre-arthroplasty tapering is uncommon and, as such, a missed opportunity to minimise opioid-related harm. The authors sought to understand general practitioners' understandings, views and needs around pre-arthroplasty patient management.

Methods: Data from semi-structured interviews with general practitioners (GPs) in Australia (from the OpioidHALT trial, and via snowballing) were used to investigate their perceptions of opioid tapering before hip and knee arthroplasty and the potential for support from pharmacists. Data were transcribed and analysed inductively and thematically.

Results: In interviews GPs (n=17) downplayed their pre-arthroplasty prescribing of opioids to manage hip and knee pain, emphasising that they used them infrequently. Analysis of transcript data resulted in three themes: 1. GPs' awareness of pre-arthroplasty opioid tapering is poor and they perceived tapering would be challenging to deliver; 2. GPs focused on patient-related and system-level barriers to tapering success and; 3. Their enthusiasm for pharmacist support was tempered by uncertainty with how it would occur in practice.

Conclusion: Consensus among GPs was clear about the benefits and, therefore, need for pre-arthroplasty opioid tapering to minimise harm in this patient cohort. Personal, patient and system level barriers to its implementation and success however, led GPs to state it would be challenging and time consuming. GPs believed pharmacists would provide valuable support to ensure success particularly in patient education, motivation and sharing of the overall burden and risk around opioid management. They suggested collaborative models would be required but were unsure of how they would be achieved or governed. Further research may explore implementation.

Developing and deploying a dashboard for hospital pharmacy outpatient dispensing dynasmics

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Background: In recent years, medication safety and workplace environment have become hot topics for pharmacists. Hospital pharmacies often struggle with manpower shortages, time constraints, and lack of information and tools, hindering them from delivering the expected service quality. Developing new methods and systems to optimise hospital drug utilisation and human resource allocation is both urgent and challenging.

Hospital outpatient dispensing management typically involves observing the number of patients waiting on-site or querying the volume of prescriptions being dispensed. However, when patient numbers increase, it becomes difficult to simultaneously track dispensing information across multiple workstations.

Dashboards provide visual representations of performance, offering a unified and interactive way to display overall efficiency. In this study, the authors established a dashboard interface to simultaneously assess dispensing information across multiple workstations. This real-time dashboard allows us to monitor dispensing dynamics and promptly identify and address related issues.

Purpose: This poster aims to showcase the development and evaluation of a dashboard for managing outpatient pharmacy dispensing dynamics in a regional Taiwanese hospital. The authors assess its practical application and effectiveness.

Method: The authors developed the system based on pharmacy management needs. Data related to prescription numbers and dispensing barcodes were collected from the outpatient hospital information system (HIS) and the pharmacy information system (PIS). These data were stored in a web server and database. By querying the progress status of each workstation, the authors created a real-time graphical dashboard that provides information on dispensing workload and progress. Data matching and logical operations were used to prompt workstation-specific information.

Results: The system supports real-time monitoring of on-site work conditions and workload estimates for both computers and mobile devices. It includes patient waiting times for medication pickup, pharmacist workload, and timely identification of patients waiting too long or pharmacists experiencing fatigue or needing support. The dashboard highlights differences in workload and progress.

When the system detects uneven workload distribution or excessive waiting times, it displays recommendations for workstation adjustments and monitors the progress of these adjustments. For patients waiting too long, the system prompts team leaders to adjust work assignments and coordination to reduce waiting times. In cases of overworked pharmacists, the system alerts team leaders to coordinate manpower, alleviating online pharmacist work stress and preventing burnout.

The benefits include maintaining average patient waiting times within the 12-minute management threshold, overall satisfaction of dashboard functionality by managers reaching 90%, and the system's ability to operate on mobile devices in addition to computers, providing flexibility.

Conclusion: The authors successfully established a dynamic dashboard for outpatient pharmacy dispensing in hospitals and applied it to dispensing and medication pickup management. By standardising and rationalising dispensing workload and processing times, the authors improved satisfaction levels among pharmacy managers and pharmacists. The dashboard's real-time performance monitoring and customised management information demonstrate its potential for broader implementation in pharmaceutical services, including inventory management, financial management, and quality control.

A study of the cost of surgical cost of esophageal and gastric cancer

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Background: According to statistics from the World Health Organisation (WHO) in 2022, the global burden of cancer remains substantial, with over 19.9 million new cancer diagnoses and 9.7 million cancer-related deaths projected. Mongolia stands out with concerning cancer statistics, ranking first in liver cancer incidence, second in stomach

cancer, and exhibiting high mortality rates, topping the list in total cancer deaths, stomach cancer deaths, and ranking third in esophageal cancer deaths worldwide.

In Mongolia, the National Health Insurance Council mandates that "Cancer Care Services" be fully covered by the Health Insurance Fund (HIF). Specifically, patients diagnosed with esophageal cancer receive 10,789,000 Tugrug, while those with stomach cancer receive 7,660,000 Tugrug from the fund for surgical treatment.

This study aims to investigate the treatment costs incurred by individuals undergoing surgical interventions for esophageal and gastric cancer at the National Cancer Center.

Method: A retrospective analysis was conducted on a total of 453 cases of esophageal and gastric cancer surgeries performed at the National Cancer Center between January 1 to September 30, 2023. Patient data were collected from the patients' medical records.

Descriptive statistics were employed to summarise the data, and a T-test was utilised to compare selected diagnostic groups.

Results: Out of the total cases, 404 individuals underwent surgical treatment for esophageal and gastric cancer. Among these, 355 (81.2%) were diagnosed with stomach cancer, while 49 (11.2%) had esophageal cancer. The majority of surgeries were open procedures, with 370 (84.7%) cases, followed by minimally invasive surgeries in 33 (7.6%) cases, and a combination of minimally invasive and open surgeries in 34 (7.8%) cases. Additionally, 14 (3.2%) patients required reoperation. The gender distribution showed that 157 (35.9%) of the respondents were female, while 280 (64.1%) were male. The average length of hospital stay was 9.9 (±8.8) days for patients with esophageal cancer and 7.2 (±2.9) days for patients with stomach cancer.

Comparison of total surgery costs between the two groups revealed significant differences. The average cost of surgery for esophageal cancer patients was 11.06±2.14 million Tugrug, considerably higher than the cost for stomach cancer patients, which averaged 5.76±1.36 million Tugrug. Similarly, the average cost of intensive care for esophageal cancer patients was 1.13±1.94 million Tugrug, significantly lower than the cost for stomach cancer patients, which averaged 2.28±8.42 million Tugrug. Regarding inpatient ward expenses, the average cost for esophageal cancer patients was 1.12±1.83 million Tugrug, significantly higher than the cost for stomach cancer patients, which averaged 6.58±5.41 million Tugrug. Overall, the total surgical treatment cost for the selected groups was 14.19±4.49 million Tugrug, for esophageal cancer patients and 7.16±1.66 million Tugrug for stomach cancer patients, indicating a substantial disparity (p = 0.000).

Conclusion: The findings highlight a significant disparity in the total costs associated with esophageal cancer surgery compared to gastric cancer surgery. Notably, the expenses incurred for esophageal cancer surgeries surpass the budget allocated by the HIF Foundation to the hospital. This underscores the necessity for a comprehensive re-evaluation of cost assessment methodologies to ensure adequate financial coverage for patients undergoing esophageal cancer treatment.

Vancomycin dosing in patients on intermittent haemodialysis – a retrospective study

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Background: Vancomycin is commonly used to treat methicillin-resistant Staphylococcus aureus in haemodialysis patients with the approach to dosing often based on locally developed protocols. This places haemodialysis patients at risk of receiving suboptimal loading doses and/or maintenance doses which can result in therapeutic target non-attainment, treatment failure and development of vancomycin resistance.

Purpose: To determine the incidence of therapeutic target attainment using a three-times weekly locally developed protocol for intradialytic vancomycin therapy.

Methods: A retrospective study was conducted of medical records in a remote Australian dialysis centre from January 2017 to July 2023. Adult patients with chronic kidney disease stage 5 on ≥3 months of intermittent haemodialysis and had received a course of vancomycin therapy with ≥1 serum vancomycin concentration recorded were included. Demographic and dosing data were collected. Clinician adherence with the dosing protocol and attainment of the therapeutic target (trough concentration 15-20 mg/L) following the loading dose and maintenance doses were assessed. Factors associated with target non-attainment following the loading dose were also analysed.

Results: A total of 98 vancomycin courses (67 patients) were available for analysis. Only 38% of the loading doses were prescribed as per protocol. Following the loading dose, 25% of trough concentrations achieved the therapeutic target concentration, 50% were sub-therapeutic and 25% were supra-therapeutic. When compared with those achieving target, sub-therapeutic concentrations were associated with a lower loading dose (median 16.6 mg/kg vs 20.0.mg/kg, p < 0.002), and supra-therapeutic concentrations had a shorter dosing interval between the loading dose and first maintenance dose (median 31.5 hours vs 39.0 hours, p = 0.06). Of the 201 maintenance trough concentrations collected, 65% were therapeutic, 21% were sub-therapeutic and 14% were supra-therapeutic with an overall median trough concentration of 17.3mg/L. As the treatment duration

increased, the number of dose adjustments required to achieve the target trough concentration increased. A similar incidence of target attainment was achieved between the 48-hour dosing interval and 72-hour interval. However, more subtherapeutic concentrations occurred during the 72-hour dosing interval, and more supratherapeutic concentrations occurred in the 48-hour dosing interval, df=2, p = 0.022.

Conclusion: The vancomycin dosing protocol does not consistently achieve the vancomycin target trough concentration following the loading dose or reliably maintain the target trough concentrations following the maintenance doses. Adherence to the loading dose protocol was shown to be suboptimal for prescribers, although adherence did not result in improved target trough concentration attainment, with most achieving a sub-therapeutic trough concentration. The recommendations from this study are to sustain the current loading dose of 25mg/kg and implement the weight-based loading dose for all indications with the removal of the current protocol dosing cap for certain conditions. When prescribing a loading dose and determining the maintenance doses, the time to the next dialysis session should also be considered, especially in those with residual renal function.

Collaborative dispensing in Spain, an example of equity in access to hospital dispensed medicines

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Introduction: During the COVID-19 pandemic, a series of extraordinary measures were adopted which in some Autonomous Communities (CCAAs) enabled the implementation of Collaborative Dispensing (CD) programmes for hospital diagnostic and hospital dispensing medicines to bring pharmaceutical care closer to and improve it for patients through collaboration between hospital pharmacy services and community pharmacies. Since the pandemic, this practice has been regulated in several CCAAs, due to its proven benefits.

Purpose: It aims to document and compare the CD procedures in a homogeneous way in the five CCAA where it has been maintained after the pandemic (Cantabria, Catalonia, Valencia, Andalusia and Navarre) in order to evaluate its functioning and estimate its impact.

Method: The opinions of more than 100 hospital and community pharmacists, health authorities and patients were collected. Thirty-three open questions were posed to the participating Regional Pharmacist Chambers (COF) and quantitative data were requested to measure the scope of CD in each territory.

Results: The leadership of the COFs is key in defining the protocols for action, agreed with the health authorities and hospital pharmacy services (SFH). The SFHs are responsible for selecting patients who are candidates for CD, according to their individual condition and therapeutic context, and patients choose the pharmacy where they want to obtain their medication, based on proximity or trust, after prior training by community pharmacists. The transport of the medication from the hospital to the pharmacy is carried out by pharmaceutical distributors, guaranteeing the pharmaceutical custody of the medication and the complete privacy of the patient throughout the entire circuit. In addition, there are communication mechanisms between the participating SFHs and community pharmacies, although the pharmacotherapeutic monitoring of the patient is the responsibility of the hospital pharmacists. Most CCAAs allow home delivery of medicines by the community pharmacist when the patient is unable to go to the pharmacy.

Despite being an unpaid activity for the time being (except in Valencian Community), its social, economic and environmental value is very high: each patient is spared an average of almost 10 visits to hospital, each of which would involve an average of 31 km of travel, a time of > 1 h and the loss of > 95 euros of productivity.

All actors in the process show a high degree of satisfaction. It is noteworthy that > 90% of the pharmacists involved report a positive impact on the quality of pharmaceutical care and 85% of patients are fully satisfied with CD; all respondents are committed to the continuity of the service in the future.

Conclusion: CD initiatives in Spain are estimated to have saved 40,850 hospital visits, 43,710 hours lost, 408,000 euros in travel and 2.3 million euros in lost productivity, 1.2 million kilometres travelled, and 108 tonnes of CO2 emitted. But the number of patients benefiting from them (< 4500) is still small compared to the possible total of 1.2 million patients, where the generalisation of this practice would mean more than 11.6 million avoided hospital visits or more than 12.4 million avoided lost hours.

Barriers and facilitators to hydroxyurea use among sickle cell disease patients: Perception of healthcare workers at a tertiary teaching hospital in Ghana

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Introduction: Sickle cell disease is a haematological genetic disorder characterised by symptoms like haemolysis, blood vessel obstruction, and tissue hypoxia. Barriers to hydroxyurea use among patients exist even in high-income countries.

Aim: To identify barriers and facilitators to hydroxyurea use in sickle cell disease patients and assess the usefulness of the current registry available for evaluating trends and outcomes in medicine use among patients.

Methods: Qualitative interviews were conducted with healthcare professionals from the Sickle Cell Clinic at Komfo Anokye Teaching Hospital. The data collection spanned from 12th May – 15th August 2023. This included a medical doctor, four nurses and a pharmacist. Interviews were audio-recorded, transcribed, and thematically analysed.

Results: The study involved healthcare professionals managing sickle cell disease patients, including one doctor, four nurses, and one pharmacist, aged between 28 to 44 years, with 1 to 15 years of experience in managing the disease. Financial burden emerged as a dominant barrier to acquiring hydroxyurea, compounded by issues of medication access during stock shortages and practical challenges in administering the medication, especially to children. The practical aspects of administering hydroxyurea especially for children who cannot take capsules, the need for reconstituting the medication into suspension added both cost and time constraints to hydroxyurea access. Improving access and compliance to hydroxyurea among patients requires a multifaceted effort of healthcare workers, hospital management, and government support. This study found that patient education sessions should emphasise the benefits of hydroxyurea treatment and the importance of adherence to prescribed regimens. Bureaucratic barriers delaying medication availability need prompt identification and resolution, alongside efforts to negotiate favorable pricing agreements. Government interventions are deemed essential to address systemic barriers, including funding mechanisms, subsidies for patients, and enhancing local manufacturing capacity to lower medication costs. In addition, healthcare workers recognised the potential of mobile apps like Ahodwo CommCare app to revolutionise patient care but noted mixed awareness and usage among providers at the clinic. While some reported using the app, many were unaware of its existence or functionality. The findings underline the necessity for comprehensive strategies to overcome barriers to hydroxyurea use, coupled with improving awareness and adoption of innovative healthcare technologies.

Conclusion: Barriers and facilitators to hydroxyurea adherence in sickle cell disease patients are complex, requiring tailored interventions aligned with recent research to improve health outcomes.

Clinical effects of hydroxyurea therapy in Sickle Cell Disease patients at a tertiary teaching hospital in Ghana

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Introduction: Sickle cell disease is among the common inherited diseases worldwide, associated with prolonged morbidity and reduced quality of life. Hydroxyurea is an effective medication proven to reduce clinical problems associated with the disease such as painful crises and frequent hospitalisations

Aim: To assess the current state, trends and outcomes of hydroxyurea usage in SCD patients.

Methods: A retrospective study was conducted on 256 patients who were purposively sampled at the sickle cell disease clinic at Komfo Anokye Teaching Hospital. Data on patients' medical information was extracted from the hospital's medical records and analysed using STATA version 16. Descriptive statistics were done for all sociodemographic characteristics of patients. The Wilcoxon Signed Rank test was used to determine whether there was a difference in the clinical parameters before and after initiation of hydroxyurea in patients

Results: A total of 256 patient records were assessed in this study. More than half of the patients (143, 55.86%) were males. More than a third of the participants (104, 40.63%) were between the ages of 6 and 10 years with a mean age of 8.84 + 4.19 years (range 1 to 23 years). Almost half of the participants (113, 44.14%) had experienced at least one

complication of the disease. A total of 40.63% of the patients had experienced at least one complication of the disease. Pain episodes (113, 44.14%) were the most common complication experienced by the patients. By sex, more males experienced pain episodes than females (66, 58.4%); by age group, more participants between the ages of 6 – 10 years experienced pain episodes than any other age group (44, 38.93%). The Wilcoxon Signed Rank test revealed that there were statistically significant differences in the number of acute chest syndrome (ACS) ($z= -4.123$, $p < 0.0001$), number of painful crisis ($z= -12.777$, $p < 0.0001$), number of hospitalisation ($z= -12.776$, $p < 0.0001$) and number of transfusion ($z= -11.783$, $p < 0.0001$) one year before and one year after the initiation of HU.

Conclusion: The study showed significant clinical benefits of hydroxyurea in management of patients with sickle cell disease. Hydroxyurea use resulted in decreased frequency of hospitalisations and blood transfusions.

Management of community-acquired pneumonia at a quaternary teaching hospital in Ghana

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Introduction: Community-acquired pneumonia is a significant global health issue, particularly affecting Sub-Saharan Africa. Despite advancements, challenges persist due to limited diagnostic tools, guidelines, medications, and vaccines.

Aim: This study aimed to investigate the etiology, pharmacological management, and patient outcomes of community acquired pneumonia at the University of Ghana Medical Centre.

Method: A retrospective cross-sectional study was conducted, analysing medical records of community-acquired pneumonia patients treated at the facility from May 1, 2022, to April 30, 2023. Data were extracted and analysed using STATA version 16.

Results: A total of 197 medical records were reviewed, comprising 108 (54.82%) outpatients, with the majority being female (107, 54.04%). Most of the patients were managed at the Emergency (59, 29.21%), Family medicine (55, 27.23%), and Internal medicine (46, 22.77%) departments. The mean hospital stay for inpatients was 4.00 ± 5.46 days, with bacterial pneumonia (73, 37.06%) and bronchopneumonia (30, 15.23%) being the most documented diagnoses. Microbial testing was conducted for 50 patients (24.88%), with organisms identified in 23 samples, predominantly coronavirus (43.47%). Antibiotics were prescribed for 153 patients (77.66%), with azithromycin (28.87%) and ceftriaxone (19.01%) being the most common choices. Cephalosporins (38.38%) and macrolides (28.87%) were the frequently prescribed antibiotic classes. Of the inpatients, 42.13% were discharged after treatment, while 2.54% experienced mortality.

Conclusion: The study revealed significant outpatient dominance and elderly susceptibility to community-acquired pneumonia. Management primarily involved cephalosporins and macrolides, with coronavirus frequently implicated. Mortality rates were low, emphasising the importance of targeted interventions for community-acquired pneumonia management and improved outcomes.

Optimisation of medication storage: Assessment of medication refrigerators in patient care areas at a quaternary teaching hospital In Ghana

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Introduction: Adequate and reliable supply of safe and effective medicines of acceptable quality is essential in healthcare delivery.1 The appropriate management of patient medications by healthcare professionals is recognised as a critical component of an efficient healthcare system. Since the management of medicines in healthcare facilities is undertaken by the multidisciplinary team, the safe and secure handling of the medications becomes a shared responsibility which must be guided by and carried out with clearly defined policies.

Aim: To assess the usage of medication refrigerators in patient care areas at the University of Ghana Medical Centre (UGMC) to identify targets for improvement.

Methods: A cross-sectional study was conducted at the University of Ghana Medical Centre (UGMC) to determine the presence and use of medication refrigerators in inpatient areas at UGMC. A data collection tool was designed and pre-tested by three pharmacists before data collection began. Data was collected on Friday, 16th February 2024. Data was entered into Microsoft Excel 2016, cleaned, and analysed using the same software. The output of the analysis was presented in tables and charts.

Results: A total of 26 patient care areas were visited with 21 (80.77%) having medication refrigerators. The average number of medications per refrigerator is 18 medications (range 3 to 76). The non-medicinal items were identified in 12(57.69%) of the medication fridges. Out of the 364 medications in the medication refrigerators, 305 (83.79%) were appropriately labelled and 59 (16.21%) were inappropriately labelled. The absence of a medication label was the most common reason for inappropriate labelling as this phenomenon was seen in about a quarter of medication refrigerators (14, 23.73%). Corrective measures implemented during the survey included; the discarding of unwholesome and inappropriately labelled medications (25, 42.4%) and relabeling of inappropriately labelled medications (10, 16.9%).

Conclusion: Frequent monitoring of patient medication refrigerators is essential in optimising medicine management. Pharmacist's interventions in this area is key in preventing medication errors and adverse drug reactions

Co-design and implementation of an integrated digital medication management solution across 45 South African private hospitals

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Introduction: Digitisation of medication management processes in hospital settings has proven to have a profound impact on patient safety. This project aimed to co-design, develop and implement a complete digital medication management module within a hospital electronic medical record. Inclusive of a fully compliant e-prescribing process, integrated e-pharmacy dispensing system, e-documentation of medication preparation and administration and automated medication reconciliation, to enhance medication safety practices across the care pathway.

Method: The five-and-a-half-year journey to date includes:

1) Pre-implementation phase consisting of the collaborative clinical and technical co-design and development of the pharmacy workplace and medication module, using agile methodology over a two-year period. The pharmacy workplace has standardised a three-step medication dispensing process and, includes various integrations with the SAP hospital information and billing systems and numerous third parties to support electronic prescribing and enhance medication safety.
2) An 18-month pilot phase inclusive of four hospitals and their pharmacies
3) The current implementation phase consisting of multi-site roll-outs including change management, training, and incessant support to ensure end user adoption.

Based on doctor, pharmacist and nurse end-user feedback regarding digital medication management, a process of system enhancement requests is performed and implemented applying plan-do-study-act improvement principles of change. This process is iterative and continues at present.

Results: To date, 45 hospitals and their pharmacies have transitioned onto the electronic medical record solution resulting in a paperless hospital medication management environment. More than 5 million electronic prescriptions have been generated, over 30 million doses administered and, over 180 000 medication line items dispensed via the system per month.

Conclusion: The implementation of the electronic medical record and integrated pharmacy workplace has enabled the digitisation of the entire medication management pathway within the private hospital network in South Africa. This has disrupted the practice of pharmacy within the organisation to further support and ensure medication safety.

The impact and implementation of a customised digital application to enable pharmacist led antibiotic stewardship surveillance in a South African private hospital network

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Introduction: Antimicrobial resistance is one of the top ten global health threats facing humanity today and is mostly driven by misuse and overuse of antibiotics. Reducing inappropriate antibiotic consumption is the aim of antibiotic stewardship (ABS). Pharmacists are in an ideal position to act as antibiotic stewards. A bespoke clinical digital application was developed to support ABS surveillance and enable pharmacists to identify and manage high risk antibiotics to ultimately reduce inappropriate antibiotic use across multiple private hospitals in South Africa.

Method: An infection management electronic tool (IMT) was developed to integrate antibiotic dispensed data, laboratory results and the hospital information system with the application of business rules and algorithms to identify patients that may require intervention on their antibiotic treatment. IMT is a web application inclusive of a rule engine that creates notifications for pharmacists to identify high-priority patients requiring possible intervention. IMT was developed using Agile methodology and a minimal viable product was delivered in 42 two-week sprints. Improvement

of the system continues with a further 25 sprints completed by January 2024.

Results: The system was implemented across 46 hospitals in August 2022 after a month-long training period. Since inception to 31 January 2024, pharmacists have collectively reviewed 154 071 antimicrobial prescriptions from 78 642 patients and attended to 443 845 notifications. This resulted in pharmacists advising on 20 069 modifications to therapy of which 78.13% was accepted by physicians. The system also supported the reduction in overall antibiotic consumption measured in Defined Daily Dose (DDD) per 100 bed days from 2022 to 2024 by 6.22 DDD's.

Conclusion: The implementation of the application demonstrated a positive impact on antibiotic consumption and allowed pharmacists to intervene on high-priority patients with improved clinically sound recommendations.

Development of a study protocol for a cross-sectional evaluation of adherence in patients with advanced breast cancer taking CDK inhibitors

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Background: Adherence to treatment is pivotal for favourable outcomes in advanced breast cancer, yet it remains challenging due to multifaceted factors, including patient attitudes, and the complexity of therapies such as CDK inhibitors (CDKI). Limited data exist on adherence to newer therapies like CDKI, underscoring the need for a deeper understanding of adherence and its correlation with drug levels and influencing factors.

Purpose: This study aims to assess adherence to CDKI through direct and indirect methods while investigating associated factors and drug blood levels.

Method: Informed by pilot study results (Bakovic et al, 2023) and a literature review, the study adopts a cross-sectional, observational design and defines data collection and CDKI plasma concentration determination. Inclusion criteria encompass patients aged 18 and above with metastatic advanced breast cancer, undergoing CDKI therapy for over 8 days, and proficient in the Croatian language. Data collection involves patient interviews, medical record review, and the utilisation of validated scales (MARS-5, BMQ, and BDI-II) to gather sociodemographic, medication history, clinical, adherence, and psychological data. Blood samples are collected, centrifuged, and stored for analysis of CDKI concentration using liquid chromatography-mass spectrometry (Turkovic et al, 2022). Collection occurs during a steady state of drug concentration within the monthly treatment cycle (9-21 days for palbociclib and ribociclib, 6-30 days for abemaciclib). Patients are monitored over 6 months, attending monthly outpatient clinic visits for check-ups and blood sample provision.

Results: Anticipated findings will provide evidence on adherence among women with advanced breast cancer using CDKI, informing recommendations for CDKI therapy management and adherence improvement. Direct and indirect measures of adherence will gather evidence on effective therapy monitoring method, while analysing association of adherence with various variables will enhance understanding of patients taking CDKI.

Conclusion: The study protocol describes a rigorous methodology for assessing adherence to CDKI in patients with advanced breast cancer. By elucidating adherence patterns and associated factors, this research will contribute to improvement of therapy outcomes in patients taking CDKI.

Active drug safety monitoring and management in children prescribed new and repurposed medicine for drug resistant tuberculosis in KwaZulu Natal, South Africa

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Background: Since 2016, the World Health Organisation recommended an injectable-free regimen for children with non-severe TB disease, and in 2018 an all-oral regimen for the majority of people living with MDR-TB. WHO reprioritised second line medicine into Group A, B and C based on new emerging evidence of safety and efficacy.

Although the data supporting this drug re-classification largely came from adults, the principles of regimen design also apply for children. Few studies have documented adverse events in children that received new (Bedaquiline, Delamanid) and repurposed medicine as part of drug resistant tuberculosis regimens. Therefore, this objective was to report adverse events in children <15 years receiving new and repurposed medicine for DR-TB.

Methods:

Retrospective review of children <15 years receiving treatment for DR-TB between 2018 - 2020 at a centralised DR-TB hospital in KwaZulu Natal, South Africa. Medicine

prescribed, dose, adverse event and outcomes was extracted from the clinical folders and are presented.

Results:

A total of 142 children were included for analysis. One hundred and four (73%) children were HIV negative. Ninety-five percent (n=135) of children had a successful treatment outcome. However, ninety-two percent (n=131) children experienced at least one side effect during the course of their TB treatment, regardless of treatment regimen. The most common adverse event was hypothyroidism (53.52%), rash (40.14%), nausea and vomiting (27.46%) and visual problems (9.86%). Most adverse events were grade 2 and below and was treated with adjuvant medicine, however a few children experienced grade 3 or 4 adverse events that required changes in regimen.

Conclusion:

A high rate of mild side effects was noted in children with drug-resistant TB receiving new medicines including Bedaquiline and Delamanid. Excellent treatment outcomes were observed in this cohort. Urgent attention must be given to pediatric-specific TB regimens to decrease side effects in this vulnerable population.

Impact of the implementation of a pharmaceutical care and clinical pharmacy programme in a public mental health hospital in Argentina

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Background: Mental illnesses represent one of the top ten causes of the overall global disease burden.

Although effective pharmacological and non-pharmacological treatments are available, more than 75% of people in low and middle-income countries receive no treatment. In addition, for those patients who receive treatment, it is often not considered optimal. This gap often includes the absence of effective collaboration between different healthcare specialists.

The Argentinian Mental Health Law underscores evidence-based treatment and interdisciplinary collaboration as crucial for optimal outcomes, emphasising the role of hospital pharmacies and specialised pharmacists in ensuring medication provision, promoting adherence, preventing adverse effects, checking drug interactions and promoting interdisciplinary work, activities, which the authors measure as interventions.

In Argentina, this pharmacist's role is still poorly developed in Mental Health Hospitals.

Objectives: implement a pharmaceutical care and clinical pharmacy programme, with the main objective of improving the results of pharmacological mental health treatments, promote a rational use of medications with the best cost-effectiveness ratio, resolve and prevent Drug-Related Problems (DRP) and develop clinical pharmacy and pharmaceutical care in Argentinian Hospitals.

This programme consists of a pharmacist's active role in medical rounds and treatments, also interaction with the interdisciplinary team and patients.

Methods: A descriptive and observational study was conducted by the pharmacy team at a public Mental Health Hospital in Buenos Aires, Argentina, since 2020. Pharmaceutical interventions were recorded, along with the evolution of medication usage and its economic impact on the pharmacy's annual budget. Interventions were carried out for both inpatients and outpatients, documented in spreadsheets, and analysed monthly.

Results: The implementation of the programme led to increased pharmaceutical interventions, particularly in reactive interventions, and improved utilisation of psychotropic drugs.

After 3 years the authors observed: 35% less use of lorazepam, 47% less use of pregabalin, 38% less use of sodium valproate, a reduction of 60% use of clotiapine and a 50% decrease in haloperidol consumption. Is very important to mention that during the same period the hospital experienced a sustained increase in the number of assisted patients (53% more patients in 2023 compared to 2020).

These reductions resulted in cost savings, enabling the inclusion of 52 new active principles in the pharmacy's vademecum within the existing budget, enabling a better integral board of patients' problems.

Conclusions: The study highlights the crucial role of pharmacists in interdisciplinary mental health teams and demonstrates the pharmacy's contribution to optimising healthcare resources. Incorporating specialised pharmacists into mental health treatments can lead to improved medication management and cost-effective care delivery.

Assessment of medication adherence among hypertensive patients in Asokoro District Hospital, FCT, Nigeria

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Introduction: Medication adherence is very important for a successful management of chronic diseases like hypertension. Failure to adhere to antihypertensive drug regimen can lead to treatment failure, increased healthcare cost and hospitalisation.

Objectives: The aim of this study is to determine the level of adherence among hypertensive patients in Asokoro District hospital, Abuja and the various factors that can affect adherence.

Methods: The study was carried out in the medical out-patient department of Asokoro, District Hospital, Abuja. A cross sectional study of 260 participants were administered self-structured questionnaires using the Hill-Bone Compliance scale and Morisky medication adherence scale. The data was analysed using Statistical Packages for Social Sciences version 29. Descriptive statistics in percentages was used to analyse demographic data. Inferential statistics (Spearman rank correlation) was used to examine the relationships between adherence and perceived barriers to adherence.

Results: The medication adherence derived from the Hill-Bone scale was 19.02% and 42.1% from the Morisky adherence scale. Both the two scales gave a low level of adherence. There was significant relationships ($p < 0.05$) between factors; religion, prescription pattern, duration of treatment, appointment periods with adherence.

Conclusion: The level of adherence measured in the study (19.02% and 42.1%) was low using the two methods. Certain factors which can hinder adherence such as prescription patterns, duration of treatment, educational level, number of pills and appointment periods showed significant correlation with the adherence measured.

Dapagliflozin short-term use: Effects on renal function and electrolyte balance

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Introduction: Sodium-glucose cotransporter-2 inhibitors (SGLT2i) are a class of antidiabetic drugs used for the treatment of type 2 diabetes mellitus (T2DM), and these drugs are currently also used in the treatment of heart failure with reduced ejection fraction and chronic kidney disease, preventing its progression. They act by impeding renal glucose reabsorption and promoting urinary glucose excretion, through the inhibition of the glucose high-capacity transporter SGLT2 located in the proximal convoluted tubule. This distinctive mechanism of action operates independently of insulin and is contingent upon blood glucose levels, concurrently enhancing sodium elimination. However, short-term concerns regarding its impact on renal function and electrolyte balance exist. This study aimed to evaluate the short-term effects of dapagliflozin on renal function and electrolyte balance in patients newly prescribed the medication.

Method: A retrospective analysis of 246 patients who initiated dapagliflozin therapy was conducted. Serum creatinine, sodium, and potassium levels were measured at baseline (before dapagliflozin) and 5-8 days after initiation (endpoint). Wilcoxon signed-rank test, Pearson's chi-square test, and Fischer's exact test were used for data analysis.

Results: Glycemia and sodium levels were significantly higher at baseline compared to the endpoint ($p < 0.001$). Conversely, creatinine and potassium levels were significantly higher at the endpoint than at baseline ($p < 0.001$). The prevalence of hyponatremia and hyperkalemia increased at the endpoint (17.5% vs. 10.2% and 16.7% vs. 8.9%, respectively). Although not statistically significant, a trend towards increased hyponatremia with co-administration of furosemide was observed ($p = 0.089$). No significant association was found between potassium-sparing medications ($p>0.05$) and hyperkalemia, except for angiotensin receptor blockers ($p = 0.017$). The combination of dapagliflozin and furosemide significantly increased the risk of acute kidney injury (AKI) at the endpoint ($p = 0.006$). Age, gender, and chronic kidney

disease status did not significantly influence the occurrence of AKI, hyponatremia or hyperkalemia (p>0.05).

Conclusion: This retrospective study provides valuable insights into the short-term effects of dapagliflozin on renal function and electrolyte balance in patients with T2DM. Dapagliflozin demonstrated effectiveness in reducing blood glucose levels within the initial days of treatment, affirming its role as a rapid-acting antidiabetic agent. However, concerns regarding renal safety were evident, with a significant increase in blood creatinine levels post-dapagliflozin administration, necessitating close monitoring of renal function in clinical practice, particularly in the first few weeks after starting dapagliflozin.

SGLT2i and GLP1 RA effects in clinical practice

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Introduction: Sodium-glucose cotransporter 2 inhibitors (SGLT2i) and glucagon-like peptide-1 receptor agonists (GLP1 RA) represent two recent classes of antidiabetic drugs that have seen a significant rise in usage in recent years. SGLT2i function by inhibiting the action of the sodium-glucose cotransporter 2 in the kidney, thereby promoting glycosuria, while GLP1 RA act by stimulating insulin secretion, suppressing glucagon secretion, and reducing gastric emptying. The increasing use of these antidiabetic drug classes has prompted investigations of their potential benefits in treating other conditions beyond diabetes. Notably, studies have explored their benefits in heart failure (HF) with reduced ejection fraction and in slowing the progression of chronic kidney disease (CKD) with the SGLT2i, as well as in addressing obesity or hepatic steatosis with GLP1 RA. This retrospective study aimed to investigate the effects of sodium-glucose cotransporter 2 inhibitors (SGLT2i) and glucagon-like peptide-1 receptor agonists (GLP1 RA) in patients with type 2 diabetes mellitus (T2DM) in clinical practice.

Method: A total of 340 patients under care at the hospital diabetology consultation were included. Data on age, gender, antidiabetic medications, and bioanalytical parameters were collected at baseline and one year later. Parameters analysed included estimated glomerular filtration rate (eGFR), blood sodium and potassium levels, blood pressure, weight, cardiovascular risk, and glycated hemoglobin (HbA1c).

Results: Patients treated with SGLT2i exhibited a significant improvement in eGFR at the endpoint compared to baseline (p = 0.006). Long-term SGLT2i use did not impact blood sodium or potassium levels. Both treatment groups experienced reductions in systolic blood pressure at the endpoint; however, the reduction was more pronounced in patients treated with SGLT2i (p = 0.0002) compared to those treated without SGLT2i (p = 0.032). GLP1 RA treatment resulted in a statistically significant weight reduction from baseline to endpoint (p < 0.0001), with a higher percentage of patients achieving ≥5% weight loss compared to the non-GLP1 RA group (33.6% vs. 19.8%). Both SGLT2i and GLP1 RA treatments significantly reduced cardiovascular risk scores at the endpoint (p = 0.004 and p = 0.002, respectively). Additionally, both treatments were associated with a significant reduction in HbA1c levels at the endpoint (p = 0.010 and p = 0.002, respectively).

Conclusion: This study provides compelling evidence of the valuable insights of the ef-ficacy of SGLT2i and GLP1 RA in managing patients with T2DM. Both drug classes demonstrated significant benefits, including improvements in kidney function, BP, weight reduction, and cardiovascular risk. These findings reinforce the growing body of evidence supporting the use of SGLT2i and GLP1 RA as integral components of the treatment armamentarium for patients with T2DM. However, further prospective studies involving larger and more diverse patient cohorts are essential to elucidate their long-term effects and to optimise individualised treatment strategies.

Pharmacist led antimicrobial stewardship programme in 2 tertiary hospitals in Malawi

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Ultimate goal of Antimicrobial Stewardship (AMS) programmes is to decrease occurrence and spread of Antimicrobial Resistance (AMR). The approach in achieving this cannot be universal, but country specific strategies determined by capacity and other resources available at the health facility would be invaluable. The Global Point

Prevalence Survey (GPPS) is one of the tools which would be used for gathering data for AMS as well as informing precise country AMR prevalence. In two referral hospitals in Malawi, GPPS has indicated a fair prevalence of antibiotic use in different hospital wards relative to African region. Ceftriaxone remains the most used antibiotic across the hospital wards for different bacterial infections. There is need for more practical interventions to improve the AMS programmes in Malawi. The most adoptable intervention with regard to Malawian hospitals is the on job trainings for the implementation and monitoring of AMS programmes. Training all health cadres at a health facility proved to be significant in improving AMR awareness in health care facilities by utilising locally developed toolkit.

Cost-benefit analysis of an antimicrobial stewardship programme in a cancer setting in Qatar

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Introduction: Infection is a typical consequence of cancer treatment due to its immunosuppressive nature, and the required high use of antibiotics raises the risk of antimicrobial resistance (AMR). AMR is projected to incur a global economic cost ranging between (United States dollar (USD) 300 billion and USD 1 trillion by the same. The primary objective of Antimicrobial Stewardship Programme (ASP) is to optimise clinical outcomes, ensure cost-effective antimicrobial therapy with minimal adverse events, and reduce the emergence of resistance. This study aimed to compare the economic advantages of using a preliminary ASP versus a developed ASP in specialised hematology/oncology settings in Qatar.

Method: The research investigated the economic benefits of employing a preliminary ASP versus a developed ASP from the perspective of a public healthcare hospital. preliminary ASP was defined as the 12 months following the establishment of the ASP (i.e., May 1, 2015, to April 30, 2016), while developed ASP was defined as the most recent 12 months of ASP implementation at the National Center for Cancer Care and Research (NCCCR) (i.e., February 1, 2019, to January 31, 2020). Patient records were retrospectively reviewed.

Results: The total economic benefit of ASP maturity was calculated as the sum of the cost savings and the cost avoidance associated with the service, minus the operational cost. A total of 186 patients were included in the study: 81 for preliminary ASP use and 105 for developed ASP use. The benefit-to-cost ratio was 640. The net benefit due to ASP development was QAR 13,230,794 (USD 3,624,875). The robustness of the results is demonstrated by the sensitivity analysis.

Conclusion: This study underscores the multifaceted benefits of ASP development in healthcare settings particularly in hematology and oncology practice settings at Hamad Medical Cooperation.

Comparative analysis of antimicrobial usage between outpatient and inpatient settings at Malindi Sub County Hospital: a prevalence study

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Introduction: Antimicrobial resistance (AMR) poses a global threat to health and sustainable development, causing significant harm and economic impacts. Annually, AMR contributes to almost 5 million deaths as per WHO, largely due to inappropriate use of antimicrobials and a need for evidence-based efforts to control the emergence and spread of AMR.

Objectives: To determine the prevalence of antibiotics usage among outpatients and inpatients at Malindi Sub county hospital (MSCH)

To compare the types and classes of antibiotics prescribed in outpatient versus inpatient settings.

Method: Baseline surveys at MSCH assessed antimicrobial use (AMU) through a Rational Drug Use (RDU) at the outpatient department (OPD) and a Point Prevalence Survey (PPS) among inpatients. Using systematic random sampling, 600 prescriptions from MSCH between July 2021 and June 2022 were collected, representing every tenth prescription out of the 6,006 received at the outpatient pharmacy during that period. Additionally, details of antimicrobials prescribed for all inpatients were extracted from patient files on a specific day using a standard PPS form.

Results: Outpatient adult prescriptions were 72% higher than pediatric ones, with 10% more female patients. On average, each patient received 2.4 medicines, half of which were antimicrobials. Among these, 78% had one antibiotic, 21% had two. The top five antimicrobials made up 75.5% of usage,

led by Amoxicillin at 20.1%, followed by Amoxicillin/clavulanic acid and Metronidazole at 16.2%.

Inpatients occupied 60.7% of the beds with 122 admissions out of 201. There were 133 prescribed antimicrobials, with 38% using a single antibiotic and 62% using two. The most common antimicrobials were ceftriaxone (31%), metronidazole (19%), and gentamicin (13%). Antibiotic consumption analysed by WHO AWaRe showed 58% in Access, 42% in Watch, and 0% in Reserve. Intravenous administration constituted 90% of all prescriptions (n=120).

Conclusion: Analysis by WHO AWaRe, highlights high percentages in use of Watch category antibiotics, highlighting the need for careful monitoring. Intravenous prescriptions dominate among inpatients, suggesting a need for an intravenous to oral switch policy. The baseline assessments emphasise the importance of monitoring of prescription practices. It's crucial for rational drug use, better patient care, and shaping facility guidelines, protocols and policies against AMR.

Use of non-prescription medicines among adolescents and young adults living with HIV receiving antiretroviral therapy at the Korle Bu Teaching Hospital, Accra

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Background: Certain factors have been found to have influence on use of Antiretrovirals among Adolescents and Young adults living with HIV. These factors tend to encourage the use of other non-prescription medicines among them, which may adversely affect their treatment outcomes.

Objectives: To determine the prevalence of non-prescription medication use among adolescents and Young adults living with HIV attending the HIV clinic, by determining their socio-demographics and clinical characteristics and identifying any association between these characteristics.

Methods: A cross-sectional study with a quantitative approach was employed in this study among 214 participants with an age range of 10 to 24 years. Data collected were cleaned and analysed using STATA version 16. Descriptive statistics was presented by finding percentages and frequencies of key socio-demographic variables and clinical characteristics. A binary logistic regression model was used to determine the factors associated with the use of non-prescriptions.

Results: More than half (56.1%) of the participants (mean age of 20years + 2.9) reported the use of non-prescription medicines. Most of the participants (70%) used analgesics and herbal preparations (20%), which was mostly influenced by family members.

Father's HIV status and orphan with both parents dead, were significantly associated with the use of non-prescription medicines ($p < 0.05$).

Conclusion: Analgesics and herbal preparations are mostly patronised under the influence of family members and significantly associated with gender, marital status, father's HIV status and orphan status.

Assessment of uptake and challenges for effective uptake of intermittent preventive treatment of malaria and tetanus toxoid vaccine among pregnant women in a Nigerian tertiary hospital

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Background: Morbidity and mortality from malaria and tetanus infections have been a global health concern among pregnant women, especially in malaria-endemic continents like Africa. These infections are highly preventable through WHO-recommended intermittent preventive therapies during pregnancy. The uptake of these preventive remedies remains questionable among pregnant women in developing countries. This study aims to assess the uptake and challenges to effective uptake of intermittent preventive treatment (IPT) (malaria and tetanus) among pregnant women at a Nigerian tertiary hospital.

Method: A structured self-administered questionnaire which was interviewer administered for non-literate groups was used to generate information from the pregnant women. Key informant interview was used on the Personnel (Nurses) involved in providing the two preventive services in the study hospital.

Results: Two hundred and eighty-six pregnant women (clients) and 6 Nurses participated in the study. The mean age of client participants was 30 ± 5.7 with mean pregnancies of 2.7 ± 1.6. More than 74 % and 83 % of the pregnant women received the malaria and tetanus preventive services

respectively. Only 12.2 % received the minimum required uptake of malaria IPT while 68.5 % received the minimum required doses for tetanus toxoid vaccination. Major challenges to the effective uptake of malaria IPT were Poor awareness of the availability of malaria intermittent preventive services by pregnant women (71.7 %) and for the key informants, non-stocking of the malaria IPT drug in the antenatal clinic (100.0 %). For effective uptake of Tetanus Toxoid vaccine, 'Out-of-pocket' travel expenses (100 %) and Poor awareness of TT immunisation services (69.5 %) were the major challenges reported by the pregnant women and the care providers respectively.

Conclusion: There was good utilisation of both malaria IPT and Tetanus toxoid vaccination services; however, there was poor uptake of the required doses for optimal protection of both preventive services among pregnant women in the study facility.

Drug therapy problems among critical care patients at a teaching hospital in South Eastern Nigeria: A retrospective assessment

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Background: Drug therapy problems (DTPs) are often associated with mortality, morbidity, and poor patient outcomes in critical-care patients, posing a huge challenge to healthcare providers. There are scanty reports of DTPs among critical-care patients in developing countries like Nigeria. This study aims to determine the extent of DTP occurrence and drugs involved in DTPs identified among critical care patients at a tertiary hospital in Nigeria.

Method: A systematic random sampling technique was employed to select and review medical records of patients admitted into Critical Care Units (CCUs) over the previous six months. DTPs were characterised based on the Pharmaceutical Care Network Europe Drug-Related Problem (PCNE-DRP) classification version 9.1. Potentially inappropriate drugs used in the elderly were identified using Beers Criteria, 2023. Findings were summarised using descriptive statistics in SPSS version 20.

Results: Medical records of 201 patients admitted into the Accident & Emergency (62.7%), Children Emergency (29.9%), and Intensive Care (7.5%) units of the study hospital were reviewed. The patients were largely male (61.2%), aged under 40 (63.2%), and in the CCUs for at most 2 weeks (78.6%). DTPs were identified in 148 (73.6%) of the records, yielding 284 specific DTPs, ranging from drug selection problems (147, 51.9%) to therapy failure (10, 3.5%). Inappropriate drug therapy was the major drug selection problems identified (13.7%), while lack of dose adjustment due to pharmacokinetic considerations were the least under dose selection problems (0.3 %). DTP occurrence was dependent on admission duration (X2=11.365, p = 0.003) and degree of polypharmacy (X2=96.34, p = 0.024), but independent of CCU of admission (X2=0.435, p = 0.805). Anti-infective drugs (106, 51.2%), predominantly antibiotics (83, 40.1%) were most commonly associated with DTPs.

Conclusion: DTPs are very common among critical care patients, and are commonly associated with inappropriate drug therapy, polypharmacy and antibiotics. To reduce DTPs, Pharmacists should play important roles in identifying and resolving DTPs through direct communications with the patients, as well as other healthcare providers. Current strategy involves the Comprehensive Medication. Management Services which focuses on identification, resolving and preventing DTPs through the pharmacists. The approach requires that all of the medications be evaluated for effectiveness, appropriateness, compliance, effectiveness and safety.

Extent and trend of cardiovascular mortality in two tertiary hospitals in Nigeria

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Background: Cardiovascular disease (CVD) is known as the leading cause of global death. CVD alone is responsible for more deaths in low income countries than infectious diseases, maternal and perinatal conditions, and nutritional disorders combined. There are limited reports on the CVD burden in developing country. This research aims to perform a comparative analysis of the trends and patterns of cardiovascular mortality in two tertiary hospitals in Nigeria.

Method: This study utilised data from deaths recorded in the hospital death registry for all deaths associated with cardiovascular diseases from 2016 to 2023 of all ages. The data was analysed using descriptive statistics such as mean, standard deviation, frequency, percentages and cross tabulations.

Results: 301 deaths were recorded due to cardiovascular disease. The average age of the population was 65 years and was predominantly female (75.1%). The major CVD in the

population that led to mortality in both hospitals was hypertensive heart disease (35.2%) while the least was angina (10%). In terms of treatment, Angiotensin Converting Enzyme Inhibitors (ACEIs) were the most commonly used treatment (25.2%), while Calcium Channel Blockers + Diuretics and Beta-blockers + Diuretics/ACEIs were the least (5.0%). The highest mortality relating to CVD occurred in 2023, with 120 deaths (39.9%) while 2019 had the least with 13 deaths (4.3%).

Conclusion: A larger percentage of women die due to cardiovascular disease. There has also been recent surge in cardiovascular related death in the two tertiary hospitals. There is need to take cardiovascular complaints among women seriously.

Antibiotic susceptibility patterns of bacterial isolates from routine clinical specimens from secondary healthcare facilities in Ghana: A retrospective study

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Background: Antimicrobial resistance (AMR) has become a major global health threat, especially in sub-Saharan Africa where the burden of infectious disease is high. In Ghana, the prevalence of resistance to common and affordable antibiotics is above 70%, according to a 2011 study by Mercy Newman and others. Despite the high prevalence, awareness of antimicrobial resistance among people is still very low. Periodic surveillance and development of local antibiograms is fundamental to the detection and control of resistant microbial strains in healthcare facilities. The study sought to evaluate the antibiotic sensitivity of pathogenic bacterial isolates from patient samples in regional and district hospitals in the Volta region, Ghana.

Method: A retrospective cross-sectional study was conducted using data obtained between January to December 2023 from Volta Regional Hospital, Hohoe and Margret Marquart Catholic Hospital, Kpando. Bacteria were isolated from sputum, blood, urine, and wound samples from 293 patients using various selective media. The isolates were confirmed utilising the Vitek 2 system and routine biochemical assays. Culture and sensitivity data on assays performed using the Kirby Bauer disc diffusion method guided by breakpoint values of the Clinical and Laboratory Standards Institute (CLSI-2022) were extracted from the hospitals' Health Information Systems and analysed using WHONET.

Results: The most prevalent organisms isolated from the 293 samples from both facilities were Staphylococcus aureus (23.9%), Escherichia coli (21.2%), Klebsiella oxytoca (8.9%), Staphylococcus saprophyticus (5.8%), Klebsiella spp.(5.1%), Streptococcus pyogenes (5.1%) and Pseudomonas aeruginosa (3.4%). The isolates were most resistant to amoxicillin/clavulanic acid (n=108, 95% CI[94.2-100]) , meropenem (n=96, 95% CI [89-99]), cefuroxime (n=99, 95%CI[84-96]) and piperacillin (n=56, 95% CI[75-94]). Amikacin (n=178, 95% CI[6.7-16.4], gentamycin (n=231, 95% CI[22-34]) and levofloxacin (n=182, 95% CI[23-37] were the most active antibiotics against all the isolates obtained from both facilities. Amikacin and gentamicin were however very effective antibacterial agents against pathogenic isolates from the Margret Marquart Catholic Hospital than those isolated from the Volta Regional Hospital, Hohoe.

A high prevalence of multidrug resistant (MDR), extensively drug resistant (XDR) and Pandrug resistant (PDR) strains of S. aureus, E. *coli*, and *Pseudomonas aeruginosa* were identified from the patient samples. Sixty percent (60%), 59% and 10% of the S. aureus isolates were MDR, XDR and PDR respectively while 30% of the *Pseudomonas aeruginosa* isolates were MDR, XDR and PDR. Seventy four percent (74%) of the E. *coli* isolates were XDR strains. There was a high prevalence of ESBL-producing (n=93) and carbapenem resistant Enterobacteriaceae (n=34). Cefotaxime (n=14), ceftriaxone (n=35) and meropenem (n=12) resistant strains of Escherichia coli were prevalent while most of the Staphylococcus aureus isolates were resistant to tetracycline, ampicillin and vancomycin.

Conclusion: The study thus highlights the presence of high priority resistant pathogens of public health significance to varied antibiotic groups and directs the need for continued sureveillance and antibiotic stewardship efforts in the study healthcare facilities.

Development, validation, and testing of the O-Palm tool for evaluating the economic significance and impact of pharmacist interventions in a teaching hospital in Ghana

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Introduction: Ward-based clinical pharmacy practice is now common in Ghana. The practice includes well-documented and published pharmacist interventions (PIs) to provide evidence of the clinical activities of pharmacists in general. In an era of limited resources, pharmacists must demonstrate the additional value of clinical pharmacy services (CPSs), and PIs in particular, to improve the quality and value of health care outcomes.

To determine the significance of (PIs), a variety of methods, tools, and instruments are utilised. However, most of these instruments are created and utilised in the developed world, with a sophisticated system of approach that is impractical in the developing world with significant resource constraints.

Therefore, an Objective-Pharmacists Algorithm Model, or O-PALM tool, could be an easy tool to utilise in resource-constrained settings to quantify the economic impact of pharmacists' interventions based on the principles of pharmacoeconomic evaluations

Aim: To develop, validate, and test the feasibility of the O-PALM tool for evaluating economic impact of PIs in hospital settings

Method: A novel O-PALM mono-dimensional tool for evaluating the economic impact of PIs was developed and validated by a review of current tools in pharmacy literature. Evaluation models of healthcare interventions and PI practice inputs were also reviewed. A group of raters known as the "Korle Bu clinical pharmacy expert group" mainly made up of clinical pharmacists from various categories of specialisation used the O-PALM tool, a 7-level Likert scale questionnaire (completely disagree=1, disagree=2, more or less disagree=3, undecided=4, more or less agree=5, agree=6, completely agree=7) to test and express levels of agreement with the content of the tool. They also assess its recommendations and outcome suggestions. Their ratings were used to assess the tool's inter-rater reliability and validity.

Results: The O-PALM tool was utilised by 30 raters and they evaluated 68 PIs with 17 (57%) of raters were female. The departments of medicine and surgery both had 6(20%) raters with (14 PIs) followed by the child health department and the polyclinic which had 5(16.60%) raters with (10 PIs) each. There were 4(13.40%) raters with (10PIs) each from the Obstetrics and Gynecology, the Eye, Ear Nose & Throat departments.

In terms of content agreement or satisfaction, a significant majority of 22 (73%) of raters agreed to recommend the O-PALM tool to their friends and colleagues, 22 (73%) of raters, agreed that is both educational and interventional, 23 (77%) of the raters, agreed that O-PALM tool was suitable for evaluating PIs. A vast majority of the raters, ratings ranged from good to excellent, 9 (30%) as good, 10(33.4%) as very good, and 4(13.4%) rated the O-PALM tool as excellent.

The overall inter-rater reliability was a slight agreement for the O-PALM tool amongst the various categories of pharmacists (agreement 76.6%; k=0.02)

Conclusion: The O-PALM tool is a mono-dimensional tool that provides real economic effect of PIs that has been developed and validated. It is reliable, reproducible, and easy to utilise in ordinary clinical pharmacy practice in resource-constrained hospital setting.

The pharmacist: Architect of comprehensive care for patients with chronic diseases in Argentine hospitals

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Introduction: High blood pressure (HBP) and diabetes (DBT) are chronic diseases that require promoting awareness about the importance of their control and prevention due to the serious complications they can cause, such as the development of cardiovascular diseases, kidney failure, retinopathy, amputations and death among others. In Argentina 1/4 adults have HBP, while 1/10 people aged 18 years or older has DBT.

Method: It corresponds to an analytical, longitudinal, retrospective, experimental study, carrying out a non-randomised controlled clinical trial. It began on April 2023 with the recruitment of patients with DBT / HBP, both in hospital services and in the field, registering more than 180

patients. A form was completed with their personal data and a survey on risk factors, providing a ranking of the most urgent people to be treated, who were scheduled for medical consultation, getting in there with their first control realised (age, weight, height, BMI, abdominal circumference, control, blood pressure and glycemia). The Health Agent entered, with prior consent, into the consultation in order to digitally record the medical interrogation, including a family chart. Prevention and promotion were carried out during the consultation by providing a notebook to record daily blood pressure/glycemia values. Before leaving the consultation, the different shifts requested by the physician were provided, for instance: laboratory, phlebology, nutrition, ophthalmology, pharmacy, vaccination, among others. Once the results of the different specialties were received, the patient was scheduled again, the treatment redesigned and monitored for a minimum of six months.

Results: 51/180 patients were classified as high risk. 28/51 patients cited, attended the consultation. 67% between 51 and 70 years old, 56% female. DBT + HBP: (26), just HBP (2). Consultations requested: Laboratory tests (28), phlebology (28), nutritionist (28), pharmacy (28), vaccination (21), ophthalmology (18), others (26). Outside consultations: Weekly group psychotherapy (5), Diabetology (3), Urology (2), Cardiology (2), others (3). Risk factors founded: sedentary lifestyle, overweight, obesity, hereditary history, lack of knowledge about risk factors and self-medication.

The feedback of the patients was very positive. In general they felt accompanied and mainly they noted the improvements after undergoing the redesign of their treatment and/or starting it for the first time.

Regarding the control group that did not attend the appointment, some of them showed a very unfavorable results.

Conclusion: The design plan for this project, prepared entirely by the pharmacist, demonstrated that the pharmacist is not only an integral member of the healthcare system, but can promote inclusive policies, achieving health equity and optimising the allocation of healthcare resources in benefit of better patient outcomes.

Pharmaceutical care interventions: A tool for building interprofessional collaboration in two public healthcare institutions in Osun State

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Introduction: Pharmaceutical care is a collaborative process aimed at identifying and preventing or resolving medication and health related problems. Evidences have shown that multidisciplinary team approach to healthcare where pharmacists take on the responsibility of identifying, preventing and/or resolving Drug Therapy Problems (DTPs) is highly effective at improving care outcomes. The degree of collaborative practice between physicians and pharmacists varies from region to region. In West Africa sub-region and with particular reference to Nigeria, collaboration between physicians and pharmacists is minimal, fragmented, and largely undefined, hence the basis for this study. The study objective is to assess the effect of pharmaceutical care interventions on inter-professional collaboration in two public healthcare institutions in Osun State.

Method: This study was conducted in two public hospitals in Osun state, Nigeria - the State Specialist Hospital, Asubiaro (SSHA), Osogbo and University of Osun Teaching Hospital (UTH), Osogbo utilising mixed methods. Six Focus Group Discussions (FGDs) with physicians (n=52) and pharmacists (n=31) were held separately. A descriptive cross-sectional study was also carried out among 28 physicians and 29 pharmacists using semi-structured questionnaire. Descriptive statistics encompassing techniques such as frequency distributions, percentages, and measures of central tendency were used in analysing the results. Ethical approval was obtained from the State Ministry of Health and the ethical committee of UTH.

Results: All the pharmacists (100.0%) had encountered prescription errors that required interventions; and 26 (89.7%) encountered at least one DTP in the last three months. Twenty-three physicians (82.1%) had been contacted by pharmacists for a medicine related problem. Dose/dosage adjustment accounted for 39.3% of the

requests. Writing at the back of prescriptions was indicated as the major (96.4%) means of communicating DTPs. Majority (82.1%) of the physicians were of the opinion that communication of DTPs could enhance inter-professional collaborations.

Themes from the Focus Group Discussion showed that to err is truly human. There have been some levels of collaborations between pharmacists and physicians, though poor. Writing of interventions at the back of prescriptions is very common but not acceptable to the physicians because of confidentiality and medico-legal issues. Most physicians demonstrated ignorance about some pharmaceutical care services while there was also a need for some pharmacists to be up-to-date in their knowledge of drugs. Physicians desire better collaborations with pharmacists but would appreciate mutual respect (communication skills) and adequate job description. It was agreed that joint clinical meetings and presentations should be held constantly to bridge knowledge gaps and joint ward rounds should be instituted to improve collaborations between physicians and pharmacists.

Conclusion: Prescription errors are commonly encountered and pharmacists have been intercepting them through pharmaceutical care interventions. There is no standardised method of communicating interventions in the facilities. Most of the methods and media used currently in communicating DTPs have negative effects on inter-professional collaborations. Joint activities and good communication skills would enhance inter-professional collaborations between pharmacists and physicians whenever interventions are made. Joint clinical meetings, presentations and ward rounds have been agreed upon to update knowledge and improve collaborations.

Assessment of guideline compliance in the treatment of community aquired pneumonia in a primary care facility in Ghana, 2023

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Introduction: Local evidence-based standard treatment guidelines (STG) are important tools in the fight against antimicrobial resistance. Adherence to these guidelines enable healthcare providers to deliver consistently appropriate diagnosis and treatment and reduce irrational use of antimicrobials. Guideline adherence is also seen as a practical way to measure and improve the quality of current and future prescribing in order to reduce morbidity, mortality and healthcare costs. In Ghana, the STG recommends treating community acquired pneumonia (CAP) based on the severity score (CURB SCORE). For ambulatory patients with low severity score, high dose amoxicillin plus azithromycin is recommended as first line treatment. Erythromycin is used if patient is allergic to penicillin and cefuroxime or doxycycline is used as second line treatment. The authors conducted a cross sectional study to assess adherence to Ghana's STGs for the empirical antibiotic treatment of outpatients with CAP in a primary care facility in Ghana.

Method: Data was extracted from the electronic medical records (EMR) of the Korle bu Polyclinic/Family Medicine Department (KBPFMD). All patients diagnosed with CAP from January to December 2023 were filtered from the database using a bespoke script run on the NodeJS framework. The extracted data included patient, age, gender, visit date, NHIS status, occupation, diagnosis, and medications prescribed. This data was then imported into Stata (version 16.0, Copyright 1985–2019, StataCorp LLC, College Station, TX, USA) for analysis.

Results: A total of 1835 patient records with diagnosis of CAP within the study period were identified. Females formed 60.0% of the population while 18.1% of the study population were children (0-18 years). 85.25 of them had valid national health insurance. The CURB score was not used to assess severity of the disease.

The overall rate of adherence to the Ghana STG was 0.5% (n = 9) for first line treatment while 3.5% were treated with the recommended second line treatment. Majority of patients (35.1%,n=645) were given the recommended treatment for hospitalised patients with more severe CAP. 34.6% of patients were prescribed with injectable antibiotics usually as stat doses. No antibiotics were prescribed for 11.1% patients while 15.2% of the study population were treated with other antibiotics. Nineteen (19) patients diagnosed with viral pneumonia were also prescribed antibiotics.

Conclusion: Adherence to CAP treatment guidelines was very poor in this study. Further investigations to unearth reasons for this poor compliance are recommended. Efforts must also be made to train and encourage prescribers to follow empirical guidelines to reduce inappropriate selection of antibiotics and thus reduce antimicrobial resistance.

Efficacy of SGLT2 inhibitors in correcting anemia in patients with Chronic Kidney Disease

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Introduction: Anemia is a common comorbidity in patients with chronic kidney disease (CKD). Severe anemia may increase patients' hospitalisation rates, decrease their quality of life, and is associated with mortality rates.

Recent studies have indicated that SGLT2 inhibitors can improve anemia in patients with heart failure and diabetes, but evidence for their benefits in patients with CKD is

currently lacking. Therefore, this study analysed the difference in hematocrit (Hct) levels in patients with CKD after starting SGLT2 inhibitors.

Method: This study is a retrospective study. Patients with CKD who started SGLT2 inhibitors between January 1, 2022, and June 30, 2023, were included. The exclusion criteria were patients lacking Hct levels collected 180 days before starting their medication and between 45 to 225 days after starting their medication. Patients without an estimated glomerular filtration rate (eGFR) collected 180 days before starting their medication were also excluded.

- CKD was defined as eGFR less than 60 ml/min/1.73m2. Patients were classified into stage 3a (45 ≤ eGFR < 60 ml/min/1.73m2), stage 3b (30 ≤ eGFR < 45 ml/min/1.73m2), stage 4 (15 ≤ eGFR < 30 ml/min/1.73m2), and stage 5 (eGFR < 15 ml/min/1.73m2) according to their eGFRs.

- Of the patients included, the authors compared their Hct levels before SGLT2 inhibitors initiation with those at three and six months after starting the medication.

Results: This study included 380 patients, with 63.1% being male and the average age being 72.9 ± 12.7 years. Among these patients, 43.9%, 35.0%, 17.6%, and 3.4% were in CKD stages 3a, 3b, 4, and 5, respectively. The SGLT2 inhibitors used were dapagliflozin (61.6%), empagliflozin (31.8%), and canagliflozin (6.6%).

- Among 302 patients with three months post-medication Hct levels, there was an average increase of 0.7% in Hct levels after three months of medication (from 37.4% to 38.1%), indicating a significant difference (p = 0.002).

- Among 258 patients with six months post-medication Hct levels, there was an average increase of 0.7% in Hct levels after six months of medication (from 36.8% to 37.5%), indicating a significant difference (p = 0.01).

- For patients in CKD stage 3a, their average Hct levels increased by 1.0% (from 39.9% to 40.9%) after three months of medication and by 1.4% (from 39.1% to 40.5%) after six months of medication, indicating significant differences (p = 0.01 and p = 0.0004, respectively).

- For patients in CKD stage 3b, their average Hct levels increased by 1.1% (from 36.6% to 37.7%) after three months of medication, indicating a significant difference (p = 0.003). However, their average Hct levels increased by only 0.8% (from 36.4% to 37.2%) after six months of medication, indicating no significant difference (p = 0.06).

- For patients in CKD stages 4 and 5, their Hct levels did not increase after starting SGLT2-inhibitors.

Conclusion: Hct levels increase in patients with CKD after starting SGLT2 inhibitors, mainly within the first three months of use. In particular, Hct levels were significantly elevated in patients with CKD stages 3a and 3b.

Description of interventions performed by pharmacists for hospitalised patients according to a vulnerability score

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Introduction: The Heart and Lung Institute – Laval University pharmacists deployed a hospital-wide care offer to optimise pharmaceutical care. They also developed a tool that allots a vulnerability score to patients according to their medication and other vulnerability factors described in the literature. Vulnerable patients are thus classified depending on their pharmaceutical care needs, whether a pharmaceutical consultation must be performed systematically (within less than a day) or in priority (between one and two days). This trial is intend to describe interventions performed by clinical pharmacists on care units according to the Institute's pharmaceutical care offer using the prioritisation tool.

Methods: This is a prospective descriptive study. Out of the 393 patients admitted between May 10th and 19th 2023, 304 were included for follow-up during their entire hospitalisation. The exclusion criterias were : visit to the emergency room only and length of stay less than 48 hours. The interventions made from the pharmacist in the central pharmacy who validate the medication orders were not included. Data were collected by pharmacists in a case report form.

Results: The pharmacists performed 1023 pharmaceutical interventions. Among the 304 patients included in the study, 184 had at least one intervention realized by a pharmacist. Among the 186 patients with a priority criteria, 135 (72,6 %) had at least one intervention by a pharmacist. For the 64 patients with a systematic criteria, 59 (92,2 %) received an intervention by a pharmacist. The number of interventions increased with the vulnerability score of the patients (p < 0.0001). The most frequent types of interventions observed were : patient's file analysis (44.3%), prescription of new medication (11.2%), medication dose adjustment (6.3%) or cessation (6.3%). The mean time to realise a first systematic or priority consultation was 1,25 days and 1,57 days, respectively.

Conclusion: The number of interventions increased with the vulnerability score of the patients. Pharmacists intervene earlier than the timeframe targeted for patients requiring a priority consultation but the delay for a systematic consultation could be optimised. The mean time to realise an intervention is shorter in more vulnerable patients according to the prioritisation tool.

Investigating patient-specific risk factors for chemotherapy induced nausea and vomiting in patients with cancer

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Introduction: Chemotherapy-induced nausea and vomiting (CINV) is the most common side effect of cancer treatment. Despite adequate antiemesis prophylaxis, the side effects remains poorly controlled. CINV decreases a patient's quality of life and affects adherence to treatment, leading to poor therapeutic outcomes. Studies have reported that patient-specific risk factors may contribute to the development of CINV. Identification of these risk factors prior to commencement of chemotherapy could decrease the incidence of nausea and vomiting experienced by patients. Comprehensive treatment regimens could potentially be developed by utilising antiemetic guidelines in conjunction with patient- risk factor assessment to further optimise antiemetic treatment regimens in high-risk patients.

Method: This study was designed to determine whether individual evaluation of patient specific risk factors for personalised antiemetic prophylaxis selection could aid in CINV treatment optimisation in a resource-constrained setting. A prescription record review and researcher administered survey was conducted among cancer patients receiving chemotherapy in an oncology outpatient facility in a large academic hospital in the public sector of South Africa.

Results: Enrolling 223 patients, the aim was to ascertain the degree of treatment-induced nausea among cancer patients undergoing chemotherapy, who were concurrently administered antiemetics according to the authorised treatment protocol at the facility. Majority of the patients were female (70.9%) and of African descent (57,0%). This study aims to delineate the prevalence of nausea and vomiting within this cohort, highlighting the disparity where nausea manifests more frequently than vomiting, often occurring independently. It was found that 91% of patients experienced nausea [acute nausea = 44.6%; delayed nausea = 46.4%] despite receiving adequate prophylaxis as indicated. Risk factors that trigger CINV including younger age, female sex, history motion/morning sickness, cycle number, alcohol consumption, smoking history, BMI, diet, sleep quality, comorbidities and use of prescription/non-prescription medications were investigated.

Conclusion: CINV still remains a significant problem in clinical practice, despite advances in antiemesis protocols. Individualised care assimilating patient specific risk factors with standard antiemetic guidelines could potentially enhance and optimise CINV management in resource limited settings. Future research should aim to include protocols for nausea relief independent of nausea and vomiting as this is an unmet need in CINV treatment due to infrequent reporting by patients.

Pharmacist-led deprescribing of potentially inappropriate medications for cancer patients in a specialist palliative care setting

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Introduction: As patients approach end of life, the focus of care shifts to comfort and symptom control, making many medications inappropriate or unnecessary due to reduced benefits and heightened risks. Despite the availability of tools to aid medication review in those with limited life expectancy, there is a lack of real-world evidence published on pharmacist deprescribing interventions in palliative care settings. Therefore, the primary objectives of this study were to determine the prevalence of potentially inappropriate medications (PIMs) among cancer patients in palliative care, the rate at which physicians implemented pharmacists' deprescribing recommendations, and some cost implications of deprescribing.

Method: This prospective study took place in three inpatient units over 12 weeks in Ireland's largest provider of specialist inpatient palliative care. Patients were included if they had a primary diagnosis of cancer, an estimated prognosis of <6 months (as per medical notes), aged ≥18 years, and prescribed ≥1 medication on admission. Medication reconciliation was performed by a pharmacist for each eligible patient, followed by medication review involving application of the OncPal deprescribing guideline and clinical judgement to identify PIMs. Deprescribing recommendations were communicated verbally and/or in writing by one of four pharmacists to a physician team.

Descriptive statistics were performed using Microsoft® Excel and IBM® SPSS. PIM prevalence was evaluated for each medication class, and both the physician recommendation implementation rate and medication cost savings were calculated. Chi-squared analyses were performed to assess for differences in recommendation implementation rates, whereby $p < 0.05$ represented statistically significant differences.

Results: Forty-eight patients were included in this study (mean age: 70 years; range: 42-97). Patients were prescribed a mean of 9.4 regular medications, whereby all patients had ≥1 PIM. One quarter of regular medications were PIMs (25.2%; mean 2.4 per patient). The majority of PIMs were those described in the OncPal tool (86.7%), most commonly vitamins (26.6%), medications for gastro-oesophageal reflux

disease (13.3%), and lipid-modifying agents (11.5%). The 28-day cost was €1,165.08 for all PIMs. Pharmacist deprescribing recommendations were implemented 71.7% of the time, corresponding to a reduction of 2,314 individual medication administrations per 28-day period, equivalent to a mean reduction of 1.7 administrations per patient per day.

The implementation rates of verbal recommendations and written-only recommendations were 72.2% and 70.6% respectively (p>0.05). Implementation rates varied based on patient admission type, with a significantly higher ($p < 0.05$) rate in those admitted for end-of-life care (83.3%) versus symptom control (65.1%) and respite (30%) admissions. Recommendations to deprescribe medications for gastro-oesophageal reflux disease had a significantly lower rate of implementation (26.7%) compared to all other medications ($p < 0.0001$).

Conclusion: Despite the modest sample size, this study underscores the benefits of pharmacist-led deprescribing in inpatient palliative care, resulting in fewer medications, reduced medication administration time, and cost savings. There is a notable need for more proactive deprescribing before reaching inpatient palliative care. Different deprescribing rates across medication classes and admission types highlights the significance of reviewing medications, especially considering symptom management. The omission of some medications from OncPal emphasises the importance in refining deprescribing guidelines for palliative care in future.

Sedation with continuous intravenous midazolam for end-of-life pain relief in home health care

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Purpose: It is widely known that sedation with midazolam injection (MZ injection) is effective in alleviating unbearable pain in terminally ill cancer patients. Since its opening in December 2021, the Daidai-no-Oka Clinic (this clinic) has made it a top priority to alleviate the suffering of terminally ill patients and has worked as a team (physician, nurses, pharmacist) to do so. The authors report on the current situation of palliation of treatment-resistant pain by MZ injection.

Methods: Patients were defined as those who had a home health care visit and they received MZ injections during the 2-year period from December 2021 to November 2023. The survey items were age, gender, cancer type, daily dose of MZ Injection, and number of days of administration, procedure to initiate continuous sedation with MZ injection, and any significant side effects.

Results: During a 2-year period, 47 patients were visited for terminal cancer, 6 patients (2 males and 4 females) (12.6%) were treated with MZ injection, median age 69 years (58-80 years). The cancer types included ovarian cancer, rectal cancer, intraductal cholangiocarcinoma, lymphoma, neuroendocrine cancer, and breast cancer, median dose of MZ injection was 48 mg per day (24-120m g), median days of administration was 3 days (2-9days). MZ injection was initiated after evaluation of the indication in accordance with the Basic Guidelines for Treatment-Resistant Distress and Sedation in Cancer Patients (2023GL) prepared by the Japanese Society for Palliative Medicine for any patient, and no serious side effects were observed.

Discussion: The percentage of patients who received MZ Injection was similar to that in the 2023GL. No deviation from the 2023GL was observed in the decision to initiate continuous intravenous infusion, and the patient was considered to have been safely administered.

Conclusion: Sustained sedation with continuous infusion of MZ injection is an adjustable dosing regimen that can be tailored to the patient's level of distress.

Overall antimicrobial use in the Ho Municipal Hospital: a comparative study from the Global Point Prevalence Survey

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Introduction: Robust antimicrobial stewardship (AMS) strategies have been instrumental in ensuring the responsible and efficient use of antimicrobials. The WHO Access, Watch, Reserve (AWaRe) classification remains an integral quality assessment tool in ensuring responsible antimicrobial selection. To contribute to international AMS and ensure the efficient utilisation of antimicrobials, Ho Municipal Hospital (HMH) participated in the Global Point Prevalence. Survey (GPPS). Hence, the antimicrobial consumption and prevalence of missed doses at HMH have been investigated and compared to reported national results for 2023.

Method: A point prevalence survey was conducted on 1st February 2024 at HMH using the Global Point Prevalence Survey tool and compared to reported national results from 7 facilities for 2023 using the same tool. Data on the consumption and missed doses of prescribed systemic antimicrobials were collected and analysed. The classification of the antimicrobials utilised was done per the WHO AWaRe recommendation.

Results: HMH issued 56 prescriptions with at least an antimicrobial medication whilst the national data reported 1024 prescriptions. According to the WHO AWaRe classification, 59% and 56% of the prescriptions respectively from HMH and the nationwide results were Access whilst the remaining 41% and 44% of the antimicrobial prescriptions were within the Watch classification. Of the 56 prescriptions from HMH, 31 (42% Access, 48% Watch), 18 (83% Access, 17% Watch) and 9 (71% Access, 29% Watch) were respectively for medical, surgical and intensive care unit (ICU) patients. Comparatively, the 1024 nationwide prescriptions had medical, surgical and ICU patients respectively receiving 462 (48% Access, 52% Watch), 465 (63% Access, 37% Watch) and 97 (64% Access, 36% Watch) prescriptions. Surgical prophylaxis accounted for 21 of the HMH prescriptions (86% Access, 14% Watch) whilst the nationwide results had 296 prescriptions (69% Access, 31% Watch). Amoxicillin (25%), metronidazole (12.5%), amoxicillin and enzyme inhibitor (AMC) (5.4%), clindamycin (5.4%) and gentamicin (5.4%) were amongst the top 5 Access antimicrobials that were used at HMH. In comparison to the nationwide results, AMC (15.8%), metronidazole (10.6%), clindamycin (8.8%), amikacin (3.9%) and gentamicin (3.8%) were amongst the top 5 Access antimicrobials. The top 5 HMH Watch antimicrobials were ciprofloxacin (14.3%), cefuroxime (8.9%), ceftriaxone (7.1%), ceftriaxone (7.1%) and cefotaxime (3.6%) whilst the top 5 nationwide Watch antimicrobials were ceftriaxone (16.8%), cefuroxime (7%), ciprofloxacin (7%), azithromycin (3.4%) and meropenem (2.4%).

Conclusion: Except in medical patients, the use of lower risk to resistance antimicrobials was higher in overall consumption, surgical, surgical prophylaxis and ICU at HMH compared to the nationwide results. AMC, metronidazole, clindamycin and gentamicin were the Access antimicrobials that were commonly used at HMH and the national level. As a recommendation, price and availability studies of Access and Watch antimicrobials must be conducted to inform policy in tackling antimicrobial resistance.

Prophylactic antimicrobial use in open chest management in a cardiac care center in London, England

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Introduction: Open chest management with delayed sternal closure is a surgical method used to optimise hemodynamics and respiratory function following complex cardiothoracic procedures. While current guidelines recommend antibiotic use for surgical prophylaxis in cardiothoracic procedures, no recommendations exist to guide antimicrobial use in patients requiring delayed sternal wound closure. There is conflicting evidence on the benefit of broad-spectrum antimicrobial use or prolonged courses of prophylactic antibiotics in this setting, and there is high variability in the type of antibiotics used. This retrospective analysis aims to review antimicrobial use in the five-day period following the initiation of open chest management.

Methods: This is a single center, retrospective review of 42 patient records identified as recipients of delayed sternal wound closure at St. Bartholomew's Hospital in London, England. The review included adult patients (≥ 18 years) with an open chest on day 1 of their admission to the adult critical care unit between January 2022 and June 2023 who were not receiving long-term antimicrobials prior to admission. All antimicrobials ordered and dosed after the end of surgery were included in the collected data. In addition to the type of antimicrobial used, the dose, duration and frequency was recorded. Other descriptive factors collected include the order indication, the indication within the clinical notes, and signs and symptoms of infection at the time of each antimicrobial initiation.

Results: Out of the 42 patients who met the inclusion criteria, 39 received at least one antimicrobial post-operatively, and 38 out of the 39 (97%) received a dose of an antimicrobial within 24 hours of the chest being left open. The average number of antimicrobials started from day 0 to day 5 was two (2.37), and 52% of patients who received chest closures continued at least one course of antibiotics. The most common antimicrobials were teicoplanin and piperacillin-tazobactam, with 72% and 56% of patients receiving at least one dose, respectively. Twenty-one out of 28 (75%) patients who received teicoplanin received it as monotherapy within the first 24 hours of the chest being left open, and 13 out of 28 (46%) received at least one dose of piperacillin-tazobactam following teicoplanin use. The initial dose of post-surgical teicoplanin varied between 3 mg/kg to 10 mg/kg with an average treatment duration of two days. Other antimicrobials used included: vancomycin, vancomycin with piperacillin-tazobactam, vancomycin with meropenem,

flucloxacillin, flucloxacillin with teicoplanin, flucloxacillin with piperacillin-tazobactam, teicoplanin with co-amoxiclav, and teicoplanin with gentamicin.

Conclusion: Current prescribing patterns show a clinical preference for the continuation of surgical prophylactic teicoplanin in the setting of delayed sternal closure. There is no clear benefit to the prolongation of prophylactic antibiotics in comparison to the initiation of broad-spectrum antibiotics such as piperacillin-tazobactam. Given the high variability of prescribing and dosing throughout open chest management, more research is needed in a longer time window to determine differences in infection rate and severity based on the use of specific prophylactic agents.

Rabies knowledge challenge

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Background: After 5000 years, rabies is still nearly 100% fatal but it can be 100% preventable with proper administration of post exposure prophylaxis (PEP). In 2022, Whitehouse published that there were 122 breakthrough rabies infections when PEP was given due to four factors: 1) deviations from core practice 2) delays in seeking health care 3) errors in administration of HRIG 4) comorbidities or immunosuppression. It is estimated that over 40% of PEP administration is given inappropriately.

Goal: The goal of this project was to determine the baseline knowledge of emergency department nurses and hospital pharmacists prior to receiving a rabies education seminar.

Methods: An eleven question (True and False) questionnaire was provided to the audience just prior to the start of the seminar. The audience was provided with the proper answers post seminar. The seminars were conducted at local ENA (emergency room nurses) and pharmacy hospital society meetings throughout the USA.

Results: There were 30 completed tests from RNs and 30 completed tests from RPhs for this project that were evaluated. The average score for the nurses was 67.9% with 3.53 missed questions and a median score of 4 missed questions. The range was 0-8 with one person with a perfect score. The most common missed question (66.7%) was regarding that rabies vaccine brands were interchangeable and the second most commonly missed question (47%) was that rabies vaccine could not be given in the gluteus maximus. The third most commonly missed question (40%) was regarding that HRIG cannot be given 7 days after the vaccine has been given. In addition, 30% of the nurses were not aware that children under the age of 15 comprised 40% of the rabies exposures globally.

For the pharmacists, the average score was 66.4%. The average number of missed questions was 3.7 with a median also of 4. The range was 1-7 with no one receiving a perfect score. There were three scores of only one missed question and also three scores of seven missed questions. The most common missed question (80%) was regarding the interchangeability of vaccines. The second most commonly missed question (53%) regarded the fact that HRIG could not be given 7 days after the vaccine is administered. The third most commonly missed was (43%) that the vaccine cannot be given in the gluteus maximus.

Discussion: The rabies challenge test showed that for both the emergency room nurses and the hospital pharmacists there was a knowledge gap of about 33% and education was important. Both the nurses and the pharmacists had similar deficits in knowledge especially related to vaccines and proper administration.

The types of errors that could be made by giving vaccines in the wrong sites or the relationship of timing of HRIG to vaccine administration could have fatal consequences.

Plan: Need to continue to educate and provide tools for "just in time "education for pharmacists and nurses regarding proper PEP.

Assessment of prescribers' compliance to antimicrobial guidelines in secondary healthcare facilities in the Volta Region of Ghana

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Introduction: Antimicrobial resistance is a growing global health concern, highlighting the importance of adherence to antimicrobial guidelines. However, compliance with these guidelines is a challenge in Sub-Saharan Africa, including Ghana. This study assessed prescribers' compliance with antimicrobial guidelines at Ho Municipal Hospital, Ketu South Municipal Hospital, and Margret Marquart Catholic Hospital in the Volta Region of Ghana.

Methods: A point prevalence survey was conducted using the Global Prevalence Point Survey (GPPS) tool between February and March 2024 to evaluate prescribing patterns at Ho Municipal Hospital, Ketu South Municipal Hospital, and Margret Marquart Catholic Hospital.

Results: The study found that 65.5% of medical cases and 68.4% of surgical cases in the three hospitals were compliant with antimicrobial guidelines. Specifically, Ketu South Municipal Hospital reported 63.6% of medical cases, 50% of surgical cases, and 50% of ICU cases adhering to guidelines. Ho Municipal Hospital recorded 65.5% of medical cases, 16.7% of surgical cases, and 57.1% of ICU cases compliant with guidelines. Margret Marquart Catholic Hospital had higher compliance rates, with 79.2% of medical cases and 81.2% of surgical cases adhering to guidelines. Comparing these results to national compliance rates in Ghana, the study found that the hospitals in the Volta Region had slightly lower compliance rates.

Conclusion: The study highlights the need for interventions to improve compliance with antimicrobial guidelines among prescribers in the Volta Region, Ghana. Strategies such as education and training for prescribers on antimicrobial resistance, rational antimicrobial use, and the development of clear, concise, and easily accessible antimicrobial guidelines are essential to combat antimicrobial resistance and preserve the effectiveness of antimicrobial agents.

Enhancing global hospital pharmacy practice: The Brisbane update to the Basel Statements

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Introduction: Hospital pharmacy practice plays a pivotal role in patient care, necessitating global standards to unify and guide pharmacists, pharmacy departments, and organisations towards a collective vision. The FIP Hospital Pharmacy Section introduced the Basel Statements in 2008 as a comprehensive framework for practice and workforce development. The statements encapsulate essential principles that reflect an aspirational global vision for hospital pharmacy. As the healthcare landscape evolves, these statements must be revisited to ensure alignment with contemporary practice and address emerging challenges. This study aims to update the Basel Statements to maintain their relevance and applicability for hospital pharmacists in all World Health Organisation (WHO) Regions, promoting best practices in hospital pharmacy worldwide.

Methods: The Basel Statements were updated using four phases, crafted to ensure comprehensive coverage, maximise consensus, and incorporate stakeholder engagement. Phase 1 initiated the process with a gap analysis, comparing the Basel Statements with foundational documents from FIP, statements from global hospital pharmacy associations, and pertinent WHO guidelines. The analysis served a dual purpose: evaluating the current alignment of the Basel Statements with international documents and identifying potential areas for enhancement to the Basel Statements.

Phase 2 was an investigation to identify gaps within the Basel Statements. In Phase 2a, researchers conducted a review of documents to locate these gaps, with each proposed gap requiring validation through a consensus review methodology amongst the researchers. Phase 2b involved synthesising these insights into an updated draft of the Basel Statements. The proposed statements integrated the identified gaps, with changes including the addition, deletion, and refinement of statements.

The third phase centred on a global survey, disseminating to the broader hospital pharmacy community to ascertain the practical impact and implementation feasibility of the Basel Statements from stakeholders. Concluding the study, Phase 4 consisted of two sub-phases: Phase 4a capitalised on the collaborative energy of the World Congress, employing focus group discussions to provide final recommendations, and validate changes. Phase 4b closed the loop with a member checking survey, sent to consenting congress participants who contributed to the drafting process, ensuring their recommendations were faithfully incorporated into the final amendments of the Basel Statements.

Results: In Phase 1, alignment with organisational practices varied significantly, highlighted by a broad range of consistency with Basel Statements (12.3% to 95.4%). The review in Phase 2 identified 107 gaps, informing the draft updates. Phase 3 survey responses indicated a moderate to high utility of the statements, yet a strong demand for implementation guidance was noted. The focus group in Phase 4 produced extensive feedback, resulting in substantial updates to 55 statements, a consolidation of 2 statements, and the addition of 2 statements, underlining the imperative for ongoing engagement and validation with stakeholders to maintain the Basel Statements' pertinence in a rapidly evolving healthcare landscape.

Conclusion: The study successfully updated the Basel Statements, reinforcing their significance and utility in global hospital pharmacy practice. Future endeavours will focus on developing practical implementation guides to facilitate the seamless integration of these updates into daily practice.

Reducing telephone response time in inpatient pharmacies through quality control circle methodology

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Introduction: In the hospital pharmacy, pharmacists often receive calls from colleagues at nursing stations, which can be burdensome. Acknowledging that certain issues can be systematically addressed through workflow enhancements and addressing challenges, and aiming to mitigate potential dispensing errors caused by phone interruptions, a quality improvement team has been established to reduce telephone response times.

Method: The quality control team members, based on common reasons for answering calls in the inpatient pharmacy, have devised the "Inpatient Pharmacy Telephone Response Reasons Record Checklist." Over 10 working days, from March 20 to April 3, 2023, pharmacists recorded a total of 63 phone calls with a talk time of 152 minutes, resulting in an average response time of 2.4 minutes. The top three reasons identified were discharge medication return issues (14 calls, 20 minutes), clinical medication problems (13 calls, 38 minutes), and undelivered medication issues (10 calls, 27 minutes). After nurses filled out questionnaires following the " Genchi Genbutsu " rules(which means in a real situation, real place, and real objects way)to identify the root causes, team members discussed and illustrated a fishbone diagram to summarise the complete causes. Corresponding strategies were then formulated:

(1) Enhance communication between Pharmacy and Nursing: Review regulations at monthly Pharmacy meetings, communicate matters at subsequent Nursing meetings, and create informational pamphlets and videos for placement in hospital's intranet public area for reference by new staff.

(2) Improve clinical problem resolution: Consolidate data and create FAQs for easy access, and conduct internal exams within the Pharmacy department.

(3) Streamline medication return process: Establish a streamlined process for handling urgent returns at discharge, communicate prioritisation processes, and ensure internal communication of business priorities.

(4) Enhance nurse medication retrieval process: Retain medication signed receipts for one week(for efficient tracking of the flow of pharmaceuticals), create flowcharts for nurses and pharmacists, and develop an easily readable guide for new staff.

Results: Following the implementation of quality control measures, improvements were observed from September 18th to September 29th, 2023, over a span of 10 working days. The frequency and duration of calls handled for various issues decreased. The top three reasons for this decline were: discharge medication return issues decreased by 8 calls with a corresponding decrease of 8 minutes in call duration, clinical medication problems decreased by 4 calls with a corresponding decrease of 8 minutes in call duration, and undelivered medication issue decreased by 6 calls with a corresponding decrease of 13.8 minutes in call duration. Furthermore, the overall average call handling time reduced to 1.81 minutes, reflecting a progress rate of 24.58%.

Conclusion: By methodically pinpointing the reasons for answering phone calls and devising tailored improvement strategies derived from root cause analysis findings, it is feasible to systematically tackle telephone response times. Further advantages encompass mitigating medical delays for inpatients due to administrative procedures, facilitating prompt patient treatment by medical departments, boosting colleagues' operational efficiency, and mitigating medical errors.

Thromboembolic events associated with the vascular endothelial growth factor receptor tyrosine kinase inhibitors (VEGFR-TKIs): A pharmacovigilance study based on the FDA Adverse Event Reporting System (FAERS) database

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Introduction: With the widespread use of vascular endothelial growth factor receptor tyrosine kinase inhibitors (VEGFR-TKIs), the anti-angiogenic effect significantly increased cardiovascular adverse events, among which thromboembolism poses a huge challenge to the treatment of cancer. The authors aimed to conduct an in-depth and comprehensive analysis of VEGFR-TKIs related thromboembolic adverse events (TAEs) based on the FDA Adverse Event Reporting System (FAERS) database.

Method: The authors obtained VEGFR-TKIs related adverse events (AEs) data from drug launch to the fourth quarter of 2023 from the FAERS database with OpenVigil 2.1 Tool. The relevant reports underwent reorganising to remove duplicate cases. This study is based on the SMQ project in MedDRA to confirm the preferred term (PT). To minimise false-positive rates, the authors conducted disproportionation analysis using Reporting Odds Ratio (ROR), Medicines and Healthcare Products Regulatory Agency (MHRA), Bayesian confidence propagation neural network (BCPNN), and Muti-item Gamma Poisson Shrinker (MGPS) methods to explore the correlation between VEGFR-TKIs and TAEs.

Results: The total number of reported TAEs was 2688, accounting for 2.98% of all AEs of VEGFR-TKIs. The United States reported the highest number of cases (39.06%). The

median age of VEGFR-TKIs-related TAEs reported was 65 years ((interquartile range [IQR] 58-73), with an increased risk of TAEs in males (N=1586, 59.00%) and elderly (≥65: N=1092, 40.62%) patients. The main outcomes of both arterial and venous TAEs were Hospitalisation - Initial or Prolonged (915,42.10%; 680, 41.97%) and Death (334,15.37%; 243,15.00%), with no statistically significant difference (p = 0.932). Seventeen arterial thromboembolic events (ATEs) and 12 venous thromboembolic events (VTEs) were found in 8 types of VEGFR-TKI drugs. Lenvatinib (N=590, ROR 3.29, PRR 3.278, IC 1.66, EBGM 3.18), sunitinib (N=612, ROR 1.31 PRR 1.31, IC 0.65, EBGM 1.30), and sorafenib (N=601, ROR 1.59, PRR 1.59, IC 1.54, EBGM 1.44) exhibit strong signals.

Conclusions: This study demonstrates the association between TAEs and VEGFR-TKI treatment, which reminds us to pay attention to the thromboembolism risk associated with VEGFR-TKIs in anti-tumor therapy. However, the correlation between them needs to be further evaluated in the real-world study.

Formulation and evaluation of Metformin Hydrochloride and Amlodipine besylate Lozenges

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Background: Lozenges are one of the solid dosage forms that have a bright future as a novel method of delivering drugs for local action and systemic effect in the oral cavity. They are generally flavored, sweetened base and are meant to be sucked and held in the mouth to lubricate and pacify irritated tissues of the throat. Various drugs have been formulated as lozenges intended for systemic effect which includes montelokast sodim, salbutamol sulphate, ketoconazole, paracetamol, clotrimazole, artesunate, garlic and itraconazole.

Puropose: This study aimed to formulate and evaluate Metformin hydrochloride and Amlodipine besylate combined lozenges for management of diabetes and hypertension which serves the purpose of increasing the drug bioavailability and adherence to therapy.

Methods: To check if there are any interactions between the drugs and various excipients, physical incompatibility test was performed for three months.

The lozenges of individual and combined Metformin and Amlodipine were prepared by melting and mold technique. Polyethylene glycol 1000 is used as a polymers.Physicochemical evaluation of both the individual and combined Metformin and Amlodipine lozenges were evaluated for their physicochemical parameters such as weight uniformity, thickness, disintegration time and drug content determination. The in-vitro drug release studies was carried out in phosphate buffer of pH 6.8. Stability studies of all the lozenges stored in the refrigerator at 8 oC were performed for 3 months.

Results: Physical incompatibility studies showed that there were no drug-expient interactions because of no change in colour and textures. Combined lozenges were non-gritty and agreeable mouthfeel. The evaluation revealed that all the physicochemical parameter for both Individual and combined soft lozenges were within the pharmacopeial limits. Weight uniformity results of all individual and combined lozenges had percentage deviation of less than ± 10%

The mean disintegration time for the Amlodipine, Metformin and combined lozenges were 4 min 21 sec, 6 min and 4 min 52 sec respectively. The drug content uniformity of prepared lozenges was found to be 98.48 % and 99.60 for Amlodipine and Metformin lozenges respectively which is within British pharmacopeal limit (95 -105%). In vitro dissolution studies of combined Metformin and Amlodipine lozenges showed 98% drug release of Metformin and Amlodipine in 4 min. However, drug release profile of Individual Amlodipine and Metformin showed a peak of Amlodipine and Metformin release of 98% and 97% after 2 min. Stability studies indicated that the formulations were stable for 3 months and no significant drug degradation was observed.

Conclusion: Based on the above findings, combined Metformin and Amlodipine soft lozenges were successfully formulated and evaluated. The results complied with the pharmacopeial limits. Fast drug release (98%) in 4 min will make both drugs bio-available at a short time which will depict fast onset of action thereby resulting in reduction of blood pressure and hyperglycemia. Thus making patient adhere to therapy. Soft combined lozenges of Amlodipine and Metformin can present an attractive substitute formulation in hypertension and diabetes comorbidity condition especially for those that have difficulty in swallowing.

Formulation and evaluation of nifedipine and naproxen lozenges for comorbidity (hypertension and arthritis)

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Background: Lozenges is a unit dosage form which provide a palatable means of oral administration of drug and is widely used. Geriatric and pediatric patient who has less compliance in swallowing tablets and capsules due to difficulties in swallowing and bitter taste of many drugs resort to lozenges as means of drug administration. This dosage form can be adopted for local as well as systemic therapy and a wide range of active ingredient can be incorporated in them. The benefits of the medicated lozenges is that they increase the retention time of the dosage form in oral cavity which increases bioavailability, reduces gastric irritation and bypasses first pass metabolism.

Purpose: The aim of this work was to formulate and evaluate lozenges containing Nifedipine and Naproxen for hypertensive patients with arthritis as a comorbidity. Lozenges of combined Nifedipine and Naproxen were formulated so as to improve adherence to geriatric patients with comorbidity.

Methods: The drugs-excipients physical compatibility study was carried out. The individual and combined Nifedipine and Naproxen lozenges were prepared by heating and mold method with polyethylene glycol 1000 as polymer. Other excipients used in formulation were saccharine, banana flavour and yellow colour. The lozenges were evaluated for various physicochemical properties such as weight uniformity, thickness determination, drug content and disintegration time tests by pharmaceutical standard methods. In vitro drug release study of individual and combined Nifedipine and Naproxen lozenges were performed in pH 6.8 phosphate buffer. Drug content assay was carried out by using Ultraviolet (UV) spectrophotometer at maximum wavelength of 340 and 270 nm for Nifedipine and Naproxen respectively in methanol solvent. The stability studies were also carried out under 8oC refrigerator condition for three months.

Results: The results of physical compatibility study showed there was no interaction between the drug and various excipients. Physical characteristics of various lozenges showed sweet, yellow and oily good organoleptic properties. Weight uniformity, thickness and disintegration time, drug content showed all values to be within pharmacopeial acceptable limit. None of the lozenges had weight percentage deviation of up to ±10%. Disintegration time of all the lozenges were within 4 min. Drug content for Nifedipine and Naproxen lozenges were 102 and 103 % respectively. All the individual and combined lozenges had >90% of the drug released within 5 min for all individual and combined lozenges. Data recorded for individual lozenges showed sharp peak drug release of Naproxen lozenges of 95.3% in 2 min and 99% Nifedipine release in 5 min The combined Nifedipine and Naproxen lozenges had 98 and 99 % released respectively in 4 min. Stability studies revealed that all lozenges formulation were stable.

Conclusion: The results clearly indicated that formulated combined Nifedipine and Naproxen soft lozenges passed the physicochemical properties and were stable. It can be a good alternative unit dosage form for combined Nifedipine and Naproxen drugs which encourages the geriatric patient with co-morbidity of hypertension and arthritis to adhere to therapy. This is especially relevant to those with difficult in swallowing tablets.

Integrating self-reported adherence with clinical data in patients receiving antiretroviral therapy at a public hospital in North West Province, South Africa

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Background: Eliminating HIV/AIDS as a public health concern by 2030 necessitates commitment, particularly in low- and middle-income countries that are heavily burdened. Achieving optimal adherence to antiretroviral therapy is critical for viral suppression and increasing CD4 cell counts. This reduces HIV transmission and opportunistic infections, thereby improving quality of life and life expectancy. Combining self-reported adherence assessments with clinical indicators may provide a detailed insight into adherence patterns.

Aim: The study aimed to determine the influence of clinical factors on self-reported adherence and its association with clinical outcomes.

Method: A quantitative, cross-sectional design was used to retrospectively collect self-reported adherence data and clinical history of adult patients (≥18 years) on ART at the provincial hospital. Participants completed a structured questionnaire and clinical data was retrieved from patient

files using a data collection tool between 12 April 2019 and 30 June 2019. Exclusion criteria were patients from other institutions or with less than 12 months of treatment history.

Results: The study included 96 patients, 42.7% male, with an average age of 44.56 years (SD ± 12.03). A low education level was observed, with 89 participants having attained Grade 12 or below and a college diploma as the highest qualification (n=7). High unemployment (74%) and parenthood rates (84%) were noted.

The majority was prescribed a first-line ART regimen (n=74, 78%), followed by second-line (n=19, 20%) and third-line (n=2, 2.1%). Treatment durations varied, with 45 (46.9%) on ART for less than 5 years and 31 (32.3%) for over 11 years.

Upon completing the questionnaire, 72 reported no missed doses in the prior six months, although 5 admitted to missing a dose in the previous week. A high self-reported adherence score was reported, with 83 participants scoring above 9 out of 10 (mean of 9.47 (SD ± 1.16)).

Clinical data showed 24.2% of the patients collected their medication on time each month for the last six months. Over the preceding 12 months, the majority had no illness (82,1%), adverse drug reactions (97.9%), or regimen switches (94,7%). Positive health outcomes included a median latest viral load of 124 copies/ml (IQR = 253) and average CD4 cell count of 380 cells/µL (SD ± 278).

Participants with a history of adverse drug reactions or regimen switches showed a lower probability of missing doses and indicated higher self-reported adherence scores (p-value=0.000, means of 1.00 and 10.0, SD ± 0.000). Results related to adverse reactions and regimen switches should be cautiously interpreted due to small sample sizes. No significant association was observed between self-reported adherence or missed doses and factors like history of illness, medicine collection frequency, current ART regimen, latest CD4 cell count, and viral load.

Conclusions: This study highlights the importance of integrating self-reported adherence measures with clinical data to better understand adherence behaviours and their effects on clinical outcomes. It provides valuable insight into the self-reported adherence levels and clinical outcomes of patients taking antiretroviral therapy within South Africa.

Analysis of the training and development path for research-oriented clinical pharmacists

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Introduction: the construction and sustained development of the hospital pharmacy discipline requires not only excellent clinical practice skills of pharmacists, but also scientific research oriented to clinical pharmacy practice. At present, there is a growing call for training clinical pharmacists with scientific research abilities, but the path is not very clear.

Purpose: This study aims to make an in-depth analysis of this topic.

Methods: with literature research and practical experiences, the authors gave a new name and connotation to "clinical pharmacists with scientific research abilities", and put forward specific paths and methods for their training and career development.

Results: According to the connotation and current development situation of "physician scientist" and "clinical scientist" from the developed countries, combined with the specific conditions of the country, the team put forward a new concept "research-oriented clinical pharmacist", and analysed suitable training and development path for them from aspects of higher education and continued education.

Conclusion: the training of research-oriented clinical pharmacists has a strong necessity and broad prospects, which will produce a batch of talents not only being good at finding discoveries and breakthroughs in the field of pharmacotherapy, but also good at escorting people's lives and health.

Niraparib-induced hematological toxicities and influencing factors: a real-world study in ovarian cancer patients in a tertiary specialised cancer hospital in China

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Introduction: Ovarian cancer is a common gynecological cancer worldwide. The majority of ovarian cancers are

epithelial ovarian cancer (EOC), and most patients are diagnosed as FIGO (International Federation of Gynecology and Obstetrics) III/IV. The traditional standard treatment for EOC is maximal cytoreductive surgery and platinum-based chemotherapy. However, about 80% of the patients experienced relapse within 1-2 years. In recent years, maintenance therapy with poly ADP-ribose polymerase (PARP) inhibitors, such as Olaparib and Niraparib, has provided a new modality for treating ovarian cancer, however the most common adverse drug reactions (ADRs) of them are hematological toxicities. Previously the authors have explored the ADRs of Olaparib, but the profile of niraparib-induced hematological toxicities in real-world has not been well explored. The purpose of this study was to analyse niraparib-induced hematological toxicities and the influencing factors in ovarian cancer patients.

Methods: Clinical chart review was conducted for ovarian cancer patients treated with niraparib at the hospital from January 1, 2021 to September 30, 2023. Clinical data including demographic information, disease information, treatment regimen, adverse drug reactions were collected.

Results: 166 patients were included. The median age of the patients was 59. Most of them had undergone surgery (98.2%). The main types of surgery were primary debulking surgery (39.8%) and neoadjuvant + intermediate debulking surgery (48.8%). FIGO staging of most patients was Stage III or above (84.3%). The vast majority of histology was serous ovarian cancer (88.6%). Most genotypes were HRD negative (57.2%). The main treatment purposes of niraparib were first-line maintenance (70.5%) and recurrence maintenance (25.9%). 84 of them (50.6%) developed hematological toxicities. The incidence of neutropenia, leukopenia, thrombocytopenia and anemia was 19.3%, 19.3%, 25.3%, 24.1%, respectively. Age (p = 0.048), the number of chemotherapy cycles before niraparib treatment (p = 0.029), and the number of past adverse drug reactions (ADRs) with grade 3 or above (p = 0.001) were independent risk factors for developing hematological toxicities.

Conclusions: Hematological toxicities were common in patients with ovarian cancer treated with niraparib. Age, the number of chemotherapy cycles before niraparib treatment, and the number of past ADRs of grade 3 or above were independent risk factors for developing hematological toxicities. Pharmaceutical services can be stratified for patients based on this to optimise treatment outcomes.

Cardiovascular adverse events associated with Antibody-Drug Conjugates (ADCs): A pharmacovigilance study based on the FAERS Database

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Introduction: Using the Food and Drug Administration Adverse Event Reporting System (FAERS) database, To ensure its clinical safety application, the authors analysed post-marketing data on antitumor antibody-drug conjugates (ADCs) to identify risk factors and drugs associated with the risk of cardiovascular events.

Method： The authors used OpenVigil 2.1 to conduct a database query for adverse events (AEs) reported to FAERS database between the time the drug was launched and the second quarter of 2023. Cardiovascular adverse events (AEs) were grouped into fourteen narrow categories using the Standardised Medical Dictionary for Regulatory Activities (MedDRA) Queries (SMQs), and The reporting odds ratio (ROR)and the proportional reporting ratio (PRR) for reporting the association between different drugs and cardiovascular disease(CVD) risk were calculated.

Results： In the FAERS database, 1863 AEs associated with CVD the authors studied were identified in patients receiving ADCs therapy. Most reports came from people aged ≥ 65, but a significant number of cases were found to be unknown. The number of patients with antibody-drug conjugates (ADCs) -related CVD cases aged <18 years, 18–64 years, and≥ 65 years was 52（2.79%）, 586（31.45%）, and 613（32.90%）, respectively. The proportion of female patients834（44.77%） was higher than that of male patients 752（40.37%. Death (770 reports), Disability (9 reports), Hospitalisation initial or prolonged (407 reports), and Life-threatening reactions (187 reports). Of the 770 deaths reported, 103 were associated with brentuximab vedotin, 10 with sacituzumab govitecan, 22 with enfortumab vedotin, and 35 with trastuzumab emtansine. 49 cases were associated with polatuzumab vedotin,62 with trastuzumab deruxtecan, 423 with gemtuzumab ozogamicin, and 66 with inotuzumab ozogamicin. In a disproportionate number of SMQS, cardiac failure (n = 277) and embolic and thrombotic events, venous (n =446) were the most frequently reported CVD related AEs in ADCs.

Conclusions： By mining the FAERS database, the authors provided relevant information on the association between ADCs use and cardiovascular associated AEs. ADCs were associated with increased cardiovascular toxicity, deserving

distinct monitoring and appropriate management.Further research is needed to confirm these findings and assess causality.

Improving outpatient pharmacy dispensing processes through human factor engineering in Southern Taiwan Regional Hospital

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Background: Medication safety has always been silently guarded by pharmacists, however with the increasing variety of medications and a large proportion of manual processing during pharmacists dispensing, it is impossible to completely avoid medication-related incidents. According to statistics from the Taiwan Patient Safety Reports (TPR), medication incidents consistently rank among the top two reported events every year, exceeding the occurrence of other medical error events. Statistical analysis shows that 60% of medication incidents are caused by human factors. Therefore, intervening through human factors engineering to improve pharmacists' physical, physiological and psychological condition should help reduce the occurrence of medication-related incidents.

Purpose: Reduce the occurrence of medication-related incidents.

Method: The authors collaborate with occupational physicians to review the human factors engineering components within the pharmacy. First, the authors measure whether the environmental noise and illuminance meets the standards. After that, occupational physicians help assess the processes in the pharmacy that do not comply with human factors engineering using the Musculoskeletal Disorders Hazard Risk Assessment checklist (MSDs). Subsequently, the authors distribute the Nordic Musculoskeletal Questionnaire(NMQ) and a self-workload questionnaire to pharmacists for completion. Finally, after analysing the data the authors collected, the authors understand the problematic processes and devise strategies for improvement.

The authors have made improvement strategies from four aspects: improving the dispensing process of outpatient the pharmacy, perfecting the dispensing bonus mechanism, enhancing the muscle strength of pharmacists, and optimising the human factors engineering equipment in the pharmacy. There are a total of eight improvement strategies. Firstly, the authors have redistributed the working content of every shifts, dividing the daily workload into 4- hours units to avoid maintaining the same posture all day long. Secondly, the authors have increased the proportion of monthly dispensing bonuses and developed a business intelligent (BI) system to assist in the distribution of bonuses based on work contributions. In addition, the authors have invited physical therapists to design morning exercises for daily morning briefings. As for the hardware improvement, the authors have implemented a self-service kiosk for chronic illness prescription refill slips to bypass the crowds at the pharmacy counter. Furthermore, the authors have updated the functions of the dispensing table to include features such as light guidance, audio prompts, dispensing quantity display, and infrared confirmation. Lastly, the authors have replaced old computers to all-in-one computer to optimise space usage and added microphone devices at the counter and replace all chairs with adjustable chairs.

Result: The rate of dispensing error decreased from 0.44% in 2021 to 0.36% in 2022, further dropping to 0.32% in 2023, resulting in an overall improvement of 27%. In the NMQ, the severity of pain in various body parts dropped by 33%(42 cases to 28 cases).The MSDs checklist saw a 100% improvement in the number of problematic process (2 processes to 0 processes). Finally, in the patient safety culture survey(pharmacists), all questions showed improvement compared to 2022.The question with the highest increase was satisfaction with work, rising by 51% (from 27.59 to 41.67), while the aspect showing the least improvement, resilience, also increased by 4% (from 10.71 to 11.11).

Conclusion: After improving the pharmacist's dispensing processes, there has been significant improvement in both the atmosphere of the pharmacy department and the medication safety. Although perfection may be unattainable because to err is human, the authors will continue to improve processes affected by human factors and strive to minimise dispensing errors.

Precision in practice: Optimising drug dosing and decision-making through user-centred design

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Background: Optimising the therapeutic use of drugs with complex pharmacokinetics and significant interpatient variability remains a challenge. Precision dosing, an approach that tailors drug dosing based on an individual's pharmacokinetics, is important for optimising treatment.

Despite technological advancements to facilitate precision dosing through the development of clinical decision support tools, their adoption is often impeded by poor design and usability. A co-design study with healthcare professionals in South Australia highlighted the need to consider usability and factors beyond drug exposure in such tools to promote utilisation in practice. From these findings, a user interface was designed, using vancomycin as the example drug. This research details the subsequent stages of tool development.

Purpose: To evaluate the usability of a decision support tool user interface and explore the factors influencing healthcare professionals' decision-making.

Method: Based on the previous co-design study, an interactive Shiny app interface was developed. Healthcare professionals used the tool while navigating clinical case scenarios and wearing Pupil Core eye-tracking glasses. Usability was evaluated through a Likert-scale questionnaire. Eye-tracking data generated heatmaps and fixation metrics on areas representing patient and clinical factors.

Results: Participants included pharmacists and prescribers from major teaching hospitals within South Australia. Overall, the user interface was well-received, but participants identified areas for refinement. Depending on their role, participants considered different factors in their decision-making. Eye-tracking data provided insight into prioritising patient and clinical information within the tool.

Conclusion: The approaches used were effective at identifying areas of development to enhance tool usability and support healthcare professionals with decision-making. This study will be used to guide further tool development and is anticipated to facilitate the real-world application of clinical decision support tools, promoting personalised and optimised patient care.

Role of oncology pharmacist in establishing chemotherapy protocol and avoiding potential drug-related problems in a regional teaching hospital

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Introduction: Chemotherapy is one of the main treatment methods for cancer, utilising drugs that possess high toxicity. Any mistake could potentially harm the patient, so ensuring the safety and effectiveness of chemotherapy is of utmost importance for the oncology team. The purpose of this study is to investigate the effectiveness of oncology pharmacists in supporting the team in developing standardised chemotherapy treatment plans and reviewing prescriptions to prevent medication errors.

Method Pharmacists joining the oncology team assist in standardising chemotherapy treatment plans for different types of cancer throughout the hospital based on evidence-based practices. These plans are then integrated into the physician's prescribing system. Physicians are required to prescribe medications according to protocols. If the adjusted dosage exceeds 115% or falls below 80% of the recommended dose, they are required to provide a reason for the deviation to proceed with the prescription. Pharmacists provide intervention to identify drug therapy problems (DTPs) related to clinician prescribing and make recommendations to intercept and resolve them. This study collected retrospective data from a community-based teaching hospital's inpatient department services between January 2023 and December 2023. The data included chemotherapy dose rates and DTPs identified by pharmacists related to inappropriate prescribing. Data analysis was conducted using SAS 9.4, and descriptive statistics were calculated for the study variables. Categorical variables were expressed as frequency and percentage, while continuous variables were presented as means (± standard deviation).

Results: During the study period, physicians utilised 224 different protocols to prescribe 7,956 medication orders. 73.44% of the prescription dosage rates fell within 80% to 115%. Further analysis revealed that 69.5% of the initial chemotherapy prescriptions had dosage rates within 80% to 115% (p = 0.007). The most common reason for dosage rates falling outside the ideal range was significant side effects that patients could not tolerate, accounting for 34.3% of cases. Additionally, 26.3% of patients had their dosage reduced to below 80% due to advanced age. All prescriptions using the 29 protocols, including "Alimta+Carbo", had a 100% deviation from the ideal dosage range. All prescriptions for Durvalumab, Trastuzumab Emtansine, Vinorelbine, Trabectedin, and Sacituzumab did not fall within the ideal dosage range. The oncology pharmacists conducted a total of 11 interventions. The rate of prescription errors was 0.11%. The most common Drug Therapy Problems (DTPs) identified were incomplete prescription information, accounting for 27.3% of cases, followed by treatment intervals not meeting standard protocol specifications, which accounted for 18.1%. According to the result, the pharmacist added 8 alerts to the computerised physician order entry system to prevent inappropriate medications.

Conclusion: The results of this study show that medication errors in chemotherapy prescriptions can be prevented by establishing a hospital-wide chemotherapy protocol based on evidence-based medicine and consensus among the oncology team. This includes implementing dose rate limits, conducting pharmacist reviews, and regularly reviewing and improving the protocol.

Tools to identify patients at high risk of readmission with a focus on medication management: A systematic review

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Background: Hospital readmissions represent a significant burden for patients and the healthcare system, associated with poorer quality of care and high financial costs. Poor medication management remains a risk factor, with many readmissions potentially preventable. Clinicians may not always be able to predict an individual's risk of readmission accurately, and risk-prediction tools have been developed to inform a patient's care plan.

Purpose: This systematic review aims to synthesise the current literature on developed risk-prediction tools focusing on medication management on hospital readmissions and what factors are considered.

Method: A systematic literature search was conducted across Medline, Embase and Scopus, including the concepts of hospital, drug-related side effects and adverse reactions, and patient readmissions. Search results were screened, and two independent reviewers extracted data.

Results: From the Twenty-four studies included, 22 risk-prediction tools focusing on medication management were identified. Tools predicted hospital readmission in adult patients, older adult patients, patients with bipolar disorder, COPD, diabetes, taking antimicrobials or receiving total hip arthroplasty. Variables evaluated included demographic data, healthcare utilisation, social history, biochemistry and medication-related factors. Common medication-related factors assessed were the number of medications (polypharmacy), use of high-risk medicines/anticholinergic/sedative burden, medication adherence and medication complexity. Most studies (13) predicted hospital readmission after one to three months. The discrimination ability of tools was reported in twelve studies (C-statistic), ranging from 0.62-0.74. Three tools had a C-statistic>0.7, including the PHarmacie-R for adult medical patients, DREAMER for older adults and OPAT for patients on outpatient parenteral antimicrobial therapy. \

Conclusion: From the 22 risk-prediction tools identified, common medication-related factors included the number of medications (polypharmacy) and the use of high-risk medications/anticholinergics/sedative burden. Further research is needed to determine whether risks are reversible and if readmission are preventable in patients identified as high risk of readmissions.

Cabergoline as an effective alternative to bromocriptine for peripartum cardiomyopathy: A case report and rapid evidence review

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Background and purpose: Peripartum cardiomyopathy (PPCM) is a type of heart failure that occurs in previously healthy women during late pregnancy or the months after delivery. It is characterised by left ventricular (LV) dysfunction, i.e., reduced left ventricular ejection fraction (LVEF) < 45%. PPCM occurs in approximately 1 in 1000 women in South Africa and has a 1-year mortality rate of 28%. Current evidence suggests that the key role of development of PPCM may be attributed to a 16 kDa cleavage product of prolactin. Existing hypotheses suggest that inhibiting prolactin with bromocriptine during the postpartum period may benefit patients with PPCM, however, there is a lack of robust data from randomised controlled trials to substantiate its efficacy and safety. Bromocriptine and cabergoline are both dopamine-receptor agonists which inhibit prolactin via a negative feedback mechanism.

Herein, the authors present a case treated with cabergoline due to a supplier stock-out of bromocriptine, with the aim of inspiring future trials to address the existing evidence gap.

Case presentation and discussion: A 40-year-old, black South African female with newly diagnosed PPCM presented with NYHA (New York Heart Association) class III symptoms and LVEF of 15%. Due to a supplier stock-out of bromocriptine, she was prescribed cabergoline along with guideline-directed medical therapy for heart failure with reduced ejection fraction (HFrEF).

A rapid evidence review was performed using keywords such as 'bromocriptine', 'cabergoline', and 'peripartum cardiomyopathy'. Additionally, similar articles, references from articles identified in searches, and evidence-based guidelines were also explored if they were relevant. Search results revealed limited data supporting cabergoline's efficacy in PPCM.

Since no other alternative options were available, cabergoline was prescribed, along with warfarin, to prevent thromboembolic events associated with prolactin inhibition. Heart failure medications were optimised to maximally tolerated doses prior to discharge.

Conclusion: There is currently insufficient evidence to recommend the use of cabergoline over bromocriptine as the preferred treatment for patients with PPCM in the postpartum period. Based on consensus statements, expert opinion and one small cohort study, cabergoline may be used with caution as a potential alternative to bromocriptine, evaluated on a case-by-case basis with appropriate monitoring (level of evidence (LOE): III, C). This case report showed the safe and effective use of cabergoline for PPCM during a supplier stock-out of bromocriptine. Key lessons learned were the importance of healthcare professionals, especially pharmacists, staying updated with the latest evidence and developing skills for conducting rapid evidence reviews from reputable, evidence-based resources to better serve their patients.

Drug survival of different biologics in psoriatic patients: evidence synthesis and historical cohort study

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Introduction: Biologic therapies have revolutionised the treatment of psoriasis, providing high levels of efficacy and safety. However, choosing the appropriate treatment for each patient remains a challenge. Purpose

This research compared the survival rates of adalimumab, etanercept, guselkumab, infliximab, ixekizumab, secukinumab, and ustekinumab for the treatment of psoriasis patients in a public hospital setting.

Method: This retrospective survival analysis was conducted at Hamad Medical Corporation in Qatar using electronic medical records for patients who received biologics between January 2016 and January 2023. The study compared the all-cause discontinuation and survival rates of biologics used to treat psoriasis. The Kaplan-Meier survival curve, log-rank test, Cox regression analysis, and hazard ratio were used for the data analysis.

Results: The study extracted data for 3,511 patients on biologics who received 145509 biologics orders. Of them, only 984 patients had psoriasis with confirmed biologics injections and received 1,223 biologics orders. The results revealed significant differences in hazard ratios and associated significance levels among the biological treatments. The study found that ustekinumab, ixekizumab, and secukinumab demonstrated lower hazard ratios than adalimumab, indicating a potentially better treatment response or lower risk of treatment failure. Specifically, ustekinumab showed the most notable decrease in the hazard ratio (0.48, $p < 0.001$), followed by ixekizumab (0.58, $p = 0.001$) and secukinumab (0.52, $p = 0.002$) in the adjusted model. In contrast, etanercept, guselkumab, and infliximab had hazard ratios closer to 1, suggesting no substantial improvement or a potentially less favourable response than adalimumab.

Conclusion: The results suggest that ustekinumab, ixekizumab, and secukinumab may be more effective treatment options than adalimumab, while etanercept, guselkumab, and infliximab showed no substantial improvement or even less favourable responses. The study also found that psoriasis type, gender, and biologic-naïve status were significant factors in treatment response.

Quality control of medicines compounded in Belgian community and hospital pharmacies

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Introduction: Pharmacy compounding is the practice of customising medication by blending specific ingredients to meet a patient's precise dosage and strength needs. In comparison to commercially available branded and generic medicines, which are manufactured according to International Standards (GMP - Good Manufacturing Practices), compounded medicines are prepared within the pharmacy setting, in accordance to tailored quality assurance protocols including both in-process and finished product quality checks, documenting each step in the preparation process. In Belgium, compounding of medicines occurs daily within its 4500 community and hospital pharmacies. Pharmacists adhere to the bespoke Quality Assurance standards and protocols, yet they receive no direct quality feedback on the compounded medicines they produce. This gap in feedback is due to the destructive nature of quality control, which is beyond the scope of pharmacy-based capabilities.

Method: In 2017, the Professional Body of Community Pharmacists APB deployed a National Quality Improvement Programme for Compounded Medicines. The programme can be summarised as "A voluntary but systematic quality control of pharmacy preparations, and individualised support for pharmacists" with the objective to guarantee and improve (where necessary) the quality of pharmacy preparations".

About 100 pharmacies compound the same medicine at a given moment and send it to APB, where it is analysed in the Medicines Control Laboratory. Individualised feedback to participating pharmacists is provided.

Results: Over the six years the programme has been running, more than 1800 community and hospital pharmacies participated in the programme. About 10 cycles or formulas are tested each year, taking the following galenic forms into account: dry forms (powders and capsules), semisolids (creams, ointments, pastes, gels), solutions & syrups, emulsions & suspensions, suppositories, and sterile solutions (mainly eye drops). Some are routine preparations, others are orphan medicines for rare diseases. In total, more than 4000 medicines have been compounded and subjected to analysis of

- Packaging and labelling
- Quality of preparation protocol
- Chemical testing: Identity, assay, uniformity of mass and content, homogeneity
- Microbiological testing: Microbiological purity, absence of pathogens, sterility

In general, the quality of the preparations is good to very good but depends strongly on the formula and galenic form: excellent results were obtained with high-dosed capsules, and average results were seen, for instance, with some suppository formulas. The programme succeeded in uncovering several issues, such as outdated legislation regarding labeling, certain preparation instructions from the national formulary that demanded adjustment, and the need to overdose by 10% when preparing dosage forms under 10 mg per unit. The presentation in September will delve deeper into the most remarkable results.

Conclusion: The programme significantly influences pharmacy practice, particularly in compounding medications tailored for specific patient groups such as children, individuals with rare diseases, allergies, or swallowing difficulties. Although the medicine prepared specifically for this programme is not used by these patients, the authors strongly believe that when pharmacists receive feedback on a specific preparation, the authors can expect learnings with regard to all preparations of the same galenic form, motivation for quality control and improvement of compounding processes within the pharmacy team.

Assessment of prospective audit and feedback intervention on antibiotic stewardship programme in surgical Prophylaxis at secondary care hospital in Ras Al Khaimah, UAE

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Introduction: Antimicrobial resistance (AMR) is a serious public health problem worldwide. Antimicrobial Stewardship Programme (ASP) was recently implemented in the secondary care hospital to optimise the use of antimicrobial agents. The research aims to assess the effectiveness of prospective audit

and feedback intervention on the standard practice of physicians using antibiotic surgical prophylaxis.

Method: This prospective interventional study was conducted in the in-patient wards of the hospital. It compared the prescribing practices of antibiotic surgical prophylaxis for clean and clean-contaminant surgical procedures two months before and after the prospective audit and feedback intervention. The accuracy of the surgical prophylaxis was analysed according to local hospital guidelines. The intervention focused mainly on educating physicians on the optimal timing of administration of first dose and duration of administration.

Results: Among the 745 patients enrolled, 409 patient's data were collected for prior and 336 for post intervention period. 243 (59.4%) patients were males and 166 (40.6%) were females. The mean age was 36.2 ⍰ 20.7. Cefuroxime was the most commonly prescribed antibiotic (40.2%). Surgical site infections rate decreased from 0.14% to 0.0 % after the intervention. The selection of antibiotic improved significantly (p <0.0001) after the intervention. No adverse effects were recorded in patients during the study period.

Conclusion: The intervention achieved improvements in indications, selection of surgical antimicrobial prophylaxis and surgical site infection rate. These findings emphasise the importance of the involvement of clinical pharmacists in regular prospective audits and feedback interventions to encourage physicians to follow hospital guidelines appropriately across all surgical disciplines.

Aligning examination methods with real-world requirements to enhance assessment

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Introduction: In Singapore, entry-to-practice pharmacists complete a 6-month pre-registration at approved training sites before registration. Trainees are expected to acquire medication dispensing competencies. At KK Women's and Children's Hospital, trainees undergo a exam during the rotation in the Children's Inpatient Pharmacy, reviewing prescriptions and checking packed medications for errors. Prior to 2021, the exam did not assess the critical skill of extracting information from Electronic Medical Records (EMRs), as clinical information was provided in prose form and trainees were not required to navigate the EMR environment to retrieve information. This could lead to false positives in evaluating their performance. Additionally, the exam lacked a structured blueprinting process. Hence, in 2021, the exam was revised for improved authenticity and validity of results.

The revised exam aims to assess pharmacists' competencies in medication dispensing, with an added focus on EMR usage. This revision aims to align the exam more closely with and to provide assessment of trainees' readiness for unsupervised practice in a real-world setting, thereby identifying and addressing gaps in the training curriculum.

Method: The exam was redesigned using Microsoft Excel to simulate an EMR interface, requiring trainees to actively retrieve clinical information. Failure Modes and Effects Analysis (FMEA) was employed to determine key domains for assessment based on the pharmacy's data on near misses, interventions, and medication errors. The FMEA was analysed by two independent members based on severity and occurrence, resulting in an exam blueprint anchored on the top ten failure modes identified.

The restructured exam comprised four prescriptions with ten errors to be identified. The exam was piloted on pharmacists for quality assurance purposes. Further refinements were then made to ensure that the content of the exam was defensible and the duration allocated for the exam was feasible, before being administered to the 2021-2023 training cohorts.

Result: The revamped exam format included three domains related to effective EMR information retrieval. In 2021, 54% of candidates made errors in at least one of these three domains, highlighting a critical competency gap not detected by the previous exam, which would have resulted in false positive results. Through feedback from the exam team based on the revamped format, the percentage of candidates making errors in these domains decreased to 42% in 2023, suggesting an improvement in the training related to this competency area. The median scores of the cohorts also improved from identifying 70% of the errors in the 2021 cohort to 85% in the 2023 cohort, with the proportion of trainees identifying all errors increasing from 23% to 33%, signaling a greater proportion of trainees ready for unsupervised practice.

Conclusion: The revised exam, which simulates real-world tasks and challenges, ensures a more accurate evaluation of trainees' readiness for unsupervised practice. There continues to be a need to provide valuable feedback gathered through assessment to continuously finetune this training and assessment.

Enhancing clinical hospital pharmacy services in Wales: An independent review and recommendations

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Background: Clinical pharmacy services in hospital settings play a critical role in ensuring patient safety and optimal medication management. However, the effectiveness of these services may vary across different healthcare facilities.

Hospital services have experienced growing pressure for many years as clinical teams adapt to meet the changing needs of the NHS; specifically, demand has increased as more people live longer, with more complex health needs and an increase in the availability of new and emerging medical technologies. While the COVID-19 pandemic placed unprecedented pressure on the NHS, it was a catalyst for change across healthcare. Along with the increased demands that have emerged from the pandemic, workforce shortages are causing increased pressure across all settings, including for hospital pharmacy teams in Wales.

Purpose: The Welsh Government commissioned an independent review by the Royal Pharmaceutical Society to assess and improve clinical hospital pharmacy services to meet evolving healthcare demands and enhance patient outcomes.

This review evaluated the current state of clinical hospital pharmacy services in Wales, identified areas of good practice that could be shared, identified areas for improvement, and provided recommendations for enhancing service delivery. If implemented, these recommendations will ensure clinical hospital pharmacy services can continue to meet the changing needs of patients and the NHS in Wales.

Method: A variety of qualitative research methods were used to gather data to inform the overarching narrative, actions and recommendations, utilising one-to-one interviews, focus group discussions, surveys, and data analysis to assess clinical pharmacy services across hospitals in Wales. To identify international examples of good practice, RPS Wales engaged and collaborated with FIP. An independent “think tank” was established to inform, review, and challenge the thinking and recommendations of the RPS project team. Most importantly, focus group discussions with patient groups explored their experiences of pharmacy teams and medicines processes in hospitals.

Results: Information collated along with the teams through leadership accumulated into 36 recommendations across seven key themes. These included redesigning clinical pharmacy services in hospitals to ensure they are responsive to patient needs, deliver consistently high quality, better utilise prescribing pharmacists and all pharmacy team members to improve treatment outcomes, and better integration into multidisciplinary working. Additionally, opportunities to advance pharmacy practice through robust technology integration and strong professional development initiatives were highlighted.

https://www.rpharms.com/Portals/0/RPS image library/Wales Hospital Review/Wales Hospital Report v11 amended.pdf

Conclusion: The Welsh Government responded to the report and accepted all the recommendations. Implementation of the recommendations outlined in this report will elevate the standard of clinical pharmacy services in Wales, benefiting patients, healthcare professionals, and the broader healthcare system.

Maximising patient care and cost savings: The vital role of clinical pharmacists' interventions in a developing country

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Background: In the healthcare landscape of developing countries, ensuring optimal patient care while managing costs effectively presents a formidable challenge. Clinical pharmacists are increasingly recognised for their potential to address this challenge through proactive interventions aimed at improving medication management and therapeutic outcomes.

Purpose: This study aims to evaluate the impact of clinical pharmacists' interventions on patient care and cost savings in a developing country facing economic crises.

Method: A retrospective analysis was conducted to assess the financial implications of clinical pharmacists' interventions in the healthcare system of the developing country. Data spanning three years (2021-2023) were collected, focusing on the savings generated from interventions. These interventions were implemented as part of routine clinical practice by the clinical pharmacy team at a tertiary care hospital in Pakistan.

Result: Over the three-year period, a total of 58.6 million PKR (210100$, at the rate of 1USD = 279PKR) was saved from patients' medical bills due to clinical pharmacists' interventions. The total cost saved per year was 13.8 million PKR (49478$), 23.09 million PKR (82786 $) and 21.7 million PKR (77800$) in the year 2021, 2022, and 2023 respectively. Almost 72% of the total cost (approx. 42 million PKR or 150500$) cost reduction came from the interventions of clinical pharmacists during multidisciplinary rounds. The major category of interventions includes: timely

discontinuation or de-escalation of antibiotics, reducing the unnecessary medication or pill burden, dose adjustments and IV to Oral switching of drugs. Out of the total 58.6 million PKR, 9.8 million PKR (35120$, 1USD = 279PKR) were saved by renal dose adjustment of drugs and 6 million PKR (21500$, 1USD = 279PKR)) were saved by IV to per oral switching of drugs specifically over the time span.

Conclusion: The findings of this study highlight the indispensable role of clinical pharmacists in enhancing patient care and achieving cost savings within the healthcare system of a developing country.

Clinical pharmacists are vital for cost savings and reducing financial strain in countries with economic crises. Their expertise optimises medication management, prevents errors, and identifies cost-effective alternatives, leading to significant healthcare savings while improving patient outcomes and strengthening healthcare resilience in developing nations. However, this is only the direct potential medication cost avoidance, but the indirect, associated cost of the length of stay, morbidity or complications as a result of inappropriate treatment is not accounted for in this review.

Optimising elderly care: The vital role of pharmacists - Insights from Taipei Medical University Hospital

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Introduction: As individuals grow older, they often experience more health issues, leading to an increase in the variety of medications they need to take. According to the literature, prescribing five or more types of medications is defined clinically as "polypharmacy." Studies based on Taiwan's National Health Insurance database show that over 30% of the population is undergoing polypharmacy. And for disabled, elderly individuals, it's as high as 81% and 38.1%, even more than ten medications. To address this pressing issue, Taipei Medical University Hospital started the Integrated Geriatric/Polypharmacy Pharmaceutical Care Clinic in 2019. This goal is to improve the quality of care for elderly patients with multiple medications.

Method: Pharmacists take a proactive approach, intervening in cases where patients are prescribed four or more chronic disease medications concurrently. A pharmaceutical service system with a bidirectional communication platform was implemented in 2021; the system allows physicians to receive real-time assessment and recommendations from pharmacists during consultations, thereby enhancing the effectiveness and efficiency of communication between medical professionals and optimising patient care.

Results: A total of 2,277 patients with four or more chronic prescriptions were admitted, 61% of whom were over 65 years old from 2019 to 2023. Findings from 2019 to 2023 revealed notable improvements:

Inappropriate medication recommendations decreased from 28.7% to 23.8%. Physicians' acceptance rate of medication recommendations was steadily increasing from 68.4% to 84.1%. Recommendations for duplicate medications, drug interactions, and potentially inappropriate medications for the elderly decreased significantly from 43.2% to 20.2%. Additionally, there were 19 recommendations to initiate medication therapy. Polypharmacy was reduced, with patients taking 20 or more medications being decreased by an average of 3 medications and 2.5 pills daily. Clinic visits decreased from an average of 7.8 to 4 times quarterly. These results demonstrate effective interventions in optimising medication regimens, reducing polypharmacy, and minimising clinic visits for elderly patients.

Conclusion: Patients taking multiple medications are at increased risk of inappropriate or unnecessary medication use, leading to adverse reactions and healthcare resource wastage. Polypharmacy is often unavoidable for those with multiple medical conditions. Therefore, the primary focus of pharmaceutical care for polypharmacy should be to ensure the necessity of each medication rather than simply reducing the quantity or variety. The Pharmaceutical Care Clinic emphasises the importance of necessary treatments over the number of pills prescribed. As a result, the rate of medication recommendation declines, which means a gradual improvement in the appropriateness of medication usage among geriatric and polypharmacy patients. This pharmaceutical care effectively enhances medication appropriateness for geriatric and polypharmacy patients, optimising their health outcomes.

Bi-directional texting for better outcomes: Enhancing patient safety and satisfaction beyond hospital walls

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Introduction: Approximately 20% of discharged patients experience adverse events, leading to avoidable healthcare utilisation. Care transition breakdowns contribute to confusion, medication errors, dissatisfaction, and poorer health outcomes. In response to these challenges, Houston Methodist (HM) implemented a post-discharge outreach bi-directional texting program facilitated by HM nurses, clinical pharmacists, and coordinators.

Purpose: To evaluate the program's impact on reducing 30-day hospital utilisation, including emergency department (ED) visits and readmissions, and improving patient satisfaction.

Method: This retrospective observational cohort study was conducted using data from 2023, which comprised of 163,738 outreaches, predominantly through text messages (97%) and automated phone calls (3%). The study analysed response rates, engagement levels (defined as three or more incoming text messages), and alert domains, focusing on discharge education, medication management, follow-up care, and health condition queries. Hospital utilisation rates and patient satisfaction, measured using Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores, were compared between participants and non-participants.

Results: Among the outreached patients, there was a notable 62.8% response rate, with 41.9% actively engaging with the program. The most prevalent alert domains included inquiries about discharge education (38.2%), medication-related concerns (33.3%), follow-up care (16.2%), and health conditions (12.3%). Within the medication-related alerts, the requests for medication clarifications (56%) and assistance with prescription issues (12.3%) were most common. Engaged participants demonstrated a significantly lower 30-day hospital utilisation rate (ED visits and readmissions) of 18.6% compared to 22.6% among non-participants. Moreover, participants exhibited a reduced 30-day unplanned readmission rate of 7.0% compared to 9.1% for non-participants. Notably, patient satisfaction scores, particularly in the "Overall Rating of Hospital" domain, improved significantly, with participants rating at 83.6% compared to 80.3% for non-participants.

Conclusion: The findings underscore the effectiveness of the automated texting program in reducing 30-day hospital utilisation rates and enhancing patient satisfaction following discharge. The program not only addressed patients' immediate concerns but also amassed granular, actionable data for ongoing process improvement and enhanced patient safety measures. These results emphasise the importance of innovative approaches in optimising care coordination and improving post-discharge outcomes.

Pharmacie-Rural. Validation of a medication-related readmission risk tool

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Background: Clinical pharmacists have limited capacity to identify patients at high risk of medication-related re-admissions and to target pharmacist interventions for them. PHarmacie-R is a bedside risk prediction tool developed to identify the risk of readmission in a metropolitan population. No tool currently exists to streamline this task for rural clinical pharmacists.

Purpose: This project aimed to validate a tool initially developed to identify patients at high risk of readmission from a metropolitan hospital to a rural setting.

Method: Retrospective data from patients across 19 rural hospitals between June 2022 and May 2023 were collected. This included age, gender, living arrangements, postcode, Indigenous status or if an interpreter was required, chronic comorbidities, medications, prior admissions and length of stay. Separate logistic regression models were carried out using these variables and then modified using the Modified Monash Model to scale the rural/remote variable.

Results: Of the 1308 patients included in the analysis, 50.4% were male, 49.6% were female. The average age was 74.5 years. Results of the validation indicate that the tool performs poorly in rural areas in regards to predicting both 30 and 90 day readmission. For 30-day readmission, C statistic = 0.5581 (95% CI 0.5139-0.6023), and for 90-day readmission, C statistic = 0.5384 (95% CI 0.5007-0.5761).

Conclusion: The risk of readmission in a rural setting cannot be predicted using the current Pharmacie-R tool. If conducting further research requiring identification of patients at high risk of readmission in rural areas an alternative method should be used. Further study into variables that impact readmission to rural hospitals is recommended.

Improvement in pharmacist-initiated antimicrobial stewardship interventions following the implementation of a customised digital solution.

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Introduction: Pharmacists play a crucial role in antimicrobial stewardship programs, which aim to improve the appropriate use of antimicrobials and combat antimicrobial resistance. Previous studies have demonstrated that pharmacists play a vital role as part of the multi-disciplinary team in contributing towards better outcomes, reduced mortality, and effective antimicrobial management. The adoption of digital tools by pharmacists has assisted in empowering health professionals to make informed decisions and optimise antimicrobial therapy.

Method: A customised digital solution designed by pharmacists for pharmacists was introduced to 46 South African private hospitals in August 2022. This system comprehensively delivers information on antimicrobial therapy, laboratory results, and microbiology findings, enabling pharmacists to form a holistic view of infection-related matters of high-risk patients. The system assists in directing pharmacists to patients with potential antimicrobial therapy incongruencies and guides them on possible actions required to remedy them. The system also ensures auditing of high-risk antimicrobials and provides a platform to document and execute applicable recommendations.

Results: Over an 18-month period, the introduction of this system facilitated 6,876 additional interventions with an intervention rate increase from 14.34% to 25.52%. The acceptance rate by prescribers also increased by 9.11% from 69.02% to 78.13%. The intervention types that showed the greatest increase were drug bug mismatch in treatment, duplicate antimicrobial spectrum, dose recommendation, de-escalation in therapy, escalation in therapy, initiation of therapy and assessment of source control. Duration of more than seven days remained the most common intervention performed. The antimicrobials requiring the most interventions were meropenem, followed by ceftriaxone and ertapenem.

Conclusion: Introducing a customised digital solution for executing antimicrobial stewardship increased the number of interventions performed by pharmacists. The system assisted pharmacists in their decision-making processes, created confidence in their abilities, and led to more clinically robust interventions and greater acceptance from doctors.

Towards enhanced performance assessment in hospital pharmacy practice: a comprehensive model and pilot project in Quebec, Canada

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Introduction: The Ministry of Health in Québec, Canada, recently committed to adopting a patient-focused funding approach for its 34 healthcare centres, enabling benchmarking across hospitals, including pharmacy departments. However, traditional assessments of pharmacy performance have focused solely on financial metrics, overlooking pharmacists' clinical care. This oversight risks labelling pharmacists as high-cost without accounting for their impact on patient outcomes. Thus, the Quebec Hospital Pharmacists Association initiated an effort to implement a comprehensive framework for measuring pharmacists' activities province-wide, spanning acute and long-term care facilities.

Method: A Working Group, supported by an Advisory Committee of pharmacy practice experts, led the implementation process. Phase 1 involved surveying hospital Chief Executive Officers and other stakeholders to identify information needed to understand pharmacy department operations and pharmacists' roles. Insights from these consultations shaped a patient-centred performance model, with proposed indicators selected for each framework dimension. Implementation, starting in June 2017, required collaboration across Pharmacy, Information Technology, Performance & Quality departments, and frontline pharmacists for data collection. Phase 2 consisted of implementing 11 indicators in three centres over one year. Phase 3 extended the pilot to three more centres, testing 18 indicators over 18 months. A feedback survey documented pharmacists' experiences.

Results: Substantial data were gathered over three years, involving 358 pharmacists from six healthcare centres,

approximately 20% of Quebec's hospital pharmacists. Extracting data from centres' information systems posed challenges due to system diversity and lack of integration. Two indicators were discarded due to data collection issues, and five were added to better capture frontline pharmacists' clinical practice. Despite voluntary data collection, frontline pharmacist participation was 55%. Feedback surveys favoured in-person events over online tools for project promotion. Most respondents (94%) recognised the importance of collecting pharmacists' activity data, with 82% seeing relevance to future activity-based funding systems.

Conclusion: This project demonstrated integrating meaningful performance indicators into daily pharmacy activities is feasible. This experience provides a foundation for the Ministry of Health to consider incorporating these indicators into its financial performance system, fostering a more patient-focused funding approach. Balancing financial aspects with data reflecting pharmacists' clinical impact is essential for optimal patient outcomes.

Medication administration errors among neonates in the neonatal intensive care units

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Introduction: Medication administration errors (MAEs) are the most common type of medication error. They are more common among neonates as compared with adults. These errors pose significant risks to patients and impose a substantial economic burden on the healthcare system. Targeting and prioritising neonates at high risk of MAEs is crucial in reducing these errors. Therefore, the overall aim of this study was to develop and validate a risk prediction model for identifying neonates at risk of MAEs.

Method: This was a four-phase study. Firstly, a systematic review and meta-analysis were conducted to critically appraise the evidence on the prevalence and causes of MAEs among neonates in neonatal intensive care units (NICUs). Secondly, a cross-sectional study using a validated self-administered questionnaire was carried out to determine the estimated percentage of MAE reporting and describe the reasons for the occurrence of MAEs from nurses' perspective in five Malaysian public hospital NICUs. Thirdly, a prospective direct observational was conducted at the same study sites to determine the prevalence of MAEs and identify factors associated with MAEs. Lastly, a machine-learning (ML) model was developed and validated for the identification of MAEs among neonates in the NICU using the factors identified in the first three phases.

Results: In the first phase, the pooled prevalence of MAEs for direct observation and non-direct observation studies was 59.3% and 64.8%, respectively, with error-provoking environments identified as the most common cause. Based on the second phase, the estimated percentage of MAE reporting was 30.6%, with inadequate nursing staff, drugs which look alike and similar drug packaging among the common reasons for MAEs. The error rate recorded in the third phase was 68.0%, affecting a large population of neonates in the NICU (92.4%). Factors significantly associated with MAEs were medications administered intravenously (AOR = 21.18; 95% CI = 13.35-33.61; $p < 0.001$), unavailability of a protocol related to the preparation and administration of medications (AOR = 2.43; 95% CI = 1.54-3.84; $p < 0.001$), the number of prescribed medications (AOR = 1.11; 95% CI = 1.01-1.23; $p = 0.048$), nursing experience (AOR = 1.07; 95% CI = 1.04-1.11; $p < 0.001$), non-ventilated neonates (AOR=2.03; 95% CI=1.13-3.64; $p = 0.018$), and gestational age in weeks (AOR=0.94; 95% CI=0.91-0.97; $p < 0.001$). In the final phase, ten ML algorithms were assessed, and adaptive boosting (AdaBoost) was found to be the best-performing model (F1 score: 83.28%, accuracy: 77.63%, area under the receiver operating characteristic: 82.95%, precision: 84.72%, sensitivity: 81.88%, negative predictive value: 64.00%). The most influential features of AdaBoost were the intravenous route of administration, followed by working hours and nursing experience.

Conclusion: The findings from this research highlighted the burden of MAEs among neonates in NICUs and factors significantly associated with these errors. The developed and validated model could potentially prevent MAEs by identifying neonates at risk of these errors, leading to a reduction in patient harm and positively impacting the healthcare system.

Patient experiences and acceptance of pharmacist-led opioid tapering prior to total hip or knee arthroplasty: A qualitative study

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Introduction: Opioid analgesics are often prescribed in patients with osteoarthritis awaiting total hip or knee arthroplasty despite poor evidence as to their benefits. Chronic opioid use prior to hip or knee replacement is associated with worse clinical outcomes. Emerging evidence has shown that these outcomes may be reversible through deprescribing opioid analgesics prior to surgery. A pilot randomised controlled trial (RCT) was conducted by the research team to establish the feasibility of pharmacist-led opioid tapering prior to hip or knee replacement. The primary objective of this study was to understand patient acceptability and experiences with pharmacist-led opioid tapering, thereby evaluating the feasibility of this intervention.

Methods: Semi-structured interviews were conducted between July and September 2023. All patients who had received pharmacist-led opioid tapering prior to total hip or knee arthroplasty in the pilot RCT were invited to participate in this study. Interviews were audio recorded and transcribed verbatim. Data was analysed using an inductive thematic approach to identify main themes related to patient acceptance and experiences with pharmacist-led opioid tapering.

Results: In total, 16 interviews were conducted with patients following pharmacist-led opioid tapering. Three main themes were identified: i) the Need for intervention (pill burden, fear of addiction, opioid-related adverse effects); ii) the Patient's acceptability of intervention (understood and listened to, personalised care, helped and supported, empowered through education); iii) Alternative recommendations made during intervention (multimodal analgesia, non-pharmacological techniques, other health-care professionals).

Conclusion: Patients who underwent pharmacist-led opioid tapering felt empowered and supported in their pain management journey. Pharmacist-led opioid tapering was shown to be an acceptable and feasible intervention to reduce opioid dose prior to total hip or knee arthroplasty.