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CONFERENCE ABSTRACTS

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Pharmacy practice research

Exploring the effectiveness of simulation-based teaching strategies on pharmacy interns' learning outcomes in resolving injectable drug compatibility issues

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Background and Objectives: On an inpatient ward, injectable medications must be compatible. Mixing drugs or diluents incorrectly can lead to treatment failure, microembolism or severe toxicity. The challenge of providing correct advice on injectable medication is made more difficult by pharmacy interns limited clinical exposure and nascent problem-solving skills. This study used a simulation-based teaching strategy in a clinical setting to improve pharmacy interns problem-solving skills in injectable drug compatibility and familiarity with clinical contexts.

Methods: Standards for medication counselling skills were set, stressing clarity, appropriate solutions, and professionalism. Pharmacy interns' confidence was assessed using questionnaires. Participants were split into two groups: the intervention group received simulation-based learning in a simulated clinical ward, while the traditional group received conventional teaching. At the end of the training programme, the performance scores of the two groups of students on the OSCE were assessed using an independent t-test.

Results and Discussion: The findings of the study demonstrated that the OSCE scores, problem-solving skills, and attitudes of the intervention group underwent a substantial enhancement following the simulation activity. In comparison with the control group, the intervention group exhibited significant improvements in OSCE scores (44.11 ± 7.29 vs. 37.37 ± 8.19, $p < 0.05$), problem-solving skills (17.21 ± 3.46 vs. 14.05 ± 3.73, $p < 0.05$), and attitudes (17.84 ± 2.77 vs. 15.00 ± 3.65, $p < 0.05$).

Conclusion: The challenge of providing accurate information about drug compatibility for critically ill patients quickly is a priority in the ward. Our study showed that simulation-based learning improved pharmacy interns ability to resolve injectable drug compatibility issues. This learning improved many interns understanding of IV drug administration and boosted their confidence in recommending appropriate medications.

Bridging the gap in Hepatitis C virus cascade of care in Africa using community pharmacies: A feasibility and implementation study

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Background: Hepatitis C virus (HCV) remains a major public health challenge in Africa, where a significant proportion of the population is unaware of their HCV status, and access to diagnosis and treatment remains limited. According to the World Health Organization (WHO), only a small fraction of those affected receive appropriate care despite the high disease burden. Community pharmacies, as underutilized healthcare access points, offer a unique opportunity to expand HCV screening, point-of-care (POC) testing, and linkage to care in resource-limited settings. This study aims to evaluate the feasibility, effectiveness, and implementation of

pharmacist-led HCV screening and testing in community pharmacies across five African regions. In Western Africa (Nigeria and Ghana), Southern (South Africa and Zimbabwe), Northern (Egypt and Morocco), and Eastern (Kenya and Rwanda). Finally, Central Africa (Congo Brazzaville and Cameroon).

Methods: A prospective, mixed-methods, multi-country feasibility and implementation study will be conducted over 24 months in 20 community pharmacies across 10 African countries (Nigeria, Ghana, South Africa, Zimbabwe, Egypt, Morocco, Kenya, Rwanda, Congo Brazzaville, and Cameroon). Eligible participants (adults ≥18 years with HCV risk factors) will undergo pharmacist-led point-of-care HCV antibody testing. Antibody-positive individuals will receive HCV RNA testing to confirm active infection. Positive cases will be linked to specialist care for further management. Quantitative data on prevalence, screening uptake, diagnostic rates, and time to care linkage will be collected through electronic data capture. Qualitative insights from pharmacists and patients will be gathered through interviews and focus groups, guided by the Consolidated Framework for Implementation Research (CFIR) and analysed thematically.

Expected Results: This study will provide evidence on the feasibility and effectiveness of integrating point-of-care HCV screening into community pharmacies in diverse African contexts. It will identify key barriers and facilitators to implementation and offer insights into scalable and cost-effective strategies to improve HCV screening and linkage to care. Findings will inform policy recommendations for expanding pharmacy-led public health initiatives to address HCV and other infectious diseases in Africa.

Conclusion: Community pharmacies are generally accessible, thus leveraging them and incorporating innovative pharma-technologies will help bridge critical gaps in the HCV care cascade in Africa. Successful implementation could transform HCV screening and care delivery across resource-limited regions, contributing to WHO's 2030 HCV elimination targets.

Monitoring and optimizing adherence to GLP-1 analogue therapy: The role of community pharmacy interventions

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Background: Glucagon-like peptide-1 (GLP-1) analogues, including Wegovy® (semaglutid) and Ozempic® (semaglutid) have become an integral part of obesity and type 2 diabetes (T2DM) management worldwide. In December 2022, Wegovy® received approval for obesity treatment in Denmark, contributing to a rising number of patients being initiated on GLP-1 analogue therapy. Despite their proven clinical efficacy in promoting weight loss and glycemic control, adherence remains a significant challenge due to factors such as side effects, treatment costs, and lack of adequate information. Pharmacists, as accessible healthcare professionals, play a key role in addressing these barriers through medication counseling and adherence support. This study aimed to evaluate adherence among newly diagnosed patients prescribed GLP-1 analogues for obesity or type 2 diabetes. By following this patient cohort throughout their treatment journey, this study explores the impact of pharmacy-based interventions in optimizing adherence and patient outcomes.

Method: A structured study combining quantitative data and qualitative insights was conducted at a community pharmacy in Stevns, where newly diagnosed patients initiating treatment with Wegovy® or Ozempic® were surveyed. Data collection included pre-treatment assessments, a survey on medication-taking behaviors and three-month follow-up consultations focusing on weight progression, treatment persistence, and patient reported challenges. Adherence counseling was offered to enhance patient engagement and understanding.

Results: A total of 38 patients participated in the survey, with 37% using Wegovy® and 63% using Ozempic®. Among them, 94% reported no issues remembering to take their medication Adherence to injection guidelines was high, with 100% changing needles after each use and rotating injection sites. Side effects were reported by 18% of patients, including nausea, bloating, and constipation, while 26% were unsure if they had experienced adverse effects. Despite this, 97% reported no major challenges with medication use. Pharmacists played a key role in patient monitoring, with 50% receiving medication counseling. Notably, 12% felt better informed at the pharmacy than by their physician. Patients who engaged in follow-up observations showed varied treatment responses, with some reporting substantial weight loss while others experienced slower progress, weight stagnation, or muscle mass loss. Reduced appetite was a commonly cited benefit, helping patients regulate food intake. Several patients reported feeling motivated by the structured monitoring, as it provided a sense of accountability and progress tracking. A few highlighted that seeing their weight changes and receiving health data during follow-ups reinforced their commitment to treatment and encouraged adherence. However, adherence was influenced by side effects, financial concerns, and expectations regarding treatment outcomes, with some patients considering discontinuation.

Conclusion: Pharmacy-based adherence interventions, including structured follow-ups, patient monitoring, and counselling are valuable tools in improving adherence among patients using GLP-1 analogues. These results highlight the need and potential for expanded pharmacist interventions to improve and optimize long-term treatment strategies and supporting patient-centered care in obesity and diabetes management. Further intervention studies are needed to evaluate whether enhanced counseling and monitoring

strategies can improve long-term treatment outcomes and patient satisfaction.

Advancing pain management in tertiary care through pharmacoeconomic evaluation and strategic pharmacist-led interventions in clinical practice

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Introduction: Effective pain management significantly improves patient quality of life but poses challenges in achieving optimal clinical outcomes and cost-efficiency. Current gaps in integrating pharmacist-led interventions limit the ability to deliver comprehensive care. This study addresses these gaps by evaluating prescribing patterns and exploring multidisciplinary innovations to optimize pain management.
Purpose:
The study aimed to assess the pharmacoeconomic impact of pain management strategies and test the effectiveness of pharmacist-led interventions. The hypothesis was that these methods would improve clinical outcomes while reducing healthcare costs.

Method: A six-month observational study was conducted at a tertiary care hospital involving 160 healthcare professionals. Data on prescribing patterns, including non-opioid analgesics, opioids, and non-pharmacological treatments, were collected through electronic health records (EHRs) and structured surveys. Pharmacoeconomic evaluations, including cost-effectiveness analysis (CEA) and cost-utility analysis (CUA), were performed. Pharmacist-led medication therapy management (MTM) were implemented to enhance care delivery. Outcomes were assessed using the Numerical Rating Scale (NRS) for pain and direct medical costs. Data were analyzed using descriptive and inferential statistics, including Chi-square; Statistical significance was set at $p < 0.05$.

Results: The prescribing pattern analysis demonstrated that non-opioid analgesics accounted for 74.38% of all prescriptions, while opioids constituted only 3.75%, indicating adherence to established clinical guidelines. Non-pharmacological interventions were employed in 21.88% of cases, with the highest utilization observed in the Orthopaedics department at 22%, followed by the Paediatrics department at 16%.

A statistically significant association was identified between adherence to prescribing guidelines and the incidence of adverse drug reactions, with a chi-square value of 6.204 and a p-value of 0.045, indicating a higher risk of adverse drug reactions associated with non-adherence to clinical guidelines. Opioid prescribing demonstrated a significant association with the absence of interdisciplinary consultation, with a chi-square value of 8.102 and a p-value of 0.014, emphasizing the lack of collaborative decision-making in opioid prescribing practices. Furthermore, a significant association was observed between opioid use and the management of opioid-related adverse drug reactions, with a chi-square value of 7.321 and a p-value of 0.041, highlighting inconsistencies and variability in the approach to adverse drug reaction management across clinical departments. The implementation of pharmacist-led medication therapy management interventions resulted in a 12 percent reduction in adverse drug reaction incidence, an 18 percent reduction in direct medical costs, and a 32 percent improvement in pain scores among 25 percent of patients. These findings underscore the cost-effectiveness, safety benefits, and enhanced clinical outcomes associated with pharmacist-led, multidisciplinary pain management strategies.

Conclusion: This study demonstrates the critical role of pharmacists in advancing pain management practices through cost-effective, pharmacist-led interventions and multidisciplinary strategies. Future initiatives should focus on scaling these approaches across healthcare systems and integrating telepharmacy, real-time decision support, and predictive analytics to improve outcomes further. Topic Area: Pharmacy Practice Research Keywords: Pain Management, Pharmacoeconomics, Medication Therapy Management, Pharmacovigilance.

Methylenedioxymethamphetamine (MDMA)-assisted psychotherapy for post-traumatic stress disorder: Experience of Australian clinicians, researchers and patients

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Back**ground information:** Australia is the first country in the world to reschedule methylenedioxymethamphetamine (MDMA) to permit authorised prescribing of MDMA for Post-traumatic Stress Disorder (PTSD) outside of the clinical trial setting. However, gaps remain regarding the translation of research evidence into clinical practice.

Purpose: The objective of the study is to explore the experience of clinicians, researchers, and patients involved in MDMA-assisted psychotherapy (MDMA-AP), both within and beyond clinical trial settings. These experiences will help inform guidelines and principles to be followed before, during, and after initiating MDMA-AP for individuals living with PTSD.

Method: In-depth interviews were conducted with various interest-holders involved in the delivery of MDMA-AP. The semi-structured interviews were guided by a topic guide based on the World Health Organization (WHO) 6-step Guide to Good Prescribing. Interviews were transcribed verbatim and coded, with themes developed using both inductive and deductive approaches.

Results: A total of 21 participants were interviewed, including 10 clinicians (mental health general practitioners, psychiatrists, psychologists, psychotherapists), 4 researchers (health economist, pharmacologist, social worker, trial researcher), and 7 consumers. Eleven themes emerged: (1) Treatment for PTSD or underlying trauma: not necessarily a last resort; (2) Not a miracle cure: expectation management; (3) Perceived therapeutic potentials of MDMA-AP: facilitating emotional processing for holistic healing; (4) Comprehensive screening to ensure suitability and safety; (5) Varying values and preferences among people with lived experience; (6) Accessibility to treatment and flexibility in deciding treatment modalities; (7) Consent and protective measures are important for increased vulnerability; (8) Duty of care in establishing a strong therapeutic alliance; (9) Information about the process and logistics; (10) Safety of MDMA-AP and management of adverse events; (11) Continuity of care post-treatment.

Conclusion: The findings emphasised the need for a patient-centered approach, with an emphasis on safety, informed consent, and therapeutic alliance. As MDMA-AP transitions into clinical practice, the insights from this study will inform the development of comprehensive guidelines to ensure its safe and effective use.

Pharmacist-led intervention and audit & feedback to reduce inappropriate medication prescriptions in patients over 65 years of age in primary care: The AIM study

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Introduction: Polypharmacy is a global concern, particularly among adults over the age of 65, leading to increased risks of falls, cognitive decline, hospitalizations, and mortality. In Spain, approximately 31.6% of adults over 65 are affected, with 34-73% receiving potentially inappropriate prescriptions.

Study protocol

Objectives: To assess the effectiveness of a pharmacist-led intervention and an Audit and Feedback (A&F) strategy for addressing potentially inappropriate medications in patients aged 65 and above. This includes the use of benzodiazepines, proton pump inhibitors, and antipsychotic treatments for dementia patients over a 12-month period.

Methods: A parallel randomized clinical trial will be conducted in Spain across three healthcare districts: Mallorca (Balearic Islands), Tarragona (Catalunya), and Paterna (Valencia). All family doctors who have treated patients in the last three months and are expected to continue for the following six months will be included for randomization. The intervention will feature an adaptive A&F approach, providing doctors with individualized graphs, tailored messages on deprescription indications, and access to an online training course led by primary care pharmacists. Additionally, doctors in the 75th percentile of prescribing rates for certain indicators will receive a personalized 25–30-minute intervention from the primary care pharmacist. This intervention will involve setting specific objectives, enhancing knowledge of appropriate prescription practices, addressing questions, and discussing specific cases. Doctors will also have the option to receive lists of patients receiving potentially inappropriate medications. The control group will actively receive A&F on antibiotic prescriptions. Data will be analyzed using an intention-to-treat approach. The evaluation will assess acceptability, reach, adoption, fidelity, feasibility, and sustainability.

Ethics and dissemination: The study was approved by the Balearic Islands Ethics Committee. The findings of this trial will be disseminated through research conferences and peer-reviewed journals. The AIM (PI22/01669) Study received a research grant from the Carlos III Institute of Health (ISCIII), Ministry of Science and Innovation (Spain) and European Union ERDF funds (European Regional Development Fund). It is also part of the Research Network on Chronicity, Primary Care, and Health Promotion (RICAPPS) (RD21/0016/0009), and is funded by the European Union – NextGeneration

The vulnerable populations' inclusiveness in pharmaceutical care (VIP-Care) Project: Validating a battery of tests and assessing pharmacists' attitudes in community setting

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Introduction: Inclusiveness in healthcare is a multifaceted theoretical concept encompassing inclusivity, diversity, and equity. Inclusiveness can be affected by healthcare professionals' ethical attitudes and moral behaviours, emotional intelligence, and well-being. This project aimed to validate a battery of tests and a composite scale to assess community pharmacists' inclusiveness in pharmaceutical care. A secondary objective was to explore pharmacy equity practices and assess variations in care delivery across patient populations.

Method: A self-administered questionnaire was distributed to community pharmacists and students training in community pharmacies. The questionnaire collected participants' sociodemographic characteristics and used validated scales to assess their inclusivity, patients' prioritisation, ethical attitudes, moral behaviours, emotional intelligence, well-being, and work fatigue. The validity of these scales was confirmed before their integration into a battery of tests to measure overall inclusiveness. Clustering analysis and a composite scale were used to identify correlates of participants' scores on the inclusiveness battery. Results: Based on a sample of 340 pharmacists, the suggested battery of validated tests comprised three primary components: (1) Healthcare Equity, Inclusivity, and Professional Integrity; (2) Moral and Ethical Perceptions; and (3) Psychological Wellness and Interpersonal Skills. The scales demonstrated robust construct and structural validity in exploratory and confirmatory factor analyses and excellent internal consistency. Overall, participants demonstrated a moderate level of inclusiveness. Female gender, working in a pharmacy serving more than 100 patients per day, and having 6-12 years of pharmacy experience were significantly associated with higher inclusiveness. Conversely, working 1–16 hours per week and lacking a designated place in the pharmacy to discuss confidential information were linked to lower inclusiveness.

Higher pharmacist inclusiveness scores, including inclusivity and accessibility, professional commitment, integrity, ethical practice, moral expansiveness, emotional intelligence, and empathy, were associated with more equitable patient care. The highest priority in healthcare was given to elderly and pregnant women, followed by children, disabled people, and lactating women ($p < 0.05$). Subsequent categories included individuals with higher socioeconomic status, Alzheimer's disease, physical and mental disabilities, those from different religions, lower education, or socioeconomic status. Average priority was reported for other ethnicities and sexes, as well as refugees, those with body dysmorphic problems, and HIV. Individuals with behaviours outside the social norms, such as past prisoners or convicted individuals and drug abusers ($p < 0.05$), were assigned a low priority, with the lowest prioritisation reserved for people with sexual breaches of social norms, i.e., living in civil partnerships, sexual minorities, and transgender patients ($p < 0.001$). Practicing pharmacists with experience exceeding 12 years showed lower diversity and higher inequity ($p<0.05$) in prioritising vulnerable populations.

Conclusion: This study allowed the validation of a battery of tests and an associated composite scale to measure the multifaceted concept of inclusiveness and identify its correlates. Moreover, patient prioritisation patterns reflected the influence of cultural, religious, and social norms, while pharmacists' well-being influenced the prioritisation of socially marginalised categories. While improving pharmacist well-being is essential for promoting equitable care, further studies are necessary to confirm these findings and explore their applicability across other healthcare settings.

Implementing community pharmacist-assisted medical teleconsultations

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Introduction: Emergency department (ED) overcrowding and limited access to primary care highlight the need for innovative healthcare solutions. Assisted teleconsultation in community pharmacies offers an accessible and timely alternative for semi-urgent medical needs, leveraging interprofessional collaboration and digital health technologies. This initiative aligns with the regional telehealth strategy, extending the Geneva University Hospitals' telemedicine service to community pharmacies. A pilot study has confirmed its feasibility.

The purpose of the four-year action-research study is to evaluate the implementation and societal economic impact of community pharmacist-assisted teleconsultation (CPAT) in an urban Swiss setting.

Method: The study follows a hybrid type-2 implementation-effectiveness design, structured into four work packages:
(1) Implementation: identification and adaptation of implementation strategies, such as interprofessional collaboration, based on contextual analysis.
(2) Potential demand estimate: analyzing patient profiles, healthcare utilizations, and perceptions among those visiting EDs and pharmacies
(3) Population adoption: mixed method service evaluation, including patient feedback immediately after the CPAT and one week later
(4) Economic evaluation: cost-effectiveness and societal economic impact analysis, also considering implementation costs and remuneration of pharmacists/physicans.

Pharmacy onboarding includes on-site education led by an interprofessional pharmacist-physician team. The main implementation strategies include bi-monthly facilitation visits, monthly newsletters, practice guidelines, and quarterly interprofessional meetings involving pharmacists, teleconsultation physicians, and investigators to review progress and share experiences. Implementation evaluation integrates qualitative data from stakeholder focus groups, visit and meeting notes, and quantitative data from consultation reports. The multidisciplinary research team comprises pharmacists, physicians, health economists, and a patient partner.

Results: Eight innovative pharmacies have joined the project. A steady increase in teleconsultations has been observed following each quarterly meeting (e.g., 8 CPATs in December, 8 in January, and 14 in February). Initial findings indicate:
•High patient acceptance, although public awareness remains low in the early project phases.
•Technical challenges with the teleconsultation platform, which have hindered service uptake. However, ongoing communication, agile problem-solving, and collaborative redesign efforts have sustained engagement.
•Key areas for service optimisation, identified with participants, include improved patient identification strategies, enhancing pharmacists' clinical skills, engagement of full pharmacy teams through a "champions" strategy, clarification of pharmacist and technician roles, and strengthening interprofessional collaboration to augment teleconsultation in comparison to non assisted service.

Conclusion: Preliminary results underscore the risks associated with a lack of a robust technological solution, while sustained pharmacist engagement is fostered through regular communication with the project team and physicians. The time required for practice change and public awareness were identified as key targets for increasing service adoption on a larger scale. Future implementation efforts will focus on targeted promotional campaigns such as 'Think Health, Think Pharmacy', positioning pharmacists and physicians as key providers of accessible primary care. The use of medical devices and digital health technologies will also be investigated to expand the range of medical conditions that can be managed by the service. The summative evaluation will provide insights into scalability and inform decision-makers and funders on the potential system-wide impact.

A qualitative study to refine and finalize the MedManageSCI prototype: A web-based toolkit to support medication self-management in adults with spinal cord injury/dysfunction

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Introduction: Adults with spinal cord injury/dysfunction (SCI/D) often take multiple medications to manage commonly occurring secondary conditions such as pain, spasticity, neurogenic bladder and bowel, and cardiovascular and respiratory complications. Challenging managing multiple medications have been described by adults with SCI/D, some of which include managing side effects, understanding complex regimens, communicating with healthcare providers, and integrating medications into daily routines. To support medication self-management, the prototype of a web-based toolkit, MedManageSCI, was co-designed by our research team, adults with SCI/D, caregivers, and healthcare providers (www.medmanagesci.ca). Key content areas, design elements, and branding were identified collaboratively to develop the initial prototype.

Purpose: The purpose of this study was to further refine and finalize the MedManageSCI prototype by examining the clarity, comprehensiveness, relevance, and delivery of the toolkit modules.

Methods: A descriptive qualitative study was conducted. Study participants included adults with SCI/D who had a traumatic or non-traumatic injury, were at least three months post-injury, 18 years of age or older, living in Canada, and able to communicate in English. Cognitive interviews were conducted virtually between July 2024 and September 2024. A concurrent verbal probing approach using scripted and spontaneous probes was followed. The interviews lasted up to 60 minutes in length and were audio-recorded. Data analysis was an iterative process. A deductive coding matrix was used to organize the data based on the scripted probes in the interview guide. Following each interview, the interviewer listened to the audio-recording and deductively coded the data directly into the coding matrix. Once all interviews were coded, the data were categorized.

Results: A total of sixteen adults with SCI/D participated in this study. Twelve participants (75%) had traumatic injuries and 4 participants (25%) had non-traumatic injuries. Participants provided nearly 200 recommendations to improve the MedManageSCI prototype by enhancing the clarity, comprehensiveness, relevance, or delivery of the toolkit modules. These recommendations were categorized as Comprehension, Design, and Delivery. Overall, participants thought the modules were comprehensive and highly relevant. The Comprehension category contained the majority of feedback and had three subcategories: Written Refinements, Ensuring Accessibility, and Revamping Resources. The Design category contained three subcategories: Formatting Content, Streamlining Function, and Enhancing Visuals. In terms of Delivery, participants described a website as an ideal way to deliver the toolkit.

Conclusions: The findings from this study provided valuable insights to refine the MedManageSCI prototype. Following these refinements, the web-based toolkit will be finalized for implementation. Future research will be conducted to assess the feasibility, acceptability, and appropriateness of MedManageSCI. Actively involving individuals with SCI/D in the development and refinement of the toolkit prototype ensures the content is tailored to their needs, increasing its potential relevance and usability. This collaborative, co-design approach will enhance engagement and facilitate the successful adoption and wider dissemination of MedManageSCI.

Co-design and prototype development of MedManageSCI: A medication self-management toolkit for adults with spinal cord injury/ dysfunction

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Introduction: As one of the most common interventions in healthcare, medications are used to prevent, manage, and treat illnesses and conditions. Certain populations, such as adults with spinal cord injury/dysfunction (SCI/D), are more

prone to taking medications. This is because of secondary conditions, such as pain, spasticity, urinary tract infections, and osteoporosis, that are often experienced post-injury. Consequently, adults with SCI/D interact with multiple healthcare providers and engage in activities related to medication self-management. Adults with SCI/D have noted significant challenging self-managing multiple medications. However, there are limited resources tailored to this population that comprehensively address the tasks, skills, and behaviours of medication management.

Purpose: The aim of this study was to co-design the prototype of a medication self-management toolkit for adults with SCI/D.

Methods: This was a participatory, multi-methods study that included adults with SCI/D, caregivers, and healthcare providers from across Canada. The Good Things Foundation Pathfinder Model was used to guide the co-design process. This model consists of three main stages – understand and define the problem, ideas and prototype, and test. In Stage 1, we understood and defined the problem by conducting a scoping review, concept mapping study, and working group sessions. In Stage 2, we created a prototype of the toolkit through working group sessions and website development meetings. In Stage 3, we tested the prototype of the toolkit through a working group session.

Results: The concept mapping study included 44 participants, including 21 adults with SCI/D, 12 healthcare providers, and 11 caregivers. The working group consisted of 19 individuals, including 9 adults with SCI/D, 9 healthcare providers, and 1 caregiver. In Stage 1, the scoping review identified a lack of medication self-management intervention tools for adults with SCI/D, which emphasized the need for a comprehensive and tailored resource. In the concept mapping study, participants generated ideas about the content to include in the toolkit, and thematized and prioritized the content into eight categories: general medication information, safety and lifestyle considerations, information-sharing and communication, healthcare provider interactions, peer connections, accessing prescription medications, information on non-prescription medication, and practical strategies. In Stage 2, the working group selected the name of the toolkit, MedManageSCI. They also provided feedback on the visual content, which was categorized as: first impressions, message and purpose, visual elements, layout and flow, and graphics. Through an iterative and collaborative process with the website development team, a web-version of the MedManageSCI prototype was created (www.medmanagesci.ca). In Stage 3, participants provided recommendations to enhance the functionality and navigation of the website.

Conclusions: Co-designed by adults with SCI/D, caregivers, and healthcare providers, MedManageSCI is a comprehensive toolkit to assist the SCI/D community with medication self-management. Further efforts are required to finalize the prototype of MedManageSCI and to assess the feasibility, acceptability, and appropriateness of the toolkit, as well as outcomes related to medication management. Ongoing feedback has been instrumental in shaping key improvements to the content, design, and functionality of MedManageSCI, ensuring its relevance to the target audience and facilitating its implementation.

Enhancing clinical pharmacy training in resource-limited settings: An international pharmacy practice residency program with a layered learning approach

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Background: Pharmacy residency programs are essential for developing clinical competencies, yet limited access to structured training programs remains a barrier in resource-limited settings. The International Pharmacy Practice Residency (IPPR) Program was designed to enhance clinical training in Nigeria through the implementation of a layered learning approach, addressing the need for structured mentorship, workforce capacity building, and improved patient-centered care.

Purpose: This initiative aimed to establish a replicable pharmacy residency model integrating global mentorship, structured learning, and evidence-based clinical training, with the goal of enhancing pharmacists' competence in medication therapy management and interdisciplinary collaboration.

Method: The IPPR Program was piloted at Delta State University Teaching Hospital (DELSUTH), a 290-bed, 24-clinic facility in Nigeria with a weekly patient load of 1,000. The program was developed in collaboration with the West African Postgraduate College of Pharmacists (WAPCP) and led by a US-based consultant. A layered learning model was implemented, where: 10 US-based board-certified pharmacists (UbC) served as virtual coaches. 4 preceptors-in-training (PiT) (WAPCP fellows) received direct mentorship. 5 Nigerian-based experienced preceptors supervised clinical rotations. Residents completed a two-year structured program following ASHP standards, incorporating longitudinal experiences, mandatory and elective rotations, and interdisciplinary collaboration. PharmAcademic, a

residency management system, was used to track progress, document clinical interventions, and enhance training transparency.

Results: Residents identified medication therapy problems such as unnecessary medications and inappropriate therapy choices. Ongoing clinical interventions optimized medication therapy and improved patient safety. Preceptors-in-training reported enhanced mentoring and precepting skills, contributing to sustainable capacity building. The program's structured approach led to improved clinical competencies among participants, fostering an advanced pharmacy practice environment.

Conclusion: The IPPR Program demonstrates a scalable and replicable model for structured pharmacy training in resource-limited settings. By integrating virtual global mentorship, structured learning pathways, and evidence-based clinical interventions, the program successfully enhances workforce capacity and patient-centered care. In the future, we plan to seek ASHP accreditation to ensure global recognition and maintain high-quality residency training standards. Additionally, we aim to expand this model to other institutions in Nigeria and WAPCP member countries, further strengthening sustainable pharmacy education and training.

Testing, prevention, collaboration: A multi-methods study of a Canadian pharmacist-led model for HIV, HCV and syphilis testing (APPROACH 2.0)

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Background: Rates of sexually transmitted and bloodborne infections (STBBI) are rising globally. The World Health Organization reported 374 million new bacterial cases (chlamydia, gonorrhea, and syphilis) in 2020, and in 2023, around 1.3 million new HIV and 1 million new hepatitis C (HCV) infections occurred. Innovative STBBI testing approaches are crucial to identify the undiagnosed. While pharmacy practice varies by country, the shift towards patient-centred care offers pharmacists opportunities to integrate into the healthcare system, providing comprehensive services that enhance accessibility. Pharmacists are well-positioned to offer STBBI services, eliminating barriers to care and connecting patients with other providers.

Purpose: Evaluate the implementation of a pharmacist-led STBBI testing model in three Canadian provinces.

Methods: This is a multi-methods study. Pharmacists offered point-of-care (HIV, HCV) and/or dried blood spot (HIV, HCV, syphilis) testing. They collected blood samples, administered tests, and provided pre-and post-test counselling. Clients with reactive results were offered laboratory requisitions for confirmatory testing and linkage to care. An electronic questionnaire gathered clients' demographic and risk behaviour information. Visit data were collected and stored in an electronic database. Post-study evaluation pharmacists' focus groups explored their experiences implementing the STBBI testing model. Descriptive statistics were used to analyze testing encounter records and questionnaires, while thematic analysis was employed to interpret the focus group data.

Results: From September 2023 to April 2024, 1,424 tests were conducted across 399 visits. More than half of the questionnaire respondents identified as men (55%), resided in large urban areas (60%), and one-third reported lacking a primary care provider (31%). Commonly reported risk factors included sexual intercourse without a condom (81%) and multiple sexual partners (54%). Clients were tested for HIV (97%), HCV (87%), and/or syphilis (68%), with 33%, 37%, and 41% indicating they were first-time testers for each infection, respectively. Thirteen percent of clients reported no previous testing for any STBBI. Twenty-five participants had reactive test results (1 HIV, 11 HCV, and 13 syphilis). Available confirmatory laboratory test results revealed four current cases of HCV and two syphilis infections. Post-study focus groups (n=18) centred on themes of 1) preparedness for STBBI testing, 2) implementation challenges and facilitators, and 3) patient-centred care and personal commitment as motivation. Overall, pharmacists felt well-prepared to offer these services after completing the training program provided by the research team. Pharmacists discussed how time management, staffing, and workflow integration influenced their testing capabilities. Compensation and colleagues' willingness to adopt new practices were reported as challenges. Nevertheless, the study protocol's adaptability, collaborative networks, regulatory structures, and support from decision-makers facilitated the implementation process. Additionally, pharmacists reported that STBBI testing is an important, well-received, patient-centred service, and they expressed a desire to expand their scope of practice in this field.

Conclusion: Pharmacist-led STBBI testing successfully reached first-time testers and identified new infections. Pharmacists reported positive experiences with the testing model; they felt well-prepared and found professional value in providing testing services to their communities. The findings will inform recommendations for scaling up a pharmacist-led STBBI testing model.

The career aspirations of overseas pharmacists planning to qualify and work in the UK

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Introduction: In recent years one solution to the pharmacy workforce shortages in the UK, has been support for overseas qualified pharmacists to work in the UK. This has been a successful initiative and approximately a third of UK pharmacists were born overseas.

Pharmacists who are qualified outside of the EEA and would like to register as a pharmacist in Great Britain, need to complete the Overseas Pharmacists Assessment Programme (OSPAP), complete foundation training and pass the common registration assessment. Applications to the GPhC to be eligible for an OSPAP course have dropped in last two years, whereas the pharmacist vacancy rate in all sectors is increasing.

The aim of this study, at one of the OSPAP providers, was to explore the career aspirations of overseas pharmacists coming to work in the UK.

Method: An online survey was developed, with a combination of closed questions and statements focussed around three key areas: previous pharmacy experience; career plans in the UK; and sources of career support. The survey was sent to all the OSPAP students studying at the University of Hertfordshire in the academic year 2024/25. A link to the survey was posted to all students via the virtual learning platform in March 2024 and data was collected over a two-week period.

Results: In total 18/48 (38%) OSPAP students completed the survey. Most of the respondents were aged under 35 years (72%) and were female (67%). The respondents had qualified from a wide variety of countries including Nigeria, India, Ukraine and The Philippines.

When asked about their identity as a pharmacist 89% respondents strongly agreed or agreed with the statement “My identity is closely linked to being a pharmacist” with 100% of respondents agreeing that “Pharmacy has been a very positive career for me”.

When asked about their experience prior to coming to the UK, 83% had worked in hospital pharmacy, 67% in community pharmacy and 33% in the pharmaceutical industry. However, 39% of respondents were not sure if their prior experience would influence their career choices in the UK. The participants reported that the most important factors that they considered when applying for a pharmacy job in the UK were salary (33%), travel/proximity to home (22%) and experience to reach career goals (22%).

Discussion: Understanding the career aspirations and decision-making of overseas pharmacists coming to the UK, may help the NHS/other employers provide the appropriate careers support to pharmacists, in the current climate of shortages. Overseas pharmacists coming to the UK have a strong sense of identity as a pharmacist, and many of them are open to new career opportunities in the UK. This may be the time for employers to work with overseas pharmacists to deliver new solutions to workforce challenges.

This study is a small study with a single cohort of students, which is a limitation. The next phase of this research is to use the survey with a wider group of OSPAP students from across all providers and alumni.

Interrupting and distracting pharmacists when dispensing - what are the consequences? A scoping review of the impact of interruptions and distractions in pharmacy practice.

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Introduction: Whilst pharmacists have been reported to reduce medication errors by identifying 30% to 70% of medication-ordering errors, they have been known to also contribute to dispensing errors. Interruptions during dispensing account for around 9% of dispensing errors with reports of frequent distractions that occur every 2 to 6 minutes. The aim of this project was to examine the impact of interruptions and distractions during the dispensing process and showcase what interventions have been tried to prevent or reduce these distractions.

Method: A scoping review search was undertaken June 26, 2024, November 13, 2024, and January 16, 2025. Descriptive statistics and content analysis were used to identify the most common types of distractions, their frequency, impact and types of interventions used.

Results: The review yielded 51 articles, revealing the most common type of external interruption to be phone calls. Face-to-face inquiries from consumers were also common sources of interruptions, as well as interruptions from shop staff interrupting the pharmacist to manage customer queries that were out of their scope. Internal distractions were also noted where pharmacists would get distracted by wanting to switch to another task, check in on other staff members whilst dispensing or non-related web browsing. These distractions largely impacted the dispensing process, pharmacists' workload performance and wellbeing, and patient’s time. Only a few interventions to mitigate the risk of interruptions have been tried and fall into three main categories: Facility modification (changing the workplace environment); system

modification (changing the workflow process), and modification of communication methods (reducing direct access to the pharmacist whilst dispensing).

Conclusion: With only few interventions conducted at the workplace and no educational interventions at the tertiary level, this scoping review may inform more interventions and strategies to build better foundational dispensing habits as well as methods to reduce the need to have direct access to the pharmacist whilst dispensing. Recommendations such as not having one sole pharmacist on duty at a time and ensuring clearly defined roles for different pharmacists at different times may also be plausible methods to reduce dispensing errors.

Pharmacists as wellness and preventive medicine advocates (WPMA): A framework for corporate and community-based health promotion in Africa

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Introduction: Noncommunicable diseases (NCDs) such as hypertension, diabetes, obesity, and mental health disorders are reshaping Africa's public health landscape, contributing to 37% of deaths in Africa and 75% of global mortality. Despite being largely preventable, responses to NCDs remain reactive, focusing more on treatment than prevention. Underinvestment in proactive health interventions has left a significant gap in disease prevention strategies.

An untapped opportunity exists at the intersection of workplace wellness and community pharmacy services. Adults spend nearly 60% of their waking hours at work, yet structured corporate wellness programs remain scarce. Meanwhile, community pharmacies, highly accessible healthcare touchpoints, are underutilized in preventive care, largely confined to medication supply rather than proactive health advocacy.

A paradigm shift is needed, redefining pharmacists as Wellness and Preventive Medicine Advocates (WPMA). Given their accessibility and trust, pharmacists can serve as frontline advocates for preventive healthcare, providing early disease detection, lifestyle counseling, and mental health support in both corporate and community settings. By integrating pharmacists into workplace wellness programs and expanding their roles in community-based prevention, this model aims to democratize healthcare access, enhance early intervention, and shift healthcare focus from treatment to overall well-being.

Puppose: The Wellness and Preventive Medicine Advocate (WPMA) Model introduces a pharmacist-led framework to promote preventive healthcare in Africa through two key channels:

Corporate Wellness Programs (CWP) – Workplace-based initiatives that promote employee health and wellness. Community Wellness Pharmacies (CWPx) – Pharmacies serving as wellness hubs, offering preventive health services to the general population.
This model assesses the feasibility of integrating pharmacists into preventive healthcare systems while designing a structured framework for corporate and community-based wellness interventions.

Method: A hybrid exploratory approach was adopted in two phases:

Situational Analysis

Reviewed global and African pharmacist-led wellness programs.
Identified gaps in pharmacist involvement in preventive healthcare, wellness coaching, and mental health support. Assessed the potential of pharmacies as wellness hubs.

Development of the WPMA Model Designed using the WHO Health Promotion Framework, tailored to African healthcare needs. Integrated two service delivery channels: Corporate Wellness Programs (CWP) – Health risk assessments, digital wellness coaching, medication therapy management, and stress management. Community Wellness Pharmacies (CWPx) – Health screenings, lifestyle counseling, medication therapy management, and wellness coaching.

Results: The WPMA model is expected to achieve the following:

Corporate Wellness Programs (CWP):

40% increase in early detection of NCD risk factors. 35% improvement in lifestyle modification adherence. Improved health literacy through monthly health talks. Limited health equity impact, primarily benefiting employees.

Community Wellness Pharmacies (CWPx):

50% increase in early detection of NCD risk factors. 45% improvement in lifestyle modification adherence. Health literacy enhancement through community health workshops.

Expanded health equity impact to underserved populations.

Conclusion: Pharmacists, as Wellness and Preventive Medicine Advocates (WPMA), can enhance early NCD detection, improve health literacy, and promote healthcare equity. Integrating WPMA into corporate and community wellness initiatives aligns with global health priorities. Pilot studies are needed to assess feasibility, scalability, and long-term sustainability.

Adherence to guideline - based peri-operative antibiotic prophylaxis in cesarean section: A retrospective study in a tertiary care hospital

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Background: The appropriate use of peri-operative antibiotics to prevent Surgical Site Infections is a well-established quality metric. Little is known about the adherence to guidelines-based antibiotic prophylaxis among obstetricians and gynecologists in the United Arab Emirates. Cefazolin is the most widely studied antimicrobial agent with proven efficacy for antimicrobial prophylaxis. It has good spectrum of activity against organisms commonly encountered in surgery with excellent safety among pregnant and breast-feeding females with cost effectiveness benefit. It is therefore essential to evaluate the adherence to antimicrobial stewardship guidelines in Obstetrics and Gynecology (OBG) department to plan interventions and improve clinical outcome.

Aims and objectives: To measure the rate of adherence to antimicrobial stewardship guidelines, in the Department of Obstetrics and Gynecology, as per the Clinical Practice Guideline adopted in the Fujairah hospital.

Design: The study was conducted using retrospective data analysis involving 587 in-patients from the Department of Obstetrics and Gynecology of a JCI-accredited largest tertiary care public hospital under Emirates Health Services on the east coast of the United Arab Emirates.

Methods: A retrospective study using cases over three years (January 2019 to December 2021), meeting the criteria of adult females undergoing elective caesarean surgeries in the Department of Obstetrics and Gynecology, Fujairah Hospital, were included in the study. The data were analyzed using IBM SPSS Statistics (version-29). Descriptive and inferential statistics were applied to achieve the study objectives. Pearson's chi-square test/z-test for proportion was performed to prove the improvement in compliance rate over the years. Kruskal Wallis test was used to show the significant difference in the year-wise distribution of patients' weight, dosage and other parameters. $P<0.05$ was considered as statistical significance.

Results: This study demonstrated a trend for increased adherence for peri-operative antibiotic prophylaxis for the use of Cefazoline from 95% in 2019 to around 99% in 2020 & 2021. Simultaneously, there was a trend for a decrease in patients who were not given prophylactic cefazolin from 3.4% to 0.5% during the same period. Interestingly, another positive finding from the study was that there was a decreased rate of wrong choices from 20% in 2019 to 1.9 % in 2021, which was statistically significant.

Conclusions: Overall increasing compliance to peri-operative guidelines from 2019 to 2021 was demonstrated in this study, indicating an improved adherence rate of Peri-operative Antibiotic Prophylaxis. It is also very encouraging to find a reduction in the wrong choice/dose over the three years.

Relevance to clinical practice: This study highlights the increased adherence to peri-operative antibiotic prophylaxis guidelines and good antimicrobial stewardship activities with team effort at the Department of Obstetrics and Gynecology of a tertiary care public hospital under Emirates Health Services on the east coast of the United Arab Emirates. Such activities encourage patient safety and confidence in the UAE's patient care and health services.

Patient or Public Contribution: Improving adherence to Guideline-Based Peri-operative Antibiotic Prophylaxis will reduce antibiotic abuse and improve patient safety.

Impact statement: Among healthcare professionals, there was an improved adherence rate of Peri-operative Antibiotic Prophylaxis.

Monotherapy versus dual lipid-lowering therapy in high-risk coronary artery disease patients

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Background information: European Society of Cardiology guidelines recommend dual therapy with a high-intensity statin and ezetimibe if target low-density lipoprotein cholesterol (LDL-C) is not achieved with statin monotherapy. Ezetimibe is currently not available on the local government formulary and necessitates out-of-pocket payment by patients.

Purpose: To assess lipid-lowering therapy and LDL-C levels in coronary artery disease (CAD) patients who underwent a cardiac intervention.

Method: This cohort study was undertaken at the Cardiac Rehabilitation Unit (CRU) of Mater Dei Hospital. Following ethics approval, patients ≥20 years, diagnosed with CAD, who underwent percutaneous coronary intervention (PCI) or coronary artery bypass graft (CABG) surgery, and attended the CRU between January 2022 and December 2023, were included. LDL-C levels were assessed at four time points: at the time of intervention, baseline (t1), 3-6 months post-intervention (t2), 7-11 months (t3) post-intervention, and 4-6

months after starting dual therapy (t4). The Wilcoxon test was used to compare mean LDL-C levels between the four time points. The Mann Whitney Test was used to assess any difference in mean LDL-C between rosuvastatin 20mg and 40mg doses at t3 and t4. A p-value less than 0.05 was considered statistically significant.

Results: From 90 patients assessed (male n=80, mode age 60-69 years n=33, Caucasian n=88), reason for admission was STEMI (n=64) or NSTEMI (n=26), and most patients (n=76) underwent PCI. Relevant risk factors and comorbidities included hypertension (n=65), obesity (n=39), active smoking (n=27), diabetes (n=14), and previous revascularisation (n=10). Mean LDL-C at baseline (t1) was 3.37 mmol/L and atorvastatin 80mg was started in all patients. With atorvastatin 80mg, mean LDL-C decreased to 2.43 mmol/L (t2). None of the patients were at target LDL-C (<1.4 mmol/L) with atorvastatin monotherapy, hence treatment was changed to rosuvastatin. Mean LDL-C (t3) was 2.32 mmol/L with rosuvastatin 20mg (n=14) and 2.34 mmol/L with rosuvastatin 40mg (n=76). None of the patients were at target LDL-C with rosuvastatin monotherapy, hence dual therapy was started. Mean LDL-C (t4) was 1.4 mmol/L with rosuvastatin 20mg + ezetimibe 10mg (n=2), 1.60 mmol/L with rosuvastatin 40mg + ezetimibe 10mg (n=83), and 5 patients did not attend follow-up. With dual therapy, 31 (36%) patients achieved target LDL-C. The decrease in LDL-C levels from t1 to t4 was statistically significant ($p<0.05$). Mean LDL-C values varied marginally between the 20mg and 40mg rosuvastatin doses at both t3 and t4 ($p>0.05$).

Conclusion: Dual therapy with rosuvastatin and ezetimibe resulted in a significant decrease in mean LDL-C levels and higher achievement of LDL-C target compared to monotherapy. These findings points towards a need for updating lipid-lowering therapy protocols according to guidelines to ensure therapy accessibility and timely management of high-risk cardiac patients. A limitation of the study was that factors which may affect LDL-C levels, such as therapy adherence, diet, lifestyle, and family history, were not assessed.

Enhancing medication safety in pharmacy practice: An AI-driven digital health solution to reduce adverse drug reactions and self-medication risks

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Introduction: Adverse drug reactions (ADRs) and medication errors are among the leading causes of hospital admissions, particularly affecting vulnerable populations such as the elderly. In the UK, ADR-related hospitalizations cost approximately £770 million annually, while in the US, over 1.5 million hospital admissions per year are linked to medication errors. The growing use of over-the-counter (OTC) drugs, combined with prescribing and dispensing errors, further increases these risks. There is an urgent need for innovative, technology-driven solutions to enhance medication safety, minimize healthcare costs, and improve patient outcomes.

Method: This study evaluates the impact of an AI-driven e-medicine platform designed to prevent ADRs, self-medication risks, and medication errors. The platform provides personalized medication recommendations, tracks drug histories, and incorporates automated alerts for potential drug interactions and inappropriate self-medication. By integrating digital health technologies, it facilitates real-time monitoring, enhances healthcare provider decision-making, and supports efficient emergency response. The platform is designed to be user-friendly, making it accessible even to individuals without a medical background.

Results: Implementation of the platform demonstrated significant improvements in medication adherence and safety. Users reported a reduction in medication errors, particularly those related to duplicate therapies and drug interactions. The system's automated alert function effectively minimized prescribing and dispensing errors. Additionally, the platform contributed to cost savings by reducing preventable hospitalizations and optimizing healthcare resource utilization. Its ability to provide real-time medication data proved particularly valuable in emergency situations, allowing healthcare providers to make informed and timely treatment decisions.

Conclusion: The e-medicine platform offers a scalable, cost-effective digital health intervention that enhances medication safety, optimizes resource allocation, and improves patient outcomes. By leveraging real-time surveillance, AI-driven alerts, and seamless healthcare integration, it serves as a proactive solution to medication-related errors, aligning with the goals of pharmacy practice innovation and health system resilience. The platform addresses one of the leading causes of preventable mortality, underscoring its significant impact on patient safety and healthcare efficiency.

Pharmacy workforce wellbeing survey in Great Britain

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Background Information: Pharmacy teams are working extremely hard across the health service to care for patients. Previous surveys show the impact of pressures on the workforce, including adequate staffing, workload, financial pressures, and professional development. Evidence suggests

that workplace pressures and their impact on mental health and wellbeing remain significant issues throughout the pharmacy profession.

Purpose
•Gather evidence on the mental health and wellbeing of the pharmacy workforce.
•Identify and address barriers to accessing support services or implementing workforce wellbeing measures.
•Identify areas requiring further improvement and/or support.
•Use data to develop policy and advocate for the profession to improve workforce wellbeing.

Method: The Workforce Wellbeing online survey was developed in collaboration with Pharmacist Support and distributed using Microsoft Forms. In 2024, the General Pharmaceutical Council (GPhC) and the Association of Pharmacy Technicians UK (APTUK) collaborated on the survey by reviewing the questionnaire content and disseminating it to members and registrants. The survey included questions exploring respondents' current mental health and wellbeing, workplace experiences, and awareness and access to support services and resources. An eligibility screening section ensured only the target population responded to the full questionnaire.

Most questions in (Sections 1 to 6) were mandatory, with ability to skip further non-applicable questions. Section 7 (Inclusion and Diversity) was optional and provided a free-text "Other" option. The survey was open to both RPS members and non-members. Data was exported to Excel and analysed using descriptive and inferential statistics. Qualitative data was coded and thematically analysed using deductive methods. Burnout scores were calculated using the Oldenburg Burnout Inventory. Responses were compared to previous years' datasets, with notable year-on-year differences reported.

Results: A total of 6,598 responses were received in 2024, a 5.5 times increase from 2023. 67% of respondents were pharmacists, 30% were pharmacy technicians, and 3% were foundation/trainee pharmacists, MPharm students, or others. Key findings include:
•87% of respondents at high risk of burnout.
•70% experienced loneliness in the last 6 months.
•61% considered leaving their current role or the pharmacy profession in the past year.
•56% said their mental health and wellbeing were impacted by medicines shortages, with 41% stating this put patients at risk. 49% suffered verbal abuse due to shortages.
•78% were offered a rest break, but 39% frequently chose not to or were unable to take it; 17% were not offered a break.
•59% not offered sufficient Protected Learning Time.
•Factors negatively impacting mental health and wellbeing include inadequate staffing (70%), lack of work/life balance (49%), increased financial pressures (47%), lack of PLT (47%), lack of colleague or senior support (47%), and long working hours (34%).

Following previous surveys, round table discussions were held, publishing a report and joint statement. Subsequent roundtables to this report in March 2025 led to collaborative actions to improve workforce wellbeing.

Conclusion: The pharmacy profession is at a very high risk of burnout. Continued efforts are needed to address workplace pressures and improve mental health and wellbeing.

The role of pharmacists in antimicrobial stewardship

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Introduction: Antimicrobial resistance (AMR) is a critical global health challenge driven largely by the inappropriate use of antimicrobial agents. Antimicrobial Stewardship Programs (ASPs) have been implemented to optimize antimicrobial use, reduce resistance, and improve patient outcomes. Pharmacists play a pivotal role in ASPs, yet their full integration is hindered by various barriers. This study aims to examine the role of pharmacists in antimicrobial stewardship, evaluate the impact of pharmacist-led interventions, and identify challenges and facilitators influencing their participation.

Method: A scoping review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. Electronic databases were systematically searched for studies published in English between 2010 and 2023. Inclusion criteria encompassed studies focusing on pharmacist-led interventions in ASPs across healthcare settings. Data were extracted, thematically analyzed, and synthesized to identify key roles, interventions, barriers, and facilitators affecting pharmacists' participation in ASPs.

Results: The review identified a growing body of literature highlighting the significant contributions of pharmacists in ASPs. Pharmacist-led interventions such as antimicrobial prescribing audits, real-time alerts, prior authorization systems, point-of-care diagnostic testing, and educational initiatives were associated with reduced inappropriate prescribing, improved patient outcomes, and cost savings. Hospital pharmacists were recognized as antimicrobial advisors, while community pharmacists contributed to antibiotic stewardship through patient education and collaborative prescribing efforts. Despite these contributions, barriers such as limited resources, lack of interprofessional collaboration, inadequate training, and organizational constraints hindered pharmacists' full engagement in ASPs. Facilitators for improved involvement included policy support, structured training, enhanced recognition of

pharmacists' contributions, and integration into multidisciplinary teams.

Conclusion: Pharmacists play a critical role in ASPs by optimizing antimicrobial use and combating AMR. However, several barriers limit their full participation. Addressing these challenges through policy reforms, targeted training, and interprofessional collaboration can enhance pharmacists' engagement and impact in antimicrobial stewardship. Strengthening their role will be essential in achieving global efforts to mitigate AMR and improve healthcare outcomes.

Empowering pharmacists to generate evidence in practice: Development of a training programme

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Background information: The International Pharmaceutical Federation (FIP) Development Goal 11 ("Impact & Outcomes") emphasizes the need to generate evidence on the impact of the pharmaceutical workforce within health systems and health improvement.

Aligned with this goal, the South and Autonomous Regions Branch (SARB) of the Portuguese Pharmaceutical Society (PPS) created in 2022 the "Centre of Studies for the Pharmacy Profession", based on three elements that comprise every FIP Development Goal: Education, Practice and Training. Integrated in the "Training" element, PPS developed the "Scientific Development Training Programme", which aims to raise awareness and train pharmacists to generate and use evidence in their practice.

Goal: To describe the development of a "Scientific Development Training Programme" and to share its outcomes.

Methods: To set up the "Scientific Development Training Programme", the PPS team benchmarked other initiatives and held several meetings to discuss the content and structure of the learning modules. Based on the findings, the PPS team structured the Programme's learning pathway, divided into five modules. The learning modules include a diversity of formats (i.e., webinars, asynchronous and synchronous courses) that are applicable to different participants according to their level of expertise (from basic to advanced level) with the aim of reaching all interested pharmacists (from community pharmacists to PhD students and academics).

The first module aims to raise awareness about the importance of generating and using scientific evidence in the professional practice. The second module is dedicated to training pharmacists in the basics of scientific research. The third module focuses on tools to be used to produce scientific material. The fourth module aims to train pharmacists how to communicate the scientific material produced. The last module seeks to display options for the initiation and progress in a scientific career.

Results: The first module included a promotional webinar about the programme, held on-line on March 2023. The initiative consisted of a basic knowledge level webinar on "Pharmaceutical Services and Evidence Generation", with a total of 498 registered participants.

The second module was composed by 3 different training courses: "Introduction to Scientific Research", "Design Thinking: Turning Research into Innovation" and "Integrity in Scientific Research". A total of 312 pharmacists registered in these initiatives.

The third module was comprised of 4 different courses dedicated to data collection and analysis in scientific research and management of information sources and references, with 341 registrations.

The fourth module included 2 different courses focused on training pharmacists to develop scientific posters, abstracts, oral communications and other forms of communicating scientific evidence, with a total of 157 registrations.

The fifth and last module included a webinar dedicated on how to produce and promote a Science Curriculum Vitae for grants or fellowships, with a total of 60 pharmacists attending.

Conclusion: Pharmacists has shown interest in the "Scientific Development Training Programme". The PPS considers this programme as an important step towards the development of practice-based research, thus contributing to the recognition of the impact of the pharmaceutical workforce on health systems and, ultimately, on the improvement of populations health.

Key challenges in hospital pharmacy practice in Turkey: A global comparison

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Introduction: Hospital pharmacists play a crucial role in patient care, patient safety, and the efficiency of healthcare systems. However, hospital pharmacists face several challenges, such as workforce shortages, limited professional rights, and inadequate continuing professional development (CPD) opportunities, which hinder their effectiveness and professional satisfaction. This study aims to analyse the key challenges faced by hospital pharmacists in Türkiye over the last decade, compare them with international standards, and identify potential solutions and policy recommendations.

Method: To understand the current situation of hospital pharmacy in Türkiye, the outcomes of the 2024 Hospital Pharmacy Symposium and Workshop, organised by the Ankara Chamber of Pharmacists, were evaluated with the literature and reports focusing on hospital pharmacy in Türkiye. In addition, a literature review of international challenges in hospital pharmacy was conducted. The findings were also compared with international recommendations, including the Basel Statements on Hospital Pharmacy, and best practice from other countries.

Results: Participants in the workshop came from public, private and university hospitals, mainly based in Ankara, the capital of Türkiye. The results show that many of the challenges discussed earlier still exist. Key persistent issues include workforce shortages with undefined roles for chief pharmacists; limited professional rights such as low salaries and lack of financial support for night duties; communication gaps with hospital management and regulatory bodies; unmet CPD needs; challenges in pharmaceutical procurement due to tendering processes; suboptimal and inadequate workspace in hospital pharmacies; and limited integration of clinical pharmacy services due to a lack of structured roles and institutional support.

Similarly, hospital pharmacists around the world face similar challenges, particularly in terms of workforce shortages, high levels of burnout and multiple responsibilities. However, various strategies have been implemented internationally to address these issues, including increased staffing, enhanced education, regulatory updates and financial incentives. In addition, hospital pharmacy is experiencing a significant transformation with the increasing integration of digital health, artificial intelligence, automation, and telepharmacy. Global efforts are underway to address these new challenges, with best practices being developed and implemented to improve hospital pharmacy services.

Conclusion: Although the situation of hospital pharmacists in Türkiye has improved over the past decade, ongoing challenges continue to limit their potential contribution to healthcare. Addressing workforce capacity, professional rights, continuing education, and stronger engagement with health authorities is essential to improve the effectiveness and motivation of hospital pharmacists.

Additionally, recognising the strategic role of hospital pharmacists and integrating their expertise more effectively into healthcare decision-making processes can strengthen pharmaceutical care and patient safety. At the same time, emerging technologies present both opportunities and challenges, and it is crucial for hospital pharmacists in Türkiye to continuously adapt and update their skills to keep up with these changes.

Finally, strengthening global collaboration through knowledge sharing and international initiatives can further support the development of hospital pharmacy in Türkiye.

Clinicians' views on the culturally safe implementation of a transition of care stewardship service for First Nations patients on discharge: A qualitative study

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Background: The transition of care from hospital to home poses a great risk for medication-related adverse events and hospital readmissions, especially in rural and remote Australia. For First Nations Australians, this risk is further exacerbated due to the longstanding and ongoing effects of colonisation and culturally inappropriate healthcare. Conversely, culturally safe healthcare revolves around how services are delivered without racism in a safe, accessible and responsive way. Pharmacist-led programs such as Home Medicines Reviews (HMR) have shown to improve medication safety and reduce adverse events throughout the care continuum. Thus, a pharmacist-led discharge intervention that ensures the safe transition of care for First Nations Australians may address medication-related adverse events after discharge. Gaining the perspectives of clinicians who are involved in First Nations peoples' healthcare can provide

novel insight into the implementation of such an intervention.

Purpose: The purpose of this study is to explore the perspectives of clinicians involved in First Nations Australians' healthcare on informing the culturally safe implementation of a medication-focused discharge intervention in rural and remote Australia.

Methods: An open-ended interview guide was formulated to gather opinions from health professionals on potential cultural safety adaptations for a medication-focused discharge intervention. The interview guide was iteratively amended to explore barriers and facilitators of the intervention, and the overall implementation process. Semi-structured interviews were conducted in person or via videoconferencing with clinicians working in rural and remote Australia. Interviews were transcribed verbatim, and framework analysis was undertaken to inductively identify key themes.

Results: A total of 30 clinicians were interviewed in rural, regional, and remote New South Wales. Clinicians' occupations included nurses (n=9), pharmacists (n=8), physicians (n=6), Aboriginal Health Workers (n=5) and allied health assistants (n=2). Three key themes were identified by clinicians to help inform the culturally safe implementation of the discharge intervention: (i) understanding patient needs and values; (ii) adaptation of clinician practice to improve communication; and (iii) health system support.

Conclusion: A system-wide approach that places the needs and values of First Nations Australians at the centre of care is required to implement a culturally safe and supportive discharge intervention. Further research on the perspectives of First Nations Australians is required to holistically inform the culturally safe implementation of a medication-focused discharge intervention.

Discharge interventions and their cultural adaptations for first nations peoples: a systematic review

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Background: The transition from hospital to home remains a prominent issue that leads to negative health outcomes when not addressed appropriately. Inadequate and insufficient discharge planning is one of the key safety issues that increase the risk of patient harm when transitioning back to the primary health network. Risks of negative outcomes at these transitions for First Nations peoples may be inflated, due to a lack of culturally safe healthcare. Culturally safe healthcare is delivered free of racism, and recognises the inherent power imbalance between practitioners and patients as a result of the generational and ongoing effects of colonisation. It is determined by the people receiving care at the individual and/or community level, not by the practitioner providing care. However, evidence-based, culturally safe transition of care frameworks have yet to be established for First Nations peoples.

Purpose: The purpose of this review was to identify and evaluate the existing discharge interventions that have been implemented for First Nations peoples, and to summarise the cultural safety adaptations of these interventions.

Method: A systematic search of databases such as Medline, Embase and Scopus was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement guidelines. Studies were included if they were primary research that included First Nations peoples in any country, had an intervention that was implemented in relation to discharge from hospital, and evaluated patient outcomes after discharge in a quantitative manner. Studies were excluded if no cultural adaptations were made for First Nations peoples.

Results: Two independent researchers screened 3,320 titles and abstracts against the selection criteria; the full text of 21 publications were assessed, of which 8 were included in this review. Seven of the studies were conducted in Australia, with one conducted in Hawaii. The studies covered a range of

patient groups such as maternity, chronic conditions, cardiovascular conditions, and paediatrics. Five of the intervention components identified were also considered cultural adaptations: facilitation of connection to community services, inclusion of a First Nations health worker or liaison officer, initiation of staff cultural training, holistic healthcare frameworks and culturally sensitive education resources. Two interventions were not directly cultural adaptations: health and risk screening, and multidisciplinary discharge planning. Two additional cultural safety components that were not considered interventions were the use of cultural imagery, native language and First Nations authorship. From the studies included in this review, outcomes were reported for rate of adverse events post-discharge, connection to primary care providers, and satisfaction of patients.

Conclusions: The findings of this review support the implementation of discharge interventions that are culturally adapted to inform safe communication and address cultural and social determinants to health that affect First Nations patients' outcomes after discharge. Further controlled primary studies are required to inform evidence-based, and routinely implemented discharge interventions for First Nations peoples.

Psychological predictors of self-medication with antibiotics among postpartum women in Tema, Ghana: Insights from the health belief model

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Introduction: Self-medication with antibiotics (SMA) is a persistent public health issue in Ghana, driven by systemic and regulatory challenges. Postpartum women, a vulnerable yet overlooked group, face increased risk of infections and recovery complications, potentially leading to unsupervised antibiotic use. This practice jeopardises maternal and neonatal health outcomes. While most interventions emphasize awareness and access, limited studies have explored the psychological drivers of SMA, especially among postpartum women. The study addresses this gap by applying the Health Belief Model (HBM) to investigate perceptual determinants of SMA, offering a theory-driven lens for behaviour-oriented interventions.

Purpose: The study aimed to determine the prevalence and psychological predictors of SMA among postpartum women, exploring how sociodemographic factors and Health Belief Model constructs (perceived susceptibility, severity, benefits, barriers, cues to action, and self-efficacy) influence SMA behaviour.

Methods: A quantitative cross-sectional study was conducted among 331 postpartum women seeking postnatal services at Tema General Hospital in January 2025. Participants were selected through systematic random sampling. Data were collected using a structured, pre-validated questionnaire aligned with the six Health Belief Model constructs. Statistical analyses were performed using SPSS v27.0. Descriptive statistics and logistic regression assessed associations at ($p<0.05$) between sociodemographic factors, psychological perceptions and SMA. Reliability and model adequacy were confirmed using Cronbach's alpha (range: 0.756–0.856) and Durbin-Watson test (1.758).

Results: The prevalence of SMA was 38.4%. Age was a strong predictor of SMA, with women aged 18–31 years (AOR = 4.75; 95% CI: 0.820–17.097, p = 0.003) and 32–38 years (AOR = 3.77; 95% CI: 1.01–22.689, p = 0.045) more likely to self-medicate than those aged ≥39 years (AOR = 2.52; 95% CI: 0.608–10.335, p = 0.015).

Employment status was significant: self-employed (AOR=0.33; 95%CI: 0.136–0.806, p=0.015) and unemployed (AOR=0.27; 95% CI 0.077–0.916, p=0.036) women had lower odds of SMA than formally employed women.

Among the HBM constructs, cues to action emerged as the strongest predictor of SMA, with medium-level cues (AOR = 12.31; 95% CI: 5.496–27.558, p < 0.001) and high-level cues (AOR = 21.91; 95% CI: 4.442–10.808, p < 0.001) significantly increasing the odds of SMA than low cues.

Perceived barriers were protective, with medium (AOR = 0.21; 95% CI: 0.084–0.529, p < 0.001) and high levels (AOR = 0.26; 95% CI: 0.044–0.583, p < 0.001) correlating with reduced likelihood of SMA. Also, psychological perceptions varied significantly ($p<0.05$) across various sociodemographic factors.

Conclusion: Cues to action emerged as the strongest predictor of SMA, highlighting their role as a key psychological lever in reducing SMA among postpartum women. This study reinforces the applicability of the health belief model in understanding drug use behaviour, showing that SMA is a psychologically driven decision shaped by risk perception and behavioural motivators, not just knowledge deficits. Findings advocate for behaviourally informed antimicrobial stewardship interventions in routine postnatal care, integrating strategies to counter misleading cues and emphasizing the risks of inappropriate antibiotic use to improve maternal and neonatal health outcomes. Future research should qualitatively explore internal and external cues and consider integrating additional behavioural theory models for a comprehensive understanding

Collaborative drug therapy management enhances both the value of pharmacists and patient experience

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Introduction: One of the ongo

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

Methods: With strong support from our hospital's medical department and clinical departments, senior clinical pharmacists independently conducted several specialty collaborative drug therapy management (CDTM) outpatient clinics, including for medications used in gastrointestinal stromal tumors, lung cancer, asthma, cardiovascular diseases, and COVID-19 pharmacotherapy.

These clinics provide patients with therapeutic drug monitoring and individualized medication and dosage adjustments guided by genotyping. Services offered also include treatment for adverse drug reactions such as rashes, edema, hand-foot skin reactions, gastrointestinal reactions, leukopenia, and anemia. Furthermore, the clinics provide guidance on special dosage forms of asthma medications, respiratory symptom treatments, medication optimization, and simplification, all of which are specialized CDTM pharmaceutical services with distinct characteristics.

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

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

Community pharmacist influenza vaccination sandbox: Empowering Singapore's pharmacists in providing vaccination service

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Background: Pharmacists have played a key role in vaccination services, including influenza immunisations in countries such as the United States, the United Kingdom, Canada, Australia, and New Zealand over the past decade. Their involvement has led to increased vaccination rates, and high consumer satisfaction. Community pharmacists are strategically positioned across Singapore as non-clinic forefronts of community health, with more than 160 retail pharmacies, many of which provide after-hours services. This positioning allows them to improve public access to influenza vaccines. However, regulatory constraints and the absence of a structured professional training framework currently limit the expansion of pharmacists' roles in providing influenza vaccination services in Singapore.

Purpose: The Ministry of Health (MOH) has established a regulatory sandbox to create a safe and regulated environment for trained community pharmacists to provide influenza vaccinations at participating retail pharmacies for eligible individuals aged 18 and above who do not have certain medical conditions. This sandbox aims to establish the necessary regulatory and professional framework for community pharmacists to administer influenza vaccines, and to evaluate key indicators.

Method: An Expert Panel committee, comprising multidisciplinary clinician experts across healthcare settings, was appointed to advise on the sandbox requirements, including key components of the proposed care model and corresponding measures to safeguard public safety. These measures were then promulgated in the form of regulatory exemption conditions to ensure strict adherence by the participating pharmacies. Key sandbox indicators include a minimum service uptake target of 200 vaccinations, evaluation of management of reportable and vaccine adverse events, findings from post-vaccination patient experience survey and results of pharmacy site audits.

Results: The sandbox was launched in October 2024, involving three approved retail pharmacy sites and eight pharmacists who successfully completed the requisite training programme. Positive public feedback was received through the patient experience surveys.

Conclusion: The regulatory and professional frameworks implemented in this sandbox were effective in improving accessibility of influenza vaccination while validating the acceptability and safety of pharmacist-administered vaccination in the community. The sandbox serves as a

strategic step to promote influenza vaccine uptake in the primary care setting, while empowering pharmacists to support General Practitioners and other healthcare professionals as part of a future collaborative team-based care model in the community.

Naloxone availability in Australian community pharmacies 2015- 2025: Policy impacts and changes over time

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Introduction: Opioid related harms are a global public health concern. In Australia, a range of harm reduction strategies designed to mitigate and reduce opioid related harms have been implemented, including take home naloxone. Naloxone is an opioid antagonist, and when administered promptly, can reverse the effects of an opioid overdose. Prior to 2022, naloxone was only available for a fee and with a prescription, however following the implementation of the national take home naloxone program, naloxone was made available to patients at no cost, through participating pharmacies. This paper presents data collected among Australian community pharmacists across four waves from 2015-2025 and explores availability and stocking of naloxone over the past decade.

Methods: Data were collected over 11 years via four cross-sectional, anonymous, online surveys among Australian community pharmacists. Wave 1 (2015) and Wave 4 (2025) were among a nationally representative sample of community pharmacists, while Wave 2 (2020) was among Victorian pharmacists and Wave 3 (2023) was among pharmacists in Australia's four most populous states, New South Wales, Queensland, Victoria and Western Australia.

Results: Among a nationally representative sample of community pharmacists (Wave 1), findings revealed that just 23% of pharmacies stocked naloxone. Rates of stocking naloxone increased in 2020 (Wave 2), where 38% (n=100) of Victorian pharmacists indicated they stocked naloxone and a third of these had supplied naloxone in the past year. Following the implementation of Australia's national take home naloxone program in 2022, whereby naloxone was made available for free from participating community pharmacies, data from Wave 3 (2023) showed an increase in the number of pharmacies stocking naloxone, with 60% (n= 321) indicating they stocked naloxone. Naloxone availability continued to increase, with data from Wave 4 (2025) among a nationally representative sample of community pharmacies, revealing 74% (n=349) of community pharmacies stock naloxone. Correlates of stocking naloxone have changed over time, with increased comfort stocking naloxone among pharmacists, while pharmacists offering other harm reduction services such as opioid agonist treatment, have greater odds of stocking naloxone.

Conclusion: This comprehensive program of work highlights access to naloxone, via community pharmacies in Australia has increased substantially since 2015, particularly following the implementation of the national take home naloxone in 2022. Policy changes including down scheduling naloxone to be available without a prescription and for free, have removed known barriers to naloxone access. Pharmacists are at the clinical interface between prescribers and patients and are uniquely positioned to identify and respond to prescription opioid-related risks. Ensuring all community pharmacies have this evidence-based, overdose reversal drug available is one important step towards making naloxone available to anyone who may be at risk of an opioid overdose or who has a high chance of witnessing an opioid overdose.

Contribution of dispensing in community pharmacies to medication safety: development of a comprehensive generic model

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Background information: Dispensing of prescribed drugs to patients is the main task of community pharmacists, supported by electronic prescriptions and automated medication surveillance systems, although specific process organization may vary between countries. Additionally, other factors influence medication safety, e.g. effective communication between community pharmacists and general practitioners and empowerment of patients. At present, a comprehensive description of the dispensing process regarding its impact on medication safety is lacking.

Purpose: To develop a comprehensive generic model that describes all relevant process steps during dispensing in community pharmacies, their ability to ensure medication safety as well as related barriers and facilitators for efficient implementation of the dispensing process.

Method: First, a literature search was performed to extract information from recent pharmacy practice research (PPR) papers from the Netherlands regarding situations, drugs and

patients presenting a high risk at the time of dispensing as well as measures to increase medication safety during dispensing. Information collected was assessed for completeness by snowballing recent international papers in Pubmed. Second, the dispensing process was observed in two community pharmacies in the Netherlands, combined with in-depth interviews with community pharmacists and technicians on the main dispensing steps, associated facilitators, barriers and additional process steps regarding situations, medications and patients at high risk. From these findings, a model was developed using generic terms for process steps, facilitators and barriers. The Consolidated Framework for Implementation Research (CFIR) was used to describe barriers and facilitators. Model steps were illustrated with specific examples from Dutch pharmacy practice. Third, a focus group with Dutch experts on quality management in community pharmacies will be conducted to confirm the process steps and to assess the potential risk of individual process steps by an adapted simplified Failure Modes and Effects Analysis. Finally, the generic potential of the model will be evaluated by German experts for its utility to describe dispensing processes, barriers and facilitators to medication safety in their country.

Results: 18 PPR papers published between 2001 and 2024 were included. As expected, examples of high risk included antithrombotic agents, elderly patients with chronic kidney disease and the hospital discharge process. The means to improve medication safety were for instance professional collaboration and laboratory monitoring. Six international papers didn't add further information. After the on-sites visits in the pharmacies, the draft of the comprehensive model consisted of 12 main steps with barriers and facilitators in different CFIR domains. It will be assessed by 8–10 Dutch experts in April 2025 and validated for potential use in Germany by 3–5 German experts in June 2025.

Conclusion: The intention is to present a comprehensive generic model of the dispensing process with essential process steps, their potential to reduce medication risks as well as related barriers and facilitators. This model is further intended to support the visibility of the essential contribution of community pharmacists and their teams regarding medication safety during dispensing. The model will be updated with the insights from assessments outside the Netherlands to facilitate its use in different countries.

Impact of a pharmacist-led education program on knowledge in patients admitted with an acute heart failure: A randomized clinical trial (Educ-HF)

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Introduction: Managing heart failure (HF) condition and medication is challenging for patients following hospitalization. Enhancing their understanding of HF is crucial for improving self-care skills, medication adherence, quality of life and decreasing morbi-mortality. The clinical pharmacist can provide education during hospitalization to help them. This study aimed to assess the impact of a pharmacist-led education program, on knowledge and humanistic outcomes 1 month after discharge.

Method: A single center parallel randomized clinical trial was conducted over one year in cardiology and internal medicine wards of a Swiss university hospital. Participants were adults with acute HF with a left ventricular ejection fraction < 50 % and treated under guideline-directed medical therapy. Intervention consisted of an education program that featured a two 45-minute bedside game-based therapeutic patient education on HF condition and medication, a discharge counseling discussion, and a post-discharge pharmacist follow-up by phone. Patients in control group (CG) received usual care. Knowledge was evaluated at baseline and 1-month post-discharge using a 17 item-questionnaire. Secondary outcomes were change scores in beliefs about medicine questionnaire specific, 3-items self-report medication adherence questionnaire and for intervention group (IG) directly post-education knowledge score and satisfaction.

Results: Nineteen patients were randomized in each group, for a total of 38 participants. At baseline, mean knowledge score was 9.4 (SD 1.9) in the IG and 8.9 (SD 2.7) in the CG. The mean knowledge scores at 1-month post-discharge significantly differed between groups [10.4, SD 1.9 vs 9.0, SD 1.8] in favor of the IG with a mean difference of 1.4 [95%CI 0.1-2.7] and 1.3 (95%CI 0.2-2.4) when adjusted to baseline score. None of the secondary endpoints were statistically significantly different between groups. Patients in the IG

significantly increased their mean knowledge score directly post-education to 12.8 (SD 2.2) comparing to baseline and were highly satisfied with the program.

Conclusion: This education program tailored to HF inpatients improved their knowledge of HF and its medication. Inclusion of pharmacists in hospital HF teams is valued. These findings support implementing the program during hospitalization and suggest complementary outpatient sessions to reinforce patients' knowledge.

Clinical pharmacy services provided via telemedicine to justice-involved individuals

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Introduction: For justice-involved individuals, healthcare at correctional facilities has not always been prioritized, accessible, or delivered consistently. For instance, prior to the implementation of telemedicine for the management of HIV in the Illinois Department of Corrections (IDOC), merely 50% of individuals were virologically suppressed. The Illinois Department of Corrections entered into an interagency agreement with the University of Illinois Hospital and Health Sciences System to deliver multidisciplinary care for HIV, hepatitis c, and diabetes to 26 prisons across the State of Illinois.

The goal of this program was to expand proper medication utilization, medication education, and medical access to subspecialty care through the utilization of telemedicine while improving clinical outcomes in justice-involved individuals.

Method: A multidisciplinary team composed of pharmacists (clinical, dispensing), pharmacy technicians, providers (medical doctors, advanced practice registered nurses), social workers, outreach workers, and nurses managed patients living with HIV (2010 – present), hepatitis C (2010 – present), and diabetes (2023 – present) through the provision of telemedicine. Both collaborative care and pharmacist-led models of care were utilized in providing care to justice-involved patients using a clinical protocol (equivalent to a collaborative practice agreement). Antiretroviral therapy, hepatitis C, and diabetes treatments were dispensed by our on-site pharmacy to each prison. Retrospective data was collected for the HIV and hepatitis C programs as the diabetes program was newly implemented.

Results: Since the inception of our telemedicine intervention, more than 3,000 justice-involved individuals living with HIV received care. Of those receiving treatment, 99% were virologically suppressed with an HIV-1 RNA <50 copies/mL. Almost 2,000 justice-involved individuals in the state of Illinois received treatment for hepatitis C and 98% of individuals who received treatment achieved sustained virologic response in the post-direct acting antiviral era. Alone in the first year of the diabetes expansion program, 475 new patients entered into subspecialty care with additional prisons still receiving on-boarding for patients. Through the provision of this program, more than 100,000 prescriptions were generated and dispensed.

Conclusion: Not only did the provision of telemedicine achieve sustainable clinical outcomes in justice-involved individuals living with HIV and/or hepatitis C in the IDOC, but through the success of this model, it expanded access of care for those living with diabetes. This model also generated a new line of funding through the generation of prescriptions for HIV, hepatitis C, and diabetes treatments. Furthermore, this provided a mechanism to train pharmacy-learners to be practice-ready to provide direct patient care to justice-involved patients while utilizing telemedicine in areas of care underrepresented in current pharmacy training.

Validation of MEDRISK: Medication Evaluation and Determination of Risk Stratification tool

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Introduction: Increasing healthcare costs emphasize the need for the enactment of cost-reduction strategies in the healthcare system. Amongst strategies to reduce healthcare costs, identifying and preventing medication-related problems (MRPs) is a top priority. Clinical evidence highlights the preventable nature of most MRPs, however, patients at risk often go unidentified by healthcare professionals, increasing adverse events, adverse outcomes and overall healthcare expenditure. The use of multiple medications, age, and use of high-risk medications are all factors that contribute to MRPs in patients. Use of multiple medications increases MRP risk and influence patient-specific health determinants like medication adherence. Use of high-risk medications intensifies MRP risk due to narrow therapeutic indexes, high toxicity, and black box warnings, especially in elderly patients.

Pro-active patient assessment and screening for actual and potential MRPs patients can reduce the risk of medication-related harm. The aim of this project is to determine the validity and inter-rater reliability of MEDRISK, a medication risk-stratification tool.

Method: The MEDRISK tool was designed for use by healthcare providers to stratify patients by MRP risk to allow for increased scrutiny of patient assessment, closer

communication with other healthcare providers, and enhanced patient support and education.

The tool, designed by clinical pharmacists, assesses individual patient risk of experiencing MRPs. It consists of 5 sections that assess patient specific factors such as age, adherence, medication regimen, and chronic conditions. The AGS Beer's Criteria is utilized to assess patients 65 and over to identify pharmacokinetic and pharmacodynamic medication changes that increase safety risk. The ISMP list of high alert medications is also integrated into the tool to improve assessment of actual or potential MRPs. Factors affecting patient adherence to medications, such as social determinants of health, medication frequency, pill burden and insurance complexity are also evaluated to better guide healthcare professionals regarding potential interventions that can target individual patient needs.

A set of 60 standardized patients was created for reliability and validity testing of the calculator. Standardized patient information included patient age, medication list, and list of medical conditions. Ten percent of standardized patients did not have a list of medical conditions included to simulate settings where a patient's medical history is not readily available, such as retail community pharmacies. Pharmacist and pharmacy student raters applied the MEDRISK tool to 10 randomly selected standardized patients. Inter-rater reliability is assessed using intraclass correlation coefficient (ICC). ICC estimates and their 95% confidence intervals are calculated based on a mean rating, consistency, two-way mixed effects model. Pearson correlation coefficient is utilized to assess validity of the tool.

Results: Thirty raters (15 pharmacists, 15 pharmacy students) assessed 10 standardized patients. Results are currently being analyzed and will be presented in the scientific research poster.

Conclusion: Development and validation of the MEDRISK tool can be integrated into health professions curricula, as all health professionals interact with patients and discuss medications to varying degrees. Likewise, a published validated and reliable tool will be an asset to ultimately improve patient health outcomes around the world.

Development and feasibility of a telehealth system (Impak Sihat) to empower rural population in Malaysia on the quality use of medicines

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Introduction: The global rise in chronic diseases necessitates quality use of medicines (QUM) and adherence for effective management. In Malaysia, a lack of understanding regarding QUM among patients adversely affects healthcare outcomes. Various factors contribute to high rates of irrational medication use, particularly in rural areas, highlighting the importance of ongoing involvement from healthcare providers, potentially facilitated by a customized telehealth system. This study aimed to develop a tailored telehealth system for Malaysia's rural population and evaluate patient experiences and acceptance.

Methods: The research unfolded in three phases: i) a qualitative pre-development phase assessing internet access and health information-seeking behaviours; ii) the creation of the telehealth system (Impak Sihat—health impact) based on identified needs; and iii) a post-development feasibility assessment of the Impak Sihat system through community demonstrations and validated questionnaires.

Results: In the pre-development phase, fifteen respondents were interviewed, achieving saturation and revealing insights regarding health issues, internet usage, social media preferences, and technology literacy. A customized telehealth system was developed to meet the identified needs, complete with appropriate content and resources. Following system development, a feasibility study involving 77 participants indicated acceptable scores ranging from 73% to 87% across six domains. However, older age was significantly correlated with lower scores in the 'User-friendly features and ease of learning and understanding' domain ($p<0.01$).

Conclusions: The telehealth system has been successfully developed and demonstrates potential effectiveness in addressing the needs of Malaysia's rural population. To enhance future applications of this system, factors such as older age, socioeconomic status, internet reliability, and information confidentiality must be taken into account.

Perceptions of pharmacists about primary care pharmaceutical services provided to young people with chronic illness

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Introduction: Recent evidence has shown that the incidence of long-term illnesses in young people is increasing (1). Pharmacists, as medicine experts, are in a unique position to promote young people's health by improving their knowledge regarding the effective use of medication.

Method: This study aimed to explore primary care pharmacists' experience of dealing with young people with long-term illnesses by exploring the pharmaceutical services currently available and identifying other issues that may influence pharmaceutical care.

A qualitative study was undertaken. From June to November 2019, semi-structured interviews were conducted with 23 primary care pharmacists in the UK. A purposive sampling strategy was followed to form a population for this study. The targeted participants were UK primary care pharmacists i.e. General Practice (GP) and community-based pharmacists. Through professional networks, the participants were identified, approached and recruited by email or in person. Interviews on average lasted 35 minutes and were audio recorded, transcribed verbatim and analysed inductively using thematic analysis. This research gained ethical approval from the University of Birmingham Ethics Committee.

Results: Emergent themes were reviewed by all authors and any discrepancies were resolved through discussion. The key theme is concerned with the pharmaceutical services that are provided to young people with long-term illnesses by primary care pharmacists. Participants thought that there was not enough age-appropriate information made available to support young people aged 18 to 24 years in making decisions regarding their condition. They thought the information was generic and not specifically customised for YP:

''I think there needs to be more specific information targeted at a younger audience'' (CP02).

Most of the participants mentioned that the counselling rates for young people are low in general and in comparison, to adults:

"It's definitely Low'' (IP04).

Conclusion: This study contributes to the limited literature on primary care pharmacists' experience of dealing with young people with long-term illnesses. The findings of this research could inform future research to provide more evidence of the benefit of pharmacists in optimising the medication-related experience for young people with long-term illnesses.

Exploring the experience of pharmacists about pharmacy services for young people in primary care: A cross-sectional study

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Background and Objective: The concept of primary care pharmacy is evolving. The current practice of such a concept is shifting towards patient-focused healthcare services such as health advice and counselling rather than just doing the usual tasks of dispensing medicines. Strategies to enhance health care for young people might involve the participation of pharmacists in providing advanced pharmaceutical services such as new medicine services (NMS) and medication reviews (MUR). This study aimed to investigate primary care pharmacists' experience of dealing with young people with long-term illnesses.

Setting and Method: A cross-sectional survey using both online and paper-based tools was conducted from June 2019 to February 2020. The population for this survey was UK primary care pharmacists i.e. General Practice (GP) and community-based pharmacists. This research gained ethical approval from the University of Birmingham Ethics Committee.

Main outcome measures: The current pharmacy services provided to young people with long-term illnesses and pharmacists' attitudes toward and practices with young people.

Results: The total number of survey responses that were returned from different recruitment sources was 134 out of approximately 2000. Most of the participants worked mainly as community pharmacists (58.21%). The most common long-term illnesses in young people aged 18 to 24 years encountered by participants in their daily practice were respiratory diseases such as asthma and cystic fibrosis. The majority of the community pharmacists who took part in this study (92.31%) provide at least one of the advanced pharmaceutical services such as NMS and MUR or both of them. Almost three-quarters of the sample agreed that NMS and MUR need to be enhanced to optimise medication use for young people aged 18 to 24 years. All pharmacists believed that building a trusting professional relationship with a young person aged 18 to 24 years with a long-term illness was important. Also, the majority (96.27%) of community pharmacists agreed that they have the potential to be a valuable resource to promote self-care information to young people aged 18 to 24 years with long-term illnesses. 35.07% of the participants reported that there is not enough age-appropriate information made available to support young people in making decisions regarding their condition.

Conclusion: The interaction between primary care pharmacists and young people when providing pharmaceutical services has been identified. However, the effectiveness of the provision of pharmaceutical services, such as NMS and MUR, counselling about the safe and effective use of medicines and the provision of age-appropriate health information to young people has not been proven yet. The research has shown that there could be an opportunity for primary care pharmacists to play a vital role in the care of young people with long-term illnesses especially with the easy accessibility of primary care pharmacies and the availability of these pharmacies in various locations. The insights gained from this study may be of assistance in understanding the current provision of pharmaceutical services.

Application of green practices within the distribution sector

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Introduction: Decreasing the environmental impact of activities related to the distribution of medications is essential to minimise the environmental footprint. The purpose of the study was to assess the application of green practices within the distribution sector.

Method: A questionnaire was developed and validated by a panel consisting of one academic pharmacist and two pharmacists working within wholesale and distribution .The questionnaire was disseminated to all local wholesale dealers and distributors which are listed on the Malta Medicines Authority (MMA) website. The data collected was analysed using Microsoft Excel® for descriptive statistics.

Results: A total of 73 participants took part in the study. Distribution companies (n=66; 90.4%) are adopting greener practices including, storing medicines more efficiently (n=48; 18.75%), making warehouses more energy efficient (n=43; 16.8%), improving the number of routes (n=43; 16.8%) and using the first in first out mechanism (n=43; 16.8%). Participants agreed or strongly agreed that environmental benefits (n=65; 89%) and improved ethical principles (n=56; 77.8%) are strong enablers for the adoption of green practices. Thirty-eight participants (52.1%) answered that their company does not carry out an environmental assessment. Participants agreed or strongly agreed that environmental assessment was not conducted due to lack of time (n=22; 68.8%) and lack of information on green practices (n=21; 60%).

Conclusion: Companies are adopting greener practices in pharmaceutical distribution, however further implementation is required. There is a need for education and awareness about green practices in distribution to enhance the integration of environmentally sustainable approaches. It is important to achieve a balance between the distribution of safe, good quality and efficacious drugs whilst minimising the associated negative impact on the environment.

Identifying barriers: monitoring the implementation process of reimbursed clinical pharmacy services in community pharmacies

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Background information: Since June 2022, five clinical pharmacy services (CPS) are reimbursed in Germany. Despite remuneration, implementation of new services remains a major challenge; at the beginning of 2023, only a few community pharmacies (CP) offered these services. This project focussed on three CPS: medication review (MR) for patients with polymedication (CPS MR), blood pressure control in hypertension (CPS HT), and assuring proper inhalation techniques for patients receiving a new device or device change (CPS Inhaler).

Purpose: To monitor the implementation of the three CPS in 25 CP with the aim to identify barriers and success factors, and to record the number of claimed CPS.

Method: CP were eligible to apply for this project during February 2023. Applicants were randomly selected by the following criteria: regional site, number of employees, and minor or no prior experience with CPS. One contact person in the participating CP received training to manage CPS implementation in their team, and additional personal support by the project team. Using a standardised procedure, data on barriers, strategies and success factors were collected via personal calls. In addition, CP set their objectives for each CPS and the project team recorded the number of claimed CPS for 6 months (observational period) and further 3 months (follow-up period without personal support). After the follow-up period, a final online survey was conducted. Data were collected until November 2024.

Results: In total, 25 CP from all German federal states were randomly selected from a total of more than 700 applications. Four CP dropped out before the observational period due to staff or time constraints. A total of 11 CP already had prior experience with CPS, and 10 CP had no experience at all. During the 6-month observational period, 1,200 CPS were recorded and 707 during the 3-month follow-up period: in

total 1,091 (57%) CPS Inhaler, 613 (32%) CPS HT, and 203 (11%) CPS MR.

Throughout the 6-month observational period, CP with prior CPS experience performed 61% (736) of CPS, while 39% (464) of CPS were carried out by non-experienced CP. Over this time, a total of 133 barriers preventing CP from achieving their objectives were reported. The most common barriers concerned organisational aspects (40%), time and staff shortages (35%), and lack of motivation (13%). During the final survey, completed by 19 CP, 79% considered the CPS Inhaler the easiest to implement. It is planned by 32% of CP to increase the number of CPS Inhalers conducted. Additionally, all responding CP wanted to permanently offer CPS.

Conclusion: The concept is suitable for monitoring implementation of (new) CPS. Despite various barriers to reach their objectives, CP continued to perform CPS during the follow-up period and planned to offer CPS even beyond the project. Having prior experience with CPS appeared to facilitate its implementation. As the next step, strategies to overcome these barriers and success factors for each CPS need to be analysed in detail.

Determinants of digital health technology adoption intentions among Lebanese pharmacy students

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Introduction: The integration of digital health technologies (DHTs) into pharmacy practice is transforming healthcare delivery, necessitating future pharmacists to develop competencies in this area. As healthcare systems increasingly rely on digital solutions for medication management and patient care, pharmacy education must evolve accordingly. This study investigated Lebanese pharmacy students' willingness to adopt DHTs using the Unified Theory of Acceptance and Use of Technology (UTAUT) framework, which has been validated in various educational and healthcare contexts. The research aimed to identify factors influencing technology acceptance, assess educational preparedness, and understand how demographic variables affect behavioral intention to use DHTs in professional practice.

Method: A cross-sectional study was conducted in March 2025 among pharmacy students at a Lebanese university. The questionnaire collected demographic information and measured UTAUT constructs—Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), and Behavioral Intention (BI)—using a 7-point Likert scale (1=Strongly Disagree to 7=Strongly Agree). Statistical analysis included descriptive statistics, Pearson correlation coefficients to assess relationships between UTAUT constructs, comparative analysis using t-tests and one-way ANOVA to examine differences across demographic groups, in addition to correlation analysis to identify significant predictors of behavioral intention. Statistical significance was set at $p<0.05$, and data were analyzed using SPSS version 26.

Results: A total of 141 pharmacy students responded to the questionnaire, with a mean age of 21.2 years. The respondents comprised predominantly female students (75.2%), with representation across all years of study. Students showed moderately positive perceptions toward DHTs, with Performance Expectancy scoring highest (mean=4.85/7), followed by Effort Expectancy (4.59), Facilitating Conditions (4.27), Behavioral Intention (4.24), and Social Influence (4.16). Strong positive correlations were observed between all UTAUT constructs (r=0.577-0.771). Facilitating Conditions emerged as the strongest predictor of Behavioral Intention (r=0.719), followed by Effort Expectancy (r=0.651), Social Influence (r=0.632), and Performance Expectancy (r=0.608). Year of study significantly influenced behavioral intention, with advanced students (Third Year: 4.64, Fourth Year: 4.25, Fifth Year: 4.73) expressing stronger intentions to use DHTs compared to earlier-year students (First Year: 3.88, Second Year: 3.86). No significant differences were observed based on gender.

Conclusion: Pharmacy students demonstrate moderate willingness to adopt digital health technologies, with access to necessary resources and support (Facilitating Conditions) being the most influential factor in their intention to use DHTs. The findings suggest that pharmacy education programs should focus on providing adequate technological infrastructure, support systems, and digital competency training throughout the curriculum, with particular emphasis on early-year students who showed lower adoption intentions. Enhancing institutional support and addressing the perceived ease of use could significantly increase pharmacy students' willingness to integrate digital health technologies into their future practice. These insights may inform curriculum development strategies aimed at preparing pharmacy graduates for an increasingly digital healthcare environment, particularly in resource-limited settings like Lebanon.

Knowledge, attitudes, and practices regarding environmental sustainability: Are pharmacy students prepared to address the climate crisis?

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Introduction: The healthcare sector contributes significantly to global greenhouse gas emissions, with pharmaceutical practices playing a substantial role. Environmental sustainability in pharmacy practice is crucial as medication waste and improper disposal contribute to water contamination, antimicrobial resistance, and broader environmental degradation. Pharmacists are uniquely positioned to implement sustainable practices and educate patients, making pharmacy students' preparation in this area essential. This study aimed to assess pharmacy students' knowledge, attitudes, and practices regarding environmental sustainability in pharmacy practice, and to examine correlations between demographic factors, knowledge levels, attitudes, current practices, and future implementation plans.

Method: A cross-sectional study was conducted among pharmacy students in a Lebanese university in March 2025 using a structured questionnaire. The instrument assessed demographics, knowledge of environmental impacts, attitudes toward sustainability, current sustainable practices, professional development experiences, and future perspectives. Statistical analysis employed Spearman's rank correlation for examining relationships between ordinal variables, chi-square tests for categorical variables, Mann-Whitney U tests for comparing groups, and Cronbach's alpha for reliability analysis of knowledge and attitude scales. Factor analysis was conducted to identify underlying constructs. Knowledge scores were calculated and categorized as Excellent, Good, Fair, or Poor. Attitude scores were computed as means of responses on 5-point Likert scales and categorized accordingly.

Results: A total of 389 pharmacy students across Lebanon responded to the questionnaire, of which 78.9% were females with a mean age of 21.3 years. The findings revealed moderate knowledge levels regarding healthcare's environmental impact and pharmaceutical waste management. Higher years of study ($rs=0.31$, $p<0.01$) and previous environmental science education ($\chi^2=15.8$, $p<0.001$) positively correlated with better knowledge scores. A significant positive correlation was found between knowledge scores and positive environmental attitudes ($rs=0.42$, $p<0.001$). Current sustainable practices correlated strongly with type of pharmacy experience ($rs=0.38$, $p<0.001$) and age group ($rs=0.27$, $p<0.01$). Students who engaged in current sustainable practices expressed greater likelihood to implement them in future careers ($rs=0.56$, $p<0.001$). Professional training received demonstrated a positive correlation with attitude scores ($rs=0.39$, $p<0.001$), with workshop participants showing the highest attitude scores. Most students (76%) considered environmental sustainability important or extremely important in pharmacy practice. Attitudes toward climate change impact on public health correlated significantly with knowledge of pharmaceutical waste management ($rs=0.35$, $p<0.001$). The majority (>70%) believed implementation of sustainable practices should be required with incentives, with lack of knowledge identified as the primary barrier (46% of respondents). Environmental impact data was identified as the most effective incentive for implementing sustainable practices (37%).

Conclusion: This study highlights the need for enhanced environmental sustainability education in pharmacy curricula. While pharmacy students demonstrate positive attitudes toward environmental sustainability, significant knowledge gaps exist. Educational interventions focusing on proper pharmaceutical waste management, sustainable dispensing practices, and patient education are recommended. Structured training through workshops and clinical rotations may effectively address identified barriers and prepare future pharmacists to incorporate environmental considerations into their professional practice.

The introduction of implementation agent for pharmacy services in community pharmacy in Croatia

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Introduction: Pharmacists public health role in the prevention, early detection and monitoring chronic diseases is yet to be fully implemented through introducing patient care services in Croatia. Cardiovascular diseases are the most common chronic, non-communicable diseases with a high mortality rate. In Croatia, 39% of all deaths in 2023 were caused by cardiovascular diseases. In addition, research shows that only 60% of people with diabetes have been diagnosed in Croatia, and it is estimated that the total number of people affected in 2023 exceeded 600,000, according to

data from the CroDiab register. As pharmacists could play an important role in the triage and management of cardiovascular disease, the purpose of this work was to show that implementation agent can help in early detection, monitoring achievement of treatment goals, educating patients on lifestyle habits such as smoking cessation, weight loss and balanced diet, and recommending scientifically proven nutritional supplements. A healthy lifestyle can prevent up to 80% of premature deaths from cardiovascular disease.

Method: The cardiovascular health consultation service was conducted in community pharmacies throughout Croatia from September 2024 to March 2025. The service was provided by the imlementation agent, a Master of Pharmacy, including a patients' interview to obtain medication history, blood pressure measurement, ECG measurement and capillary blood analysis for HbA1c and lipid profile (total cholesterol, triglycerides and HDL). Foot examinations were also carried out for people with diabetes. The total duration of the service was 30 minutes.

Results: A total of 260 persons were counseled. Among them blood pressure of 120 (46,15%) people were in the target range (below 140/90 mmHg). There were 99 people with dyslipidemia, and only 55 (55,56%) reached the target values. Elevated lipid levels were found in 80 (30,77%) people without prior diagnosis.

There were 80 people with diabetes, and 24 (30%) had HbA1c target values <6.5%. Elevated HbA1c levels were measured in 53 people without a diagnosis. Overall, 47 people had borderline HbA1c levels (between 5.7% and 6.5%), indicating prediabetes, and were counseled on lifestyle changes.

Conclusion: Pharmacy services ensure early detection, monitoring and triage of cardiovascular disease and diabetes. Patient education is also crucial. These goals could be achieved through the implementation of services, and follow-up meetings will help to determine the effectiveness of the proposed pharmaceutical interventions.

Clinical pharmacy in private hospitals in Qatar and MENA Region: Challenges, opportunities, and insights: A qualitative study

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Background: Clinical pharmacists play a central role in medication safety activities. However, in Qatar and the Middle East and North Africa (MENA) region, this role has been restricted to public hospitals and little is applied in private hospitals. As a result, graduates from Doctor of Pharmacy programs are facing challenges in securing employment due to the saturation of the public sector job market. With increased access to private hospitals through new health insurance policies, there are concerns that patients may receive medical care with a higher risk of safety issues, often due to the absence of clinical pharmacists in the healthcare team. Therefore, using the Consolidated Framework for Implementation Research (CFIR), we aimed to identify the barriers and facilitators to clinical pharmacists' integration across various private hospitals in Qatar and the MENA region.

Method: Face-to-face semi-structured interview discussions were conducted using an interview guide that was drawn upon the CFIR. Participants were included if they were employed as administrative leaders or healthcare providers in a private hospital in the MENA region. Purposive sampling strategies were used to recruit participants identified through professional networks. Interview discussions were audio-recorded, transcribed, and analyzed using manual sorting and coding of the transcripts independently by two researchers. Ethical approval was obtained from Qatar University's Institutional Review Board (IRB) under the identifier QU-IRB 1994-EA/23.

Results: This is an ongoing study, and currently 6 stakeholders were interviewed from Qatar, United Arab Emirates, Saudi Arabia and Oman. Key major domains emerged from the study: pharmacists' professional identity, the barriers and facilitators for implantation, perceptions toward clinical pharmacy services (CPS), and strategies for implementation. The results revealed an ongoing barrier by private hospitals to establishing CPS as financial constraints, limited government support, and a lack of appreciation and demand for CPS within private hospitals. Facilitators of the involvement of CPS included hospital leadership advocacy and support, policies requiring CPS for hospital licensing, and academic role in promoting the value of CPS to stakeholders through internships in private hospitals. Key competencies for clinical pharmacists working in private hospitals include strong communication skills and the ability to reduce costs and errors.

Conclusion: The facilitators and barriers to the implementation of Clinical Pharmacy Services (CPS) in private hospitals are influenced by factors such as the academic role, the financial value of CPS, support from policymakers, hospital demands, and the competencies of clinical pharmacists. Therefore, the study recommends fostering collaboration between pharmacy colleges, policymakers, and leaders of private hospitals to facilitate the successful implementation of CPS, ultimately improving patient safety and healthcare outcomes.

Qualitative assessment of challenges in reporting adverse events in clinical trials: A site management office perspective

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Introduction: Evaluating harm in a clinical study is more challenging than assessing benefits. Literature suggests that adverse events are often underreported. The aim of the study was to identify the challenges to the collection, reporting, and analysis of adverse events (AEs) in clinical trials.

Method: A single-center, face-to-face interview was conducted at a site management office in South India. A semi-structured questionnaire was developed to interview various stakeholders, including principal investigators, clinical research associates, and clinical research coordinators involved in reporting adverse events in clinical trials. The interview was recorded, transcribed, coded, and analyzed using thematic analysis. The institutional ethics committee approved the study, and informed consent was obtained before enrolling the participants.

Results: The study was conducted in a single center where a total of 62 stakeholders were contacted for the interview. Out of these, 11 refused to participate in the study, and one stakeholder was left in between interviews, so we analyzed 50 stakeholders' data for analysis. Lack of awareness and training on AE Reporting on the SUGAM portal, Lack of frequent visits to the site, Lack of effective communication with patients, Change of care setting by the patient, myth that AE should be reported after its confirmation only, negligence on documentation of AE, unawareness and hesitancy among study participants on AE, difficulty in diagnosing AE, lack of Mobile accessories for AE communication, unawareness on the Serious Adverse Events and on SAE timeline are the significant challenges faced by the stakeholders in the clinical trials for reporting of adverse events.

Conclusion: Addressing identified challenges and providing training and support in adverse event reporting are key to enhancing AE reporting during clinical trials and thus improving drug safety.

Trends in menopausal hormone therapy dispensing in Australia between 2014 and 2023

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Introduction: In recent years, international studies have shown that the use of Menopausal Hormone Therapy (MHT) has increased again. However, it remains unclear whether similar trends are observed in Australia. The main aim of the current study was to describe changes in subsidised MHT dispensing among Australian women aged 45-64 years between 2014 and 2023. A secondary aim was to measure the rate of MHT prescribing in women with diabetes, addressing a critical gap in our understanding of how menopause interacts with underlying chronic health conditions.

Methods: We utilised a 10% sample of the Pharmaceutical Benefits Scheme (PBS) database in Australia. We conducted a cross-sectional study to determine the annual prevalence of MHT using age-specific mid-year population estimates from the Australian Bureau of Statistics. A secondary cohort was created including women with a validated diagnosis of diabetes only. Dispensing records of MHT were based on ATC and PBS item codes, including oestrogen, progestogen, and their combinations in any strength. The annual prevalence was expressed as percentage (per 100 individuals) with 95% confidence interval (CI). Relative average annual changes between 2014 and 2023 were assessed using linear regression model and stratified by different age groups and routes of MHT. The routes of administration included oral route (tablets, capsules), transdermal (patches), local (vaginal tablet, cream, pessaries, gel), and other route (injection, implant, nasal spray).

Results: The overall prevalence of PBS MHT dispensing showed a stable trend from 9.05% (95% CI 8.94-9.15) in 2014 to 9.74% (95% CI 9.63-9.84) in 2023; a relative annual change of 0.42% (95% CI -0.50-1.35). When stratified by age, the highest relative annual change was observed in women aged 45-49 from 3.80% (95% CI 3.73-3.87) to 4.98% (95% CI 4.90-5.05); a relative annual increase of 2.50% (95% CI 0.86-4.15). A gradual annual increase in MHT use was also seen in women aged 50-54 (relative annual increase 2.14%, 95% CI 1.06-3.21). By route, only the dispensing of transdermal MHT increased, from 2.03% (95% CI 1.98-2.08) in 2014 to 3.38% (95% CI 3.31-3.45) in 2023; a relative annual increase of 5.89% (95% CI 3.88-7.91). The dispensing of oral MHT was stable; from 2.05% (95% CI 2.00-2.10) in 2014 to 2.15% (95% CI 2.09-2.20) in 2023. The prevalence of PBS MHT dispensing in women with diabetes showed a similar trend: The dispensing of transdermal MHT increased from 1.89% in 2024 to 2.80% in 2023, while the dispensing of oral MHT remained unchanged (from 2.13% in 2024 to 2.17% in 2013).

Conclusion: The overall prevalence of PBS MHT use in Australia remained stable from 2014 to 2023. By age, the highest relative annual change of overall MHT dispensing was measured in women aged 45-49, followed by women aged 50-54. Transdermal use of MHT increased across all age groups as well as in a cohort of women diagnosed with diabetes. The modest increase in transdermal MHT use in Australia may reflect growing acceptance due to its improved safety profile.

Identification and management of pharmaceutical care issues in a pediatric critical care unit in Ghana: A pharmacist-led initiative

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Introduction: Pediatric critical care in resource-limited settings faces numerous challenges, including medication-related problems. Clinical pharmacists are increasingly recognized as vital members of healthcare teams. However, evidence of their impact in Ghanaian pediatric critical care is limited justifying their inclusion in the PICU team. We aimed to evaluate the impact of integrating pharmacists into the pediatric intensive care unit (PICU) at Komfo Anokye Teaching Hospital (KATH) on the identification and management of pharmaceutical care issues.

Methods: A retrospective analysis of pharmaceutical care issues before and after pharmacist integration (August 2022) was conducted. Data collection was done using a structured data collection questionnaire. Documentation of pharmaceutical care issues, interventions, and outcomes were analyzed, comparing pre-intervention (n=74) and post-intervention (n=72) periods.

Results: A total of 146 pediatric patients' records were reviewed during the study period. The most common pharmaceutical care issues identified included inappropriate dosing, drug-drug interactions, and therapy duplication. Pharmacist interventions resulted in medication regimen modifications in 71.4% of cases where issues were identified post-intervention, compared to 27.3% pre-intervention. Physician acceptance rate of pharmacist recommendations was 89.5%. The number of patients receiving pharmacy-led medication reconciliation increased from 5.4% to 86.1% following pharmacist integration. Following pharmacist integration, there was a significant increase in the identification of pharmaceutical care issues from 14.9% pre-intervention to 30.6% post-intervention (p=0.0217).

Conclusion: Integration of clinical pharmacists into the PICU at KATH significantly improved the identification and management of pharmaceutical care issues over a 16- month period. This study provides evidence supporting the value of clinical pharmacy services in pediatric critical care settings in Ghana and highlights the importance of expanding such services to improve medication safety and optimize patient outcomes.

Breaking down barriers to contraception: Pharmacists as prescribers

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Introduction: Many women face significant barriers to initiating and maintaining contraception, often due to difficulties in accessing primary care services. Pharmacist prescribing of contraceptives has emerged globally as a strategy to enhance access and alleviate pressures on the healthcare system. This approach provides an additional pathway for women to access contraceptive care and offers benefits including lower costs, shorter wait times, and extended hours of operation.

Purpose: This review of the grey literature aims to compare the protocols for practice of community pharmacists who prescribe and continue hormonal contraceptives.

Method: This review utilised grey literature, as clinical protocols are often not formally published. The process followed four stages as described by Godin et al.: searching a grey literature database, Overton; using Google Search engine; reviewing websites of professional, health, and government agencies; and consulting international experts. Records were included if they met the definition of a clinical protocol, were intended for use by community pharmacists for prescribing or continuing hormonal contraception and written in English. Grounded Theory was used for analysis, involving axial and selective coding to identify key concepts.

Results: Thirty clinical protocols were identified from the USA (n = 23), Canada (n = 2), the UK (n = 2), New Zealand (n = 1), and Australia (n = 2). Pharmacists were authorised to initiate (prescribe) and continue contraceptives in 27 protocols, and in 3 protocols pharmacists were authorised to continue contraceptives only. Pharmacist initiation and continuation of contraceptives most frequently involved oral contraceptives (POP and COC). Key requirements involved in pharmacists' practice included ensuring compliance with age restrictions, ensuring patients had been reviewed by a health professional other than a pharmacist as necessary, measuring blood pressure and body mass index, use of patient self-completed screening tools, and use of other best-practice clinical guidelines.

Conclusion: The review provides insights into the current international landscape of pharmacist-prescribed contraception using clinical protocols, and valuable information for policymakers to support the development of frameworks for pharmacist-prescribed contraception globally.

Analyzing nephrotoxic burden and acute kidney injury in adult patients admitted to non-intensive care units at two hospital systems

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Introduction: Acute Kidney Injury (AKI) is associated with poor short and long-term patient outcomes; thus, risk assessment, prevention, and treatment are essential. Medications are a common cause of AKI by contributing to kidney damage and deterioration in renal function. Co-administration of nephrotoxic drugs cause burden on the kidney increasing the likelihood of developing AKI. Current evaluations of nephrotoxic burden are limited to critically ill or pediatric patients. The objective of this study was to assess the number of nephrotoxic drugs administered to adult patients admitted to non-intensive care units and investigate the progression of kidney injury from no AKI or stage 1 AKI to AKI stage ≥ 2 in two geographically distinct health centers.

Method: A retrospective cross-sectional study was conducted in adult patients admitted to non-intensive care units at the University of Florida Health (UFH) between 2012 and 2019 and at the University of Pittsburgh Medical Center (UPMC) between 2018 and 2022. Exclusion criteria were patients with end-stage kidney disease, baseline estimated glomerular filtration rate ≤15 mL/min/1.73m2, a hospital length of stay of less than 48 hours, AKI stage ≥ 2 upon admission and those with no serum creatinine within the first two days of admission. Number of drugs administered with known mechanisms of causing kidney injury and dysfunction during the patient's hospitalization were assessed. Nephrotoxic drugs evaluated were selected from a published list that used a Delphi method for inclusion. Exposure to 3 or more nephrotoxic drugs was considered nephrotoxic burden. AKI was defined and staged according to the Kidney Disease Improving Global Outcome serum creatinine criteria. A descriptive assessment of nephrotoxin exposure and progression from no AKI or AKI stage 1 to AKI stage ≥ 2 was conducted.

Results: There were 122,324 hospital admissions included at the UFH and 39,756 admissions at UPMC with 1.5% and 4.7% progressing from no AKI or AKI stage 1 to AKI stage ≥ 2, respectively, without consideration of nephrotoxin exposure. At UPMC, 14,337 patients experienced nephrotoxic burden, and of those 807 (5.6%) progressed from no AKI or stage 1 AKI to AKI stage ≥ 2 compared to the 18,546 patients that did not receive any nephrotoxins (i.e. no burden) among whom 672 (3.6%) progressed to AKI stage ≥ 2. At UFH, 63,858 patients received 3 or more unique nephrotoxic drugs and of those 1,388 (2.2%) progressed from no AKI or stage 1 AKI to AKI stage ≥ 2 compared to the 34,258 patients that did not receive any nephrotoxins, among whom 179 (0.5%) progressed to AKI stage ≥ 2.

Conclusion: At both institutions, occurrence of AKI progression was higher for patients with nephrotoxin burden compared to those patients who did not receive any nephrotoxins. Nephrotoxin burden surveillance should be a component of nephrotoxin stewardship in pharmacy practice to prevent AKI occurrence, and progression.

The Canadian travel health landscape: Current education needs and practices and future directions identified by pharmacists experienced in travel health

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Introduction: Travel consultations have increasingly become part of pharmacists' professional service offerings over the past decade, supported by changes in scope of practice and heightened public awareness of both health risks while travelling and pharmacists' roles in patient care. To support pharmacists with providing evidence-based care now and in the future, perspectives of Canadian pharmacists experienced in travel health were sought to provide insight on education and resource needs and a vision for pharmacist practice in travel health.

Method: A panel of Canadian pharmacists from varied backgrounds with experience in travel health were purposively recruited to participate in an asynchronous virtual checkpoint in June 2024. Questions were posed for feedback and discussion on needs and preferences related to continuing professional development, use of clinical decision support software and other resources in practice, and areas of concern and opportunities related to pharmacy practice in this field.

Results: Nine pharmacists completed the checkpoint. Key themes arising from discussions were: (1) The value of holding a Certificate in Travel Health; (2) Education needs related to changes in disease epidemiology and therapeutic options; (3) The use of specialized travel software to inform consultations, but the need to use clinical judgment when applying recommendations to patient care; (4) A need to balance maximizing pharmacists' accessibility with the maintenance of high standards related to quality of care in this specialty, and (5) An appetite for creating a community of travel health practitioners for networking and peer support.

Conclusion: Canadian pharmacists experienced in travel health see value in maximizing pharmacists' accessibility to provide pre-travel care to patients; however, they also recognize travel health as a specialty field, especially for more complex cases, where additional training/credentialing should be leveraged to ensure quality care.

Pharmacy-based injection services scheduled outside of typical operating hours of other primary care providers: An analysis of 1.2 million injections administered in Canadian community pharmacies

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Introduction: Community pharmacies are a leading setting where Canadians receive vaccinations, and many provinces and territories also allow pharmacy professionals to administer other injectable medications. Considering pharmacies' accessibility and convenience, the objective of this work was to examine the proportion of these services scheduled at times when other primary care providers (e.g., family physicians, nurse practitioners, or public health unit offices) are typically unavailable, and predictors impacting when patients schedule these services.

Method: A retrospective analysis was performed of all injections scheduled using MedMe Health and MedEssist programs from January 1 to December 31, 2023. Vaccines were grouped by the disease being prevented and medications were grouped by drug class. 'Off-clinic' hours were defined as those when other primary care settings are generally unavailable to provide injections and included times before 9:00 AM or after 5:00 PM, weekends, and holidays. Analyses explored the proportion of services scheduled within off-clinic hours and if this differed by the specific vaccine or drug being scheduled and pharmacy-level factors including type (chain vs. banner/independent), province, and rurality. Ethics approval was received from the Office of Research Ethics at the University of Waterloo.

Results: Of 1,226,903 injections scheduled over the study period, 99.1% were for vaccines and 0.7% for non-vaccine products, with the remaining 0.1% unknown. Across all pharmacies, 27.0% of injections were scheduled during off-clinic hours, ranging from 9.1% among banner/independent pharmacies to 34.0% among chain pharmacies. Weekends were the most frequent among the 'off-clinic' hours appointments followed by weekdays outside of 9:00 AM to 5:00 PM, and holidays falling on weekdays. The leading products administered during off-clinic hours were COVID-19, influenza, herpes zoster, hepatitis, and HPV vaccines.

Conclusion: Public interest in scheduling injection services on evenings, weekends, and holidays appears to be high when this is available. Pharmacy staffing during respiratory virus season when demand for vaccines is highest may be well allocated to supporting appointments during these times when possible.

Trends in increased blood pressure in Pune, India: A comparative 10 year assessment

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Introduction/Objectives: Hypertension in India continues to be a growing concern. An increase in more sedentary lifestyles and changes in dietary patterns have resulted from India's modernization, new-found wealth and Western influences. Additionally, social factors have impacted awareness and prevention efforts of hypertension. Although increasing in many communities, they remain limited in rural and underserved urban populations. Given these ongoing changes, the assessment of trends in hypertension continue to be of importance. The objective of this study is to compare the rates of increased blood pressure in Pune, India at three time points over a 10- year period.

Methods: Secondary data was utilized to compare the rates of increased blood pressure amongst patients ≥ 25 years of age at a medical camp in Pune, India; three time points (2013, 2019, and 2023) were assessed over the 10-year period. Increased blood pressure was defined as ≥ 140/90 mmHg, consistent with the International Society of Hypertension Global Hypertension Practice Guidelines. Descriptive statistics were used to summarize hypertension outcomes. Chi-square test was used to compare the rates of hypertension between years.

Results: Overall, there were 1,730 patients screened in all years with 29.8% having increased blood pressure. Of the 847 patients screened in 2013, 20.4% of patients were identified with increased blood pressure, followed by 37.8% of the 404 patients screened in 2019 and 39.01% of the 479 patients screened in 2023 ($p < 0.0001$). Individual comparisons indicated a significant difference among those screened in 2013 compared to other years, with no differences found in recent years: 2013 vs. 2019, $p < 0.0001$, 2013 vs. 2023, $p < 0.0001$, and 2019 vs. 2023, $p = 0.677$.

Conclusions: Hypertension remains a major concern in India, with increased blood pressure rates continuing to rise, especially among underserved urban and rural communities. These findings confirm trends toward increasing rates over the 10 years; however, the similar rates found in recent years could indicate improved access to healthcare or awareness of hypertension in these communities. Further research should specifically assess community outreach interventions and awareness of hypertension and the relationship with controlled hypertension in Pune; additional expansion into other states in India, including urban and rural villages would be particularly beneficial.

Telepharmacy in Asia: Transforming access to healthcare and pharmacist-driven patient care

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Background Information: Telepharmacy is revolutionizing pharmaceutical care across Asia by addressing critical barriers to healthcare access, particularly in remote and underserved regions. By leveraging digital platforms, telepharmacy enhances pharmacist-driven interventions, facilitates medication adherence, and optimizes healthcare efficiency. Given Asia's diverse healthcare landscape and varying regulatory frameworks, this study systematically reviews the implementation, outcomes, and challenges of telepharmacy in the region.

Purpose: The objective of this study is to evaluate the impact of telepharmacy on healthcare accessibility, pharmacist-driven patient care, cost-effectiveness, and medication adherence in Asia. Additionally, it seeks to identify key challenges, regulatory gaps, and future opportunities for integrating telepharmacy into national healthcare systems.

Method: A systematic review was conducted following PRISMA guidelines to ensure a structured and comprehensive evaluation of telepharmacy in Asia. Data sources included peer-reviewed studies, case reports, and government healthcare reports retrieved from PubMed, Scopus, Web of Science, and Google Scholar, covering publications from 2010 to 2024. The search strategy incorporated keywords such as "telepharmacy," "digital pharmaceutical care," "remote pharmacist services," and "virtual medication management". Studies were selected based on their focus on telepharmacy adoption, patient outcomes, and economic benefits in the Asian healthcare context.

To maintain relevance, inclusion and exclusion criteria were applied. Studies were included if they reported on telepharmacy's impact on patient outcomes, healthcare accessibility, pharmacist-driven interventions, and cost-efficiency. In contrast, non-Asian studies, articles lacking measurable outcomes, and opinion-based commentaries were excluded to ensure the review's reliability.

For data extraction and analysis, key variables such as study design, sample size, intervention type, patient adherence, cost savings, pharmacist involvement, and accessibility improvements were systematically collected. A thematic analysis was performed to categorize findings into major impact areas, highlighting patterns and emerging trends in telepharmacy implementation.

Results: Analysis of 32 studies on telepharmacy in Asia revealed the following key findings:
-Healthcare accessibility: Telepharmacy significantly reduced patient travel times, improving access to chronic disease management and medication counseling in rural areas.
-Pharmacist engagement: Virtual pharmacist consultations enhanced medication adherence, reducing errors and optimizing drug therapy management.
-Economic benefits: Telepharmacy programs in hospital settings reported cost savings of $300,000–$500,000 annually due to optimized resource allocation and reduced hospital visits.
-Patient outcomes: Studies reported a 20–40% increase in adherence rates for patients receiving pharmacist-led teleconsultations.
Challenges: Regulatory variations, technological infrastructure limitations, and issues related to pharmacist licensing are barriers to broader adoption.

Conclusion: Telepharmacy has proven effective in enhancing healthcare accessibility, improving medication adherence, and reducing healthcare costs in Asia. However, its full-scale implementation requires harmonized regulatory frameworks, investments in digital health infrastructure, and increased awareness among healthcare professionals and patients.

Future research should focus on long-term clinical outcomes, policy integration, and cross-border telepharmacy initiatives.

From plan to practice: Using implementation mapping to develop theory based, adaptable and context appropriate implementation strategies for the delivery of myCare Start in Switzerland

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Introduction: Effective implementation of innovative pharmacy services requires structured planning to address context-specific barriers, facilitators and practice patterns in new health care settings. Since its inception in the UK in 2011, attempts to implement the New Medicine Service (NMS) have been documented in 11 countries across Europe, Africa and Australia. However, to date, only three have successfully integrated the service into routine nationwide care. In the absence of prospective planning to better understand healthcare settings and address known implementation barriers, international scale up of the service was hindered. Common challenges include low patient uptake, underdeveloped pharmacist-physician relationships, and a limited understanding of a pharmacist's role in chronic care management. In Switzerland, the NMS has been adapted to form myCare Start intervention using a co-creation approach with key stakeholders supplemented by contextual information, known theory and empirical evidence. This study applied Implementation Mapping to develop a core and adaptable implementation strategy bundle to facilitate the successful delivery of myCare Start in ambulatory primary care medicine and community pharmacy settings in Switzerland.

Method: The five-step Implementation Mapping framework guided strategy development. (1) Conducting an implementation context analysis to identify key barriers and facilitators. (2) Defining implementation outcomes, specifying performance objectives, identifying cognitive, behavioural, and environmental determinants, and setting change objectives. (3) Mapping evidence-based behaviour change methods to the identified determinants to inform strategy selection. (4) Selecting implementation strategies based on stakeholder preferences and the Expert Recommendations for Implementing Change (ERIC) taxonomy. (5) Designing an evaluation plan to assess implementation outcomes. Implementation strategies were defined and operationalised in accordance with Procter et al. (2013) recommendations for specifying and reporting implementation strategies.

Results: The mapping process identified key contextual determinants and practice patterns, including pharmacist and physician time constraints, variability in workflow integration, and challenges in patient engagement. Twenty-three discrete, multilevel strategies were selected—16 core and 7 adaptable—to accommodate the heterogeneous needs of community pharmacies and general practices. Strategies will be deployed across five phases of implementation: exploring (appraising), preparation (planning), testing (initial operation), operation (implementation), and sustainability (maintaining). The core implementation strategy bundle includes standardised training modules focusing on implementation, recruitment, patient engagement, communication and interprofessional collaboration, workflow integration guidelines, technical support, the selection of practice champions, and initiatives to enhance understanding of professional roles. Adaptable components include facilitation, context-specific workflow adjustments, and customisable patient and physician engagement materials.

Conclusion: Implementation Mapping facilitated the development of a structured yet flexible implementation strategy bundle for myCare Start, allowing adaptability across diverse pharmacy and primary care contexts and enhancing likelihood of fidelity to the evidence-based components. Evaluation will be conducted using a Type II hybrid effectiveness-implementation trial set to commence in 2025. Insights generated on effectiveness and implementation will support the broader scalability of pharmacy services.

A smarter start: Adaptation of the new medicine service to form Switzerland's mycare start service using a context-driven and stakeholder led co-creation approach

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Introduction: The New Medicine Service (NMS), developed in the UK, was effective in improving medication adherence among patients initiating long-term medications. However, international scale up of this complex intervention has highlighted the need for meaningful intervention adaptation to address contextual differences and implementation barriers in new healthcare settings. Guided by the O'Cathain et al. (2019) Framework for intervention development and the ADAPT Guidance, the myCare Start – Implementation project (myCare Start-I) utilised a co-creation approach supplemented by contextual information, known theory and empirical evidence to adapt the NMS. This process led to the development of a contextually fitting myCare Start service model for use within the ambulatory primary care medicine and community pharmacy setting in Switzerland.

Method: The co-creation process involved an exploratory qualitative approach, including repeated semi-structured focus groups with stakeholders (patients, physicians, and pharmacists) and consensus-based workshops with interprofessional investigators to iteratively refine the intervention. An initial context analysis identified 63 contextual factors impacting intervention design or implementation of myCare Start in Switzerland. Factors included underdeveloped interprofessional communication and collaboration, setting-based factors (e.g. such as lack of sufficient staff, workload and time constraints in pharmacies and general practice) and intervention design (e.g., patient content preferences, number and frequency of consultations and remuneration of service). A panel of interprofessional investigators including primary care physicians, pharmacists, nurses, health economists, statisticians and end-user representatives (n=15) prioritised these factors, assessing both the importance of addressing each factor and the confidence that it could be addressed in the Swiss context. The resulting priority areas formed the focus of repeated semi-structured stakeholder focus groups to discuss solutions and possible service adaptations. A deductive thematic analysis was conducted on focus group data using the Intervention and Implementation domains of the Context and Implementation of Complex Interventions (CICI) framework. This iterative process culminated in 12 proposed adaptations of the original NMS intervention which were presented to the investigative team and assessed by investigators based on acceptability to Swiss context.

Results: A total of 12 stakeholder focus groups (n=50 stakeholders) and two investigator consensus workshops led to a final list of seven selected intervention adaptations. Adaptations were mapped in accordance with the Framework for Reporting Adaptations and Modifications Expanded (FRAME). Adaptations occurred at both individual (e.g., flexible delivery modes, extended follow-up timeline, pharmaceutical device demonstration options, inclusion of support persons) and organizational levels (e.g., physician referrals to myCare Start, standardized pharmacist feedback to physicians and greater guidance for interventions to assist patients).

Conclusion: The co-creation process, as part of a multi-strategy intervention adaptation process, produced a contextually appropriate myCare Start model tailored to the needs of the Swiss health care context. These adaptations are anticipated to enhance fit for the context, recipient and provider alignment, service feasibility, engagement and cultural relevance that hopefully, will translate to improved intervention and implementation outcomes when the service is evaluated in a Type II hybrid effectiveness-implementation trial.

Community pharmacy-based testing and treatment for chlamydia trachomatis and neisseria gonorrhoeae (Swab-Rx Study)

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Background information: Sexually transmitted infections are on the rise globally with an estimated 129 million chlamydia and 82 million gonorrhoea new infections in 2020. Chlamydia trachomatis and Neisseria gonorrhoeae are the first and second most reported bacterial sexually transmitted infections in Canada. Accessible, efficient, and convenient testing mechanisms are essential to identify infections, reduce transmission, and prevent sequelae. Additional testing options are required to complement existing services. Internationally, pharmacists are offering sexual health clinical services.

Purpose: We implemented a pharmacy-based chlamydia and gonorrhea testing and treatment program in Nova Scotian community pharmacies. Clinical findings, patient acceptability, and pharmacist workload were evaluated.

Methods: Chlamydia and gonorrhea management was implemented in four community pharmacies in the Halifax Regional Municipality of Nova Scotia, Canada. Pharmacists offered chlamydia and gonorrhea testing in pharmacies using patient self-collected swabs (pharyngeal, anorectal, and vaginal/front hole) and first-catch urine. Samples were analyzed at the provincial microbiology laboratory. Results were relayed to the patient by the pharmacist, who then prescribed treatment for the identified infection. Pharmacists offered counselling, including determination of the appropriate tests, safer sex practices, immunizations, and partner notification. Patient acceptability was explored using an electronic questionnaire and pharmacist workload was explored in time per encounter and tests per week.

Results: Ninety-seven discrete participants were enrolled for 99 testing encounters. 45% were between the ages 25-34, 26% identified as sexually diverse and 15% as gender diverse. Most participants (62%) had a primary care provider and travelled on average 8 kilometres to be tested. Many had never been tested for chlamydia (26%) or gonorrhea (30%) before, and most had not been tested since their last sexual activity with a new partner (90% and 91% for chlamydia and gonorrhea, respectively).

Of the participants tested, 17% had positive test results; 14% were found to have chlamydia and 3% to have gonorrhea. Pharmacists assessed one hundred percent of the participants with positive test results and prescribed antibiotic treatment. Oral azithromycin (71%) and doxycycline (29%) were prescribed for chlamydia, and intramuscular ceftriaxone (100%) was prescribed and administered for gonorrhea.

Most participants felt comfortable accessing testing from the pharmacist (94%), felt it should always be available in pharmacies (97%), found the pharmacy accessible (92%), and lacked discrimination (92%). Many said they would not have been tested if the study was unavailable (52%). Participants felt it was important they could speak to a healthcare provider in person about testing (63%), they could be tested and treated at the same pharmacy (68%), and the pharmacist coordinated delivering the sample to the laboratory for processing (77%).

On average, pharmacists required 21 minutes for testing encounters and 22 minutes for treatment encounters. Sites averaged 4 testing encounters per week. The mean time between a testing encounter and result delivery was 10 days, and between result delivery and assessment encounter was 1 day.

Conclusion: Community-pharmacy-based testing and treatment of chlamydia and gonorrhea was highly acceptable to service users. The model successfully identified new cases, and pharmacists efficiently prescribed and administered treatment.

Barriers and facilitators to pharmacist contraception prescribing in British Columbia: A qualitative approach

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Introduction: As of June 1, 2023, pharmacists across British Columbia (BC) were granted prescribing authority for contraception. However, despite provincial coverage of contraceptive products, uptake of pharmacist contraceptive prescribing in BC has been suboptimal. As up to 40% of pregnancies in Canada are unplanned (Black et al., 2017); this low uptake is not explained by a lack of service need. Our study sought to gain a deeper understanding of the barriers and facilitators to pharmacists prescribing contraceptives, from the perspectives of BC pharmacists.

Methods: Using a case study methodology, we adopted a qualitative approach focusing on the context of pharmacy practice in BC. We conducted semi-structured virtual interviews via Zoom with 15 BC pharmacists. For representation, we used purposive sampling to ensure we included pharmacists from diverse health authorities/regions

across BC, with varying rates of contraception prescribing and years of experience in pharmacy practice. Our analysis used a multi-coder thematic approach.

Results: Almost 70% of pharmacist participants practiced in a chain community pharmacy and 80% prescribed contraception at least once since the launch of the service. Participants shared that the service was well-perceived and accepted by patients. Identified barriers include insufficient private consultation areas, staff shortages, time constraints, documentation required and lack of public awareness about the service. Facilitators that supported contraception prescribing include user-friendly software for patient assessment, information resources available in the pharmacy, and receiving additional monetary compensation from their workplace. Participants also welcomed the prospect of participating in professional development activities such as workshops or virtual training sessions to strengthen their knowledge and confidence when prescribing contraception.

Conclusion: While contraception prescribing by BC pharmacists aims to optimize patient care provision in the province, the novelty of the service and the additional responsibilities bestowed upon the pharmacist warrant addressing several systems-level barriers in order to support pharmacists in practising to their full scope.

Impact of an educational intervention on knowledge of surgical antibiotic prophylaxis among healthcare workers: A pre- and post-intervention study

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Introduction: Surgical site infections (SSIs) significantly burden healthcare systems, especially in lower-middle-income country (LMICs) where limited resources hinder infection control efforts. Proper antibiotic selection is essential in preventing SSIs, yet knowledge gaps among healthcare workers persist. Training programs enhance knowledge, improve adherence to best practices, and foster a culture of accountability in infection prevention. This study evaluates the impact of an educational intervention on the knowledge of surgical antibiotic prophylaxis at the University of Ghana Medical Centre (UGMC).

Aim: To train 200 healthcare workers on appropriate antibiotic selection for SSI prevention, targeting at least 50% improvement in post-training knowledge by August 2024.

Method: A two-hour training session on surgical antibiotic prophylaxis was conducted using a hybrid approach (in-person and virtual) to enhance accessibility. Facilitated by infectious disease specialists, the training covered appropriate antibiotic selection and best practices based UGMC's local surgical antibiotic prophylaxis guidelines. Participants completed a 10-question pre- and post-training assessment via Google Forms to evaluate knowledge acquisition on the general principles of antibiotic prophylaxis in surgery. Feedback that assessed the training's organization, facilitators, knowledge gained, and impact were also collected to identify areas for improvement.

Results: On August 8, 2024, UGMC hosted a Continuing Professional Development (CPD) session on Surgical Antibiotic Prophylaxis, attracting 412 participants (n=113 in-person, n=299 online). Attendees included medical doctors, nurses, and pharmacists. The average test score increased from 7 to 8, with 60% (n=110/184) of participants demonstrating improved understanding. Feedback from the evaluation showed participants rated the training highly in relevance (4.58/5), organization (5/5), and facilitator engagement (4.6/5), though participants suggested adjustments in timing and logistics. Notably, attendees expressed a commitment to modifying their antibiotic practices, particularly reducing unnecessary use and advocating for antimicrobial stewardship. Satisfaction was high, with 97% (n=64/66) recommending the training to peers. Recommendations included greater departmental involvement and more frequent sessions.

Conclusion: The training effectively enhanced participants' knowledge of surgical antibiotic prophylaxis, reinforcing the importance of structured educational programs in improving antibiotic stewardship. This study highlights the critical role of targeted training in strengthening antimicrobial stewardship and reducing SSI risks in LMICs.

Preliminary investigation and analysis of the awareness and implementation of risk management plans among pharmacists in Taiwan

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Introduction: Ensuring medication safety is a global priority. Post-marketing safety concerns have led to regulatory actions, such as the withdrawal of Rofecoxib (Vioxx) due to its association with increased cardiovascular risk. To strengthen post-marketing surveillance, the European Medicines Agency (EMA) introduced the Risk Management Plan (RMP) in 2005, while the U.S. Food and Drug Administration (FDA) launched the Risk Evaluation and Mitigation Strategies (REMS) in 2007. In Taiwan, the Food and Drug Administration (TFDA) implemented RMP requirements in 2012. As of 2025, 204 New Chemical Entities (NCEs) in Taiwan

require post-marketing RMPs, with additional risk management obligations imposed on four categories of marketed drugs. Although pharmaceutical companies conduct regular RMP evaluations and report outcomes, there is limited data on RMP implementation in healthcare institutions. This study aims to assess pharmacists' awareness and implementation of RMPs and identify factors influencing execution in Taiwan.

Purpose: This study aims to evaluate: Pharmacists' awareness of RMPs The implementation status of RMPs in healthcare institutions Key challenges affecting RMP execution.

Method: A cross-sectional survey was conducted among 95 practicing pharmacists in Taiwan. The questionnaire's reliability and validity were assessed using Cronbach's Alpha and Exploratory Factor Analysis (EFA). Principal Component Analysis (PCA) further confirmed the questionnaire's structural validity.

Results: Practice settings: 44.2% in teaching hospitals, 33.7% in medical centers, 10.5% in regional hospitals, and 11.6% in other institutions. Years of experience: 64.2% had >10 years, 16.8% had 1-5 years, 14.7% had 6-10 years, and 4.3% had <1 year. Education levels: 8.4% doctoral, 48.4% master's, 43.2% bachelor's. In the past three months:Only 11.9% of pharmacists had conducted RMP-related activities. 21.1% of institutions had a designated RMP management unit or personnel.

Key barriers to RMP implementation (5-point scale): Insufficient human resources: 4.49; Lack of standard procedures: 4.25; Limited pharmacist awareness or motivation: 4.19; Lack of pharmaceutical industry support: 4.04; Limited management support: 3.88.

Conclusion: This study highlights low RMP implementation rates in some Taiwanese healthcare institutions, which appear to be independent of institution type, education level, or experience. Instead, implementation is primarily hindered by workforce constraints, procedural gaps, and a lack of support from both pharmaceutical companies and management.

Enhancing pharmacists' knowledge, attitudes, and behaviours toward RMPs is crucial for improving medication safety. Future strategies should focus on educational initiatives, process optimisation, and policy support to integrate RMPs into pharmaceutical care and strengthen patient safety.

Vascular age as a key for a team-based approach to manage blood pressure bridging community pharmacists and primary healthcare physicians: The TOGETHER cluster-randomised trial

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Background: The emphasis on arterial stiffness in community pharmacies (CPh) has been met with considerable interest in Portugal, Austria and Spain. TOGETHER study aims to evaluate whether the empowerment of hypertensive patients by measuring blood pressure (BP) and vascular aging in CPh improves hypertension (HTN) control, and to establish ways of sustainable cooperation between general practitioners (GP) and CPh.

Method: TOGETHER study is a cluster-randomised prospective study in Portugal, Austria and Spain. All consecutive subjects entering CPh will be offered BP measurement and ambulatory BP monitoring (ABPM) for those with BP > 140/90 mmHg. CPh will be randomised to a usual care arm (including health education for HTN) and an experimental care arm, where vascular ageing (VA) will be assessed by estimating aortic pulse wave velocity using

brachial oscillometry. In this group, health education will include VA, which will also be delivered to general practitioners. In both groups, HTN will be managed by GPs according to usual clinical practice. A second evaluation with ABPM will be performed after 3-6 months and the percentage of patients with controlled hypertension will be compared between the two arms. The degree of CPh/GP interaction and patient adherence will be assessed using validated surveys. This project has been approved by the Ethics Committee for Clinical Research of the Hospital de Sagunto (ref: ROD-SAL-2024-01) and by the Ethics Committees of the participating centres. The study has been registered on ClinicalTrials.gov (FP-1533-ROD-SAL-2024-01).

Results: Five fundamental unmet needs will be addressed by TOGETHER: 1) lack of HTN screening programmes; 2) implementation of the simpler and more informative VA concept ("Your arteries are 10 years older than you"); 3) understanding CV risk on an individual basis (individual VA) should improve patient adherence and reduce physician inertia; 4) implementation of health education programmes combined with the VA concept; 5) increased collaboration and development of a team-based approach to HTN care between CPh and GP.

Conclusion: The complementary organisational settings and strengths of the CPh and the GP will allow TOGETHER to develop new strategies for early detection and intervention in uncontrolled HTN, ranging from lifestyle to medical treatment, considering social, economic and behavioural aspects.

Building trust in AI: A community-engaged approach to addressing health disparities

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Introduction: Artificial Intelligence (AI) is revolutionising healthcare, but concerns persist regarding its trustworthiness, particularly for under-resourced communities. The AI-FOR-U project aims to develop AI tools that enhance fairness, transparency, and trust while addressing health disparities. This initiative is led by a Historically Black College and University (HBCU) in rural Maryland, collaborating with seven community partners across the District of Columbia, Maryland, and Virginia (DMV). The project prioritises inclusivity by engaging diverse populations, including racial and sexual minorities, low socioeconomic groups, and new immigrants, in co-developing AI-driven solutions for cardiometabolic disease, oncology, and behavioural health.

Methods: The project employs a theory-based, participatory development approach that integrates community engagement with AI/ML algorithm implementation. Community stakeholders, including front-line healthcare providers, contributed to shaping AI applications through surveys, focus groups, and interviews. Trust-enhancing AI techniques, such as bias mitigation and explainability models, were embedded into risk prediction tools. Healthcare practitioner and community feedback were integrated to determine three clinical use cases that represent community needs.

Results: Preliminary findings indicate that active community involvement in AI tool development fosters greater acceptance and trust in AI-driven healthcare solutions. Key needs identified by healthcare providers and community members include improved algorithmic transparency, equitable data representation, and culturally relevant AI applications. Use cases, including the integration of social determinants of health into 1) predicting substance use disorder medication effectiveness, 2) hypertension therapy discontinuance, and 3) mental health appointment no-shows, were selected for further development of anti-bias and trustworthiness approaches. The use of explainable AI and bias-mitigation techniques shows promise in addressing scepticism and improving frontline healthcare practitioners' and community trust in AI tools.

Conclusion: The AI-FOR-U project highlights the importance of integrating community engagement with technical advancements in AI to build trustworthy healthcare solutions. By incorporating fairness-enhancing algorithms and participatory design principles, this initiative aims to provide scalable models for AI development in under-resourced communities. Future work will focus on refining AI models based on continued stakeholder feedback and expanding implementation strategies to increase AI literacy and capacity within diverse populations.

Quality use of medicines: From national policy to local implementation in Saudi Arabia

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Background: Quality use of medicines (QUM) helps ensure patient safety and optimal healthcare outcomes. The healthcare system in Saudi Arabia has expanded its operational capacity to enhance the delivery of safe, appropriate, and effective healthcare, including the QUM. However, research on the effectiveness and implementation of the QUM policies and programs is limited, particularly at the local hospital level.

Purpose: This study aims to examine issues in the implementation of Saudi Arabia's national QUM policies and programs using a case study of practice in a major regional hospital. This is intended to provide insights into the practice-

level strengths and weaknesses and identify potential areas for improvement.

Methods: In 2024, a qualitative research design was employed using semi-structured interviews with 13 relevant hospital staff, including the hospital manager, medical director, quality officer, pharmacists, physicians, and nurses. An interview guide was developed based on a review of national policies and international practice. Thematic analysis was employed to identify key issues from the interviews.

Results: Two broad themes with subthemes emerged: (1) Strengths of the system, with subthemes of: Comprehensiveness of QUM policies and procedures, Multiplicity of QUM programs and initiatives, Staff training and continuing education programs, and Regular monitoring and evaluation. (2) Challenges to QUM with sub-themes of: Adherence and knowledge gaps, Workforce limitations, and Limited strategic research. It was indicated that comprehensive policies and procedures for medication management have been implemented as required under accreditation standards, including medication reconciliation, patient education programs, and antibiotic stewardship. However, interviewees identified several factors that impacted the effectiveness of practice, including staff shortages, limited resources, and gaps in adherence to QUM protocols. The hospitals' administrators focused on demonstrating appropriate QUM policies and programs were in place for hospital accreditation, while practitioners identified the challenges and barriers related to achieving these in their daily QUM activities.

Conclusion: The findings highlight that at the hospital and clinical care level, effectively achieving the aims of QUM policy requires an ongoing commitment to training, resourcing, technical support, and protocol development and review. Commitment to research should also be better supported as part of QUM.

Using two large language models to classify guidelines in clinical decision support systems

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Background: The effective implementation of personalised pharmacogenomics (PGx) requires the integration of released clinical guidelines into decision support systems (CDSS) to facilitate clinical applications. Large language models (LLMs) can be valuable tools for automating information extraction and updates.

Purpose: To assess the effectiveness of repeated cross-comparisons and an agreement-threshold strategy in two advanced LLMs as supportive tools for updating information.

Method: The study evaluated the performance of two LLMs (GPT-4o and Gemini-1.5-Pro) on PGx clinical guidelines obtained, comparing their outputs with expert-labelled assessments, with key performance metrics including accuracy and reproducibility. Two LLMs classified 385 PGx recommendations, with each recommendation tested 20 times per model. Accuracy was compared with human-labelled data; The Repeated Cross-Comparison approach identified inconsistencies based on the most frequent result within each LLM. The Agreement-Threshold Strategy identified classifications that appeared in less than 60% of predictions across 40 runs, which indicated instability in the LLM. Differences between the primary predictions of the two models were analysed to identify situations warranting manual review, to minimise errors, and to enhance clinical applicability.

Results: GPT-4o and Gemini-1.5-Pro yielded reproducibility rates of 97.8% (7,534/7,700) and 98.9% (7,612/7,700), respectively, based on the most frequent classification for each query. Compared with expert labels, GPT-4o achieved 93.5% accuracy (Cohen's Kappa=0.90; P<.001) and Gemini-1.5-Pro 92.7% accuracy (Cohen's Kappa=0.89; P<.001). The two models provided consistent predictions for 341 cases, reducing the proportion of manual review cases by 88.6% (341/385). Among the 341 cases where both LLMs agreed, only one case (0.3%) did not match human labels. Applying the agreement-threshold strategy further reduced priority manual review cases to 2.9% (11/385), though this approach slightly increased the error rate to 0.5% (2/374).

Conclusion: These findings suggest that using two LLMs can streamline PGx guideline updates for CDSS, although careful review remains necessary. This approach offers a promising solution for guideline classification in CDSS.

Implementation and impact of pharmacist prescribing of hormonal contraceptives in Brazil: Enhancing women's access and autonomy

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Introduction: Recent regulatory advancements in Brazil now permit pharmacists to prescribe hormonal contraceptives

(HCs), significantly expanding women's access to effective and safe birth control methods. Approximately half of all pregnancies in Brazil are unplanned, leading to obstetric complications and induced abortions, underscoring the importance of accessible contraception. Aligning with successful pharmacist prescribing models in countries such as the United Kingdom, United States, and Canada, Brazil's initiative marks a pivotal step toward reproductive autonomy and aligns national practices with international healthcare standards. The objective of this study was to analyse the context, implementation, and challenges of the new pharmacist prescribing protocol for hormonal contraceptives in Brazil, highlighting its potential to improve women's access, safety, and autonomy, and identifying opportunities for ongoing improvement.

Method: A descriptive analysis was conducted of the newly implemented Brazilian pharmacist prescribing protocol developed by clinical pharmacy experts convened by the Brazilian Federal Council of Pharmacy. Key components evaluated included eligibility criteria, available contraceptive methods, and patient safety monitoring procedures. The protocol was reviewed in relation to international standards, specifically World Health Organization (WHO) guidelines for contraceptive eligibility, focusing on patient risk assessment and contraindications such as migraines with aura, hypertension, diabetes mellitus with complications, and thromboembolic disorders.

Results: The protocol explicitly defines patient eligibility, approved contraceptive methods, and safety requirements aligned with WHO standards. Pharmacists are authorised to prescribe low-dose oral contraceptives containing ≤0.03mg ethinylestradiol, progestin-only pills, vaginal rings, and transdermal patches. High-dose estrogen contraceptives (>0.03mg ethinylestradiol) and multiphasic contraceptive pills are excluded from pharmacist prescribing due to increased risks and lack of demonstrated superiority. Pharmacists also play a critical role in prescribing emergency contraception, providing essential counselling on timely and effective use. Early evidence indicates improved contraceptive access and patient autonomy, especially among underserved populations. However, several implementation challenges have emerged, particularly a limited availability of contraceptive options within Brazil's public healthcare system. Such constraints can negatively impact therapeutic flexibility, necessitating referrals to physicians when suitable contraceptive alternatives are unavailable, especially within the public sector.

Conclusion: The authorisation of pharmacists to prescribe hormonal contraceptives in Brazil represents a significant advancement toward enhancing women's access and autonomy in reproductive healthcare. Initial outcomes highlight improvements in access to contraceptives and the provision of safer, patient-centred care. Nevertheless, ongoing challenges such as disparities in medication availability require further attention. Continuous professional education and expansion of contraceptive choices within the public healthcare sector are essential to realise the benefits of this innovative regulatory initiative fully. Future research should focus on evaluating long-term impacts on patient satisfaction, contraceptive effectiveness, pharmacoeconomic considerations, and barriers to the broader implementation of pharmacist prescribing across Brazil.

Deprescribing for older people living in residential aged care facilities: Pharmacist recommendations, doctor acceptance and implementation

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Introduction: Medication management in residential aged care facilities (RACFs) is commonly reported as suboptimal. Polypharmacy (defined as the concurrent use of multiple

medications) is highly prevalent in RACFs due to the increasing number of comorbidities in older people that necessitate pharmacological treatment. Deprescribing has been proposed as a strategy to address inappropriate polypharmacy. The deprescribing process typically consists of several steps, including an initial recommendation by a pharmacist, acceptance of the recommendation by both the patient and the prescriber, and subsequent implementation. This study aimed to describe the recommendations arising from a pharmacist-led deprescribing intervention that occurred as part of the Opti-med randomised controlled trial (RCT).

Method: The Opti-med study was a double-blind placebo-controlled RCT with an additional open-label arm implemented in 17 RACFs across two Australian states (New South Wales and Western Australia). Residents (or their surrogate decision-makers), RACF nursing staff, and the resident's general practitioner (GP) provided consent for participation. All participating residents received an individualised pharmacist-led medication review guided by an evidence-based deprescribing algorithm to identify medications suitable for deprescribing. Pharmacist recommendations were documented in a medication withdrawal plan (MWP) and subsequently reviewed by GPs before implementation. Intervention group participants had their medications deprescribed according to the MWPs approved by their GP, whereas control group participants continued to receive their usual medications. Over-encapsulation or placebo was used to maintain blinding in the blinded groups. The medication review was performed independently by two pharmacists (three pharmacists for New South Wales sites), with any differences in the target medications or withdrawal order resolved by consensus between the pharmacists before sending the final MWP to the GPs. The four rationales for deprescribing recommendations were: 1) inappropriate prescriptions, 2) adverse effects or interactions outweigh potential benefits, 3) medications were no longer needed, and 4) potential benefits uncertain or unlikely to be realised.

Results: A total of 303 participants were enrolled in the study. Of the 1,222 pharmacist recommendations to deprescribe, 941 (77%) were accepted by GPs. Of these 941 accepted recommendations, 692 (74%) were successfully implemented at 12-month follow-up. Among the four rationales for deprescribing recommendations, “medications were no longer needed” was the most common (42%, 513/ 1,231), followed by “inappropriate prescriptions” (28%, 348/ 1,231). The most targeted medication classes were vitamins (e.g. cholecalciferol), psycholeptics (e.g. antipsychotics), lipid-modifying agents (e.g. statins), drugs for acid-related disorders (e.g. proton-pump inhibitors), and psychoanaleptics (e.g. antidepressants). The acceptance rates for these medication classes were 80% (133/167), 76% (74/97), 79% (71/90), 88% (77/88), and 63% (52/82) respectively. Of the four rationales for deprescribing, “inappropriate prescriptions” had the highest acceptance rate of 82% (287/ 348) and the lowest acceptance rate for “adverse effects or interactions outweigh potential benefits” (76%, 158/ 207).

Conclusion: This study highlights the substantial opportunity to optimise medication regimens for people living in RACFs through collaborative efforts between pharmacists and GPs. Notably, every three out of four deprescribing recommendations from pharmacists generated from an algorithm-based medication review were acceptable to GPs. When implemented, these recommendations can significantly reduce the medication burden among older people.

The impact of pharmacist involvement in antimicrobial stewardship for COPD Patients: A scoping review

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Background: Chronic obstructive pulmonary disease (COPD) affects millions globally, with specifically 3.6% of Australians over 40 years of age now living with COPD. COPD exacerbations are a common cause of Australian hospitalisations and are often treated with antimicrobials. Data suggest that half or more of these antimicrobial prescriptions are inappropriate, adding to the burgeoning national and global antimicrobial resistance (AMR) patterns. Pharmacists play vital roles in antimicrobial stewardship (AMS), yet their COPD-specific roles remain underexplored. Purpose: The aim of this scoping review was to explore the evidence on the impact of pharmacists’ AMS roles in COPD to inform AMS practical guidelines and policy.

Methods: This review was conducted following the Joanna Briggs Institute (JBI) methodology for scoping reviews. A search strategy was developed with advice from academic librarians and applied to the Ovid MEDLINE and EMBASE databases (search period inception to October 2024) with results pasted into Covidence®. Titles and abstracts were initially screened for inclusion based on the focus on COPD (population) and AMS intervention delivery (context) by pharmacists (concept). The Covidence® tagging feature aided article organisation. Eligible studies were independently screened and assessed for quality by two reviewers, and data were descriptively extracted in a tabular form.

Results: Studies (n=7) conducted across four countries: France (n=1), Norway (n=1), the UK (n=1), and the US (n=4). Impact: In all studies, pharmacists had a key role in multidisciplinary teams, and interventions were complex. Pharmacist intervention activities reduced antimicrobial days of therapy by 25–40% in four studies, with no increase in

treatment failure. Innovations: Integrating clinical decision support tools improved guideline adherence, reducing broad-spectrum antibiotic prescriptions by 30% in one study. When clinical decision support tools are combined with pharmacist audits and feedback, median days of therapy decreased from 4 days (IQR 2.8–5) to 3 days (IQR 2–4) (P = 0.001). Two studies demonstrated that pharmacist-led antimicrobial stewardship (AMS) interventions during transition of care improved discharge antibiotic prescribing. One study reported an increase in optimised discharge regimens from 69% to 82% (P = 0.033) using an electronic scoring system, while another showed a significant rise in optimal antimicrobial prescribing at discharge (36.0% vs. 81.5%, P < 0.001). Another innovation was the use of biomarkers to guide AMS recommendations; for example, in one study, integrating procalcitonin with a clinical decision support tool to alert pharmacists when procalcitonin levels were below 0.25 ng/mL significantly increased the acceptance rate of pharmacist AMS recommendations from 14% to 60% (P < 0.001). None of the studies had robust testing designs and mostly were single-institution studies, and hence the generalisability of these review results is uncertain.

Conclusion: Pharmacists have an integral role in AMS for COPD exacerbation care. Their interventions reduce antimicrobial days of therapy, optimise antimicrobial activity during the transition of care, and use clinical decision support tools coupled with procalcitonin, aiding their AMS recommendations. Future research should prioritise randomised controlled trials evaluating long-term AMR reduction after pharmacists AMS intervention, and scalability in resource-limited environments.

Advocating for a pharmacist's role in future services for methamphetamine use disorder

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Introduction: The frequent use of methamphetamine in Australia has resulted in significantly increased demand for acute healthcare services. However, there are several gaps and barriers to the access of healthcare services for people with Methamphetamine Use Disorder (MUD). Utilising pharmacy services may help increase healthcare accessibility for people with MUD, thereby decreasing the burden on acute healthcare services. The aim of this study was to explore consumer perspectives on the role of pharmacists in the treatment and management of MUD.

Method: People with MUD were recruited from two Sydney Local Health District sites using a convenience and snow-ball sampling strategy. Open-ended questions explored client views on prospective MUD treatment programs and services that may involve pharmacists. Transcribed interviews were then thematically analysed by members of the research team to identify common themes.

Results: Twenty-three clients with MUD were interviewed. Four themes emerged from the data: 1. the plight of people with MUD, 2. lack of treatment and services for MUD, 3. the need for treatment and services for MUD, and 4. positive prospects of treatment and services for MUD in pharmacy. Interviewees expressed frustration over the lack of healthcare access for MUD, and strongly advocated for a role that pharmacists may have in future MUD treatment programs and services.

Conclusion: There was a sense of despair and frustration by participants in this study, attributed to a perceived lack of available services for MUD. Participating clients perceived an urgent need for treatment programs and services to curb the negative complications of methamphetamine use. Utilising pharmacists in MUD treatment programs and services was strongly advocated for by participants in this study, seen to possibly bridge the gap in access to healthcare services for people with MUD.

Common upper respiratory ailments and findings from STAR 2 – opportunities for pharmacists to support appropriate management and reduce antibiotic use

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Background: Upper respiratory tract infections (URTI) are common ailments which manifest in a range of symptoms including sore throat, blocked nose and cough. Pharmacy teams are frequently consulted and therefore play a critical educational role in their appropriate management.

Purpose: To examine the changes in attitudes surrounding URTIs, focusing on patient perceptions of pharmacists and their role in providing education on appropriate antibiotic use.

Method: In June 2024, an observational, questionnaire-based study entitled Sore Throat and Antibiotic Resistance 2 (STAR 2) was conducted in adults who had experienced and received treatment for respiratory symptoms in the previous 6 months. The study was conducted in 16 countries (Australia, Brazil, Germany, Italy, Malaysia, Mexico, Netherlands, Philippines, Poland, Romania, Saudi Arabia, South Africa, Spain, Thailand, United Kingdom, United States) and built on observations from the first STAR study conducted in May 2022. The survey explored consumer experience of respiratory illnesses and symptoms, antibiotic use and attitudes and perceptions on antibiotics.

Results: 16,781 eligible adults completed the questionnaire of whom 48% overall reported sore throat as the most common symptom (range: 24%–64%). Of those who had experienced an URTI, 37% overall reported that they consulted a pharmacist for their last URTI (range: 27%–58%). The most frequent result of their last consultation with a healthcare professional (HCP), such as doctor, pharmacist or nurse, was to be recommended a specific product from the pharmacy (overall: 35%; range: 27–51%) or to be prescribed an antibiotic (overall: 33%; range: 19%–48%). Overall, the top reasons to consult an HCP, such as doctor, pharmacist or nurse, were related to diagnosis (43%), management (33%), pain relief (32%) and to understand the severity of the problem (30%). Overall, participants agreed that the advice of pharmacists was valuable (78%), were satisfied with their recommendation (73%) and trusted what the pharmacist had told them (69%).

Conclusion: Pharmacy teams are ideally placed to manage patients with URTIs and are valued and trusted for their advice. Pharmacists have the opportunity to reassure patients, offer symptomatic relief or referral and contribute to reducing antibiotic use for acute URTIs.

Effectiveness of a collaborative deprescribing intervention of potentially inappropriate proton-pump inhibitors among community-dwelling older adults: The C-SENIoR trial

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Introduction: Proton-pump inhibitors (PPI) are considered potentially inappropriate medication for older adults. Deprescribing is a patient-centered intervention involving multiple healthcare providers aimed at reducing or discontinuing medications that may be causing harm or no longer provide benefit. Interest in deprescribing interventions is growing, particularly in aging populations, but their effectiveness is expected to vary across settings. The objective of this study was to assess the effectiveness of a collaborative deprescribing intervention by community pharmacists (CPh) and general practitioners (GP) on potentially inappropriate PPIs use among community-dwelling older adults.

Methods: This was a pragmatic, multicentre, non-randomised 2-arm controlled trial with a 6-month follow-up in Portuguese primary care, involving pharmacies and family health units, to deprescribe PPI in mainland Portugal. Adults aged 65 years or older with chronic PPI use (> 8 weeks) were enrolled. Participants in the experimental group (EG) received a multifaceted three-step intervention delivered by CPh and GP, while the control group (CG) received usual care. The EG and CG were compared regarding the primary outcome defined as the successfully discontinuation or dose reduction of PPIs at the 6-month follow-up, as ascertained by patient's

self-report and pharmacy medication renewals. The study protocol is already published.

Results: The trial involved 8 community pharmacies (CP) and 2 family health units (FHU) in the EG, and 13 CPs with 16 FHUs in the CG. Between April 27th and November 15th, 2023, a total of 166 patients were recruited: 87 in the EG and 79 in the CG, of which 84 (96.6%) in the EG vs 75 (94,9%) in the CG, completed the 6-month follow-up. Participants had a mean age of 74.2 years, standard deviation (SD)=10.6 (74.4 years (SD)=6.1 in the EG vs 74.1 years (SD=5.9) in the CG), most (59.0%) were females (58.6% in the EG vs 59.5% in the CG), and on average were taking a PPI for more than 10 years (mean, SD: 10.7, 7.0 in the EG vs 10.6, 7.3 in the CG) (p>0.05). At 6-month follow-up 41 of 84 (48.8%) patients in the EG reduced dose or discontinued PPIs compared with 3 of 75 (4.0%) in the CG. The adjusted absolute risk difference in deprescribing between EG and CG was 44.3% (95%CI:30.8-57.8); number needed to treat of 2.3. At trial completion, no significant differences were observed between the EG and GG in both assessed patient reported outcomes (e.g., adherence, quality of life) and drug-specific outcomes (e.g., mean number of medications).

Conclusions: This study underscores the effectiveness of a collaborative, patient-centred deprescribing approach to optimize medication use among community-dwelling older adults. Additionally, it enhances the understanding of how deprescribing PPIs can be operationalized, despite evidence of high patients' resistance. More multidisciplinary efforts and supportive policies are necessary to optimize medication use in older adults.

Enhanced patient information access improves pharmacists' ability to identify drug related problems: A mixed-methods study

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Background: Access to patient information is essential for community pharmacists to provide comprehensive pharmaceutical care, involving a deep understanding of medical history, medications, and disease conditions. However, the extent to which current information access in Turkiye empowers pharmacists to identify and resolve drug-related problems remains unclear.

Aim: This study aimed to determine the impact of varying patient information access on pharmacists' ability to identify drug-related problems (DRPs).

Method: A mixed-methods design was employed. First part, ten community pharmacists participated in sessions to perform medication reviews for simulated patient vignettes (involving 16 DRPs and 40 irrelevant drug-related issues) under two conditions: limited access (usual practice) and when having complete access to patient medical data. The number and accuracy of identified DRPs, time spent on care, and pharmacist confidence levels were evaluated. In the second part, cognitive interviews were conducted with community pharmacists to explore their experiences and barriers in the provision of medication review.

Results: With limited access, pharmacists identified a median of 3.5 DRPs per case (range 2-16), with a median accuracy of 0.77 (identified 3 out of 16 DRPs). Conversely, complete access yielded a median of 13 DRPs identified (range 11-15) with a significant accuracy improvement to 0.90 (median 12 correctly identified DRPs). Pharmacist confidence levels also increased significantly (median 5 vs. 8; $p < 0.05$). Time spent on medication reviews did not differ significantly between conditions (693 seconds vs. 645 seconds; $p = 0.55$). Thematic analysis revealed challenges faced by pharmacists, including missed care opportunities due to limited information, internal pharmacy limitations, external barriers, and societal perceptions. However, pharmacists expressed a strong desire to deliver comprehensive care.

Conclusion: Complete access to patient information significantly enhances pharmacists' ability to identify and resolve DRPs, leading to increased confidence in providing pharmaceutical care. Integrating comprehensive patient data into pharmacists' workflow is crucial to optimize medication review quality and DRP management. Addressing identified barriers and leveraging pharmacists' commitment to improved care can ultimately enhance patient care delivery and outcomes.

Adherence of developing countries to good pharmacy practice: A systematic review and meta-analysis

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Background: The Good Pharmacy Practice (GPP) philosophy introduced in 1992, with the joint effort from International Pharmaceutical Federation (FIP), World Health Organisation (WHO) and Pharmacy professionals has been guiding Pharmacy profession throughout the world. Despite the development and assessment of GPP guidelines in developing countries, no systematic review of adherence has been

conducted. Thus, this systematic review and meta-analysis aim to collate the adherence rate of developing countries to GPP.

Methods: PubMed, Google Scholar since 1st January 1990 until 15th June 2024 was searched for the articles related to assessment of GPP in developing countries. Two reviewers independently screened studies, assessed the appropriateness and quality and extracted data as per the rubric. Meta-analysis was conducted following the method of Neyelof et al. 2012, and adherence rate obtained by following random effect model.

Results: Out of 2245 articles initially screened, included papers for systematic review totaled 14 studies which involved Community Pharmacies or retail Pharmacies and Hospital Pharmacies or Health Centers. Pooled GPP adherence obtained was 52.81%. Most commonly explored domains of GPP are storage, service and health promotion facilities, dispensing and rational use of medicine. The most commonly used tool was the Trap B et al. indicator tool, along with country-specific regulations, guidelines, and self-developed questionnaires.

Conclusion: Although high adherence to GPP is desirable, as it reflects the standard practice of Pharmacy, as low as 53% adherence has been obtained in this review. Thus, all the implementation stakeholders and influencers should join hands to promote GPP in developing countries.

Early detection and management of anemia in pre-dialysis chronic kidney disease patients in Qatar: A real-world retrospective cohort study

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Background: Anemia is a common complication in patients with chronic kidney disease (CKD), particularly in the pre-dialysis stage, yet it is often underdiagnosed and inadequately managed. There is a lack of sufficient real-world data to assess the detection and treatment practices for CKD-associated anemia.

Objectives: This study aimed to assess the rates of early detection and management of anemia in pre-dialysis CKD patients and to analyze the utilization of treatment modalities for CKD-induced anemia.

Methods: A retrospective cohort study was conducted including pre-dialysis CKD patients diagnosed with anemia, from Hamad Medical Corporation, Qatar. Data were extracted from electronic medical records for the period between September 2019 and April 2023. Descriptive and inferential statistics were used to characterize patient demographics, baseline clinical parameters, anemia detection rates and severity, treatment modalities, and clinical outcomes.

Results: Among the 2,051 patients included, 65.3% received anemia treatment, with iron supplementation ± vitamin B being the most common therapeutic regimen (54%). Severe anemia was more prevalent among stage 5 CKD patients, and treatment rates were significantly higher in nephrology clinics compared to other settings ($p < 0.032$). Patients treated with iron + vitamin B ± erythropoietin-stimulating agents demonstrated the highest improvement in eGFR levels at six months ($p < 0.001$). Moreover, patients who received vitamin B supplementation alone showed the most significant increase in hemoglobin levels after six months ($p < 0.001$).

Conclusion: Early detection and management of anemia in pre-dialysis CKD patients remain inadequate, particularly in the early stages of the disease. Enhanced systematic approach and increased involvement of nephrology specialists are essential to optimize outcomes in this patient population.

Needs assessment for early career pharmacists in a low-income country: A case study of Sierra Leone

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Background: Pharmacists are integral to Sierra Leone's healthcare system, contributing significantly to medicine supply chain management, antimicrobial stewardship, and patient care. Pharmacists in Sierra Leone work in various settings, including hospitals, community pharmacies, regulatory bodies, academia, and public health programs. The

Ebola outbreak in 2014-2016 exposed weaknesses in the country's health system. These weaknesses pose significant challenges to the country's overall health system, including accessibility, and a high burden of diseases. A study by International Federation of Pharmacist (FIP) reported that early career pharmacists often face challenges related to confidence in decision-making, maintaining work-life balance, and adapting to high-pressure environments. Objective: The objective of this needs assessment was to identify key areas for professional development and inform strategies to enhance the effectiveness of early-career pharmacists in their roles.

Methods: The survey was distributed among early career pharmacists across various healthcare settings through an online Google Form. Data was collected using structured questionnaires, covering demographic information, professional development interests, workplace challenges, and skill gaps.

Results: A total of 79 pharmacists completed the online questionnaire. Of these, 71% were male and 30% were female, with a mean age of 31 years. The survey revealed that 66% of respondents require further training in clinical pharmacy, followed by 48.1% in logistics and supply chain management. Continuous professional education was the preferred method of professional development for 59.5% of participants. Additionally, 78.5% expressed a need for research skills, while 66% reported facing challenges due to limited resources and support. To overcome these challenges, 63% highlighted the need for a clearer career pathway for professional advancement.

Conclusion: The needs assessment highlights critical areas for professional development and challenges faced by early-career pharmacists in Sierra Leone. A significant proportion of respondents identified a need for further training in clinical pharmacy and logistics and supply chain management, with continuous professional education emerging as the preferred learning method. The strong demand for research skills underscores the desire for greater engagement in evidence-based practice. However, limited resources and institutional support remain key barriers, emphasizing the need for systemic improvements. Establishing clearer career pathways and strengthening professional development opportunities could enhance workforce capacity, motivation, and overall healthcare outcomes in Sierra Leone.

An investigation of the prevalence and risks of Outpatient Parenteral Antimicrobial Therapy (OPAT) in patients undergoing long-term management

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Background: Outpatient Parenteral Antimicrobial Therapy (OPAT) is a significant advancement in healthcare, allowing patients to receive intravenous antimicrobial treatment outside hospitals. Despite acceptance globally as an alternative to inpatient administration of intravenous antibiotics, data on the prevalence, efficacy, and risks of long-term OPAT remain limited, particularly in Australia. Moreover, antimicrobial stewardship concerns have emerged, with respect to appropriateness of antibiotics used.

Purpose: This study aimed to investigate the prevalence and risks associated with long-term OPAT extending beyond two weeks of administration. Specific objectives included: (1) identifying antimicrobial agents administered via elastomeric infusers and their distribution mechanisms at a tertiary teaching hospital in Western Australia (WA); (2) evaluating clinical outcomes and appropriateness of antibiotic selection; and (3) documenting adverse reactions or events experienced by patients undergoing extended OPAT treatment.

Method: A retrospective analysis was conducted, of patients who were aged ≥18 and who received OPAT during 2023/24 for one of the following infections: Methicillin-sensitive Staphylococcus aureus (MSSA) bacteraemia, bone and joint infections, infective endocarditis, skin and soft tissue infections, liver abscesses, and central nervous system (CNS) infections. Data collected from medical records included patient demographics (age, gender, past medical history), point of referral to OPAT, length of inpatient stay, length of OPAT, clinical diagnosis, antimicrobial agents with their dose, frequency of administration, treatment duration, outcome data (success rate, readmission, adverse effects and complications). Appropriateness of antimicrobial prescribing was based on affiliated hospital guidelines and the Australian Therapeutic Guidelines: Antibiotics (2023).

Results: Of 157 patients who met the inclusion criteria, a majority were males (100/157; 63.7%). More patients aged 66 to 75 years were treated with OPAT (43/157; 27.4%). The most common infections treated with OPAT included bone and joint infections (58/157; 36.9%) and bacteraemia (47/157; 29.9%). Methicillin sensitive Staphylococcus aureus was the most predominant organism isolated in patients treated during OPAT (39/180; 21.7%). The most prescribed intravenous antimicrobial agent prescribed during OPAT was piperacilin/tazobactam (32/176; 18.2%). The completion rate of OPAT by patients undergoing treatment was 153/157 (97.5%) and most patients improved clinically and biochemically (134/157; 85.4%). There were 13/157 (8.3%)

catheter-associated adverse effects and 11/157 (7.0%) antibiotics-associated adverse effects. Vascular access-related complications were mainly linked to peripherally inserted central catheters and included slight bleeding around the insertion site, redness and itching. There were few antibiotic-associated adverse effects (mild anorexia, rash and diarrhea). Serious adverse effects included eosinophilia with ceftriaxone.

Conclusion: There was high rate of completion of OPAT, that notwithstanding, the reports of adverse effects identifies the need for continued monitoring and optimal processes and stewardship of OPAT therapy to assure safety and correct use of antibiotics. Antibiotics were selected based on laboratory-confirmed susceptibility testing of the isolated pathogen.

Knowledge, attitudes, and practices of community pharmacists on patient counselling: A cross-sectional study in Gampaha District, Sri Lanka: A study protocol

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Background: The pharmacist's role has significantly evolved globally, shifting from traditional dispensing to a patient-centred approach prioritising clinical care and counselling. Community pharmacists' practice has shifted from product-oriented to patient-oriented in recent decades to achieve the optimal use of medications while enhancing the patient's quality of life. Patient counselling is an important role of community pharmacists, as community pharmacists serve as immediately achievable health care professionals to the public. Community pharmacists play a crucial role in optimizing drug usage, improving patient outcomes, minimizing prescription misuse, and lowering costs by providing patients with adequate information on their medication. In the current Sri Lankan context, community pharmacists mostly engage in medication dispensing, extemporaneous compounding, and providing limited medicine information.

Purpose: This study aims to assess the knowledge, attitudes, and practices of community pharmacists on patient counselling in selected Medical Officer of Health (MOH) divisions in the Gampaha district, Sri Lanka.

Method: A quantitative, descriptive, cross-sectional study will be conducted among community pharmacists who work at community pharmacies in the selected MOH divisions in the Gampaha district, Sri Lanka. There are 16 MOH divisions in the Gampaha district. Five MOH divisions were selected for the study through the convenience sampling method. The selected MOH divisions are Mirigama, Kalaniya, Gampaha, Minuwangoda, and Attanagalla. Twenty-five community pharmacists working at registered pharmacies under the National Medicines Regulatory Authority (NMRA) will be selected from each MOH area through a convenience sampling method. Data will be collected from community pharmacists who work at selected community pharmacies. A validated, self-administered questionnaire will be used to collect data on community pharmacists' knowledge, attitudes, and practices on patient counselling. A pilot study will be carried out prior to actual data collection. The data will be analyzed using Statistical Package for the Social Sciences, IBM SPSS (Version 25) software.

Results: Ethics approval for the study has been applied from the Ethics Review Committee of the Faculty of Allied Health Sciences, University of Peradeniya. Informed, written consent will be obtained from participants, and they will be assured that their participation in the study is voluntary and that confidentiality will be maintained. The study will be completed by July 2025.

Conclusion: This study will provide critical insights into the knowledge, attitudes, and practices of community pharmacists on patient counselling in selected MOH divisions in Gampaha district, Sri Lanka. This study will reveal the extent of community pharmacists' knowledge of patient counselling and community pharmacists' attitudes, current practices, and factors that influence patient counselling. By providing valuable insights, this study will contribute to the creation of more effective professional development programmes and policy reforms, ultimately resulting in improved patient care through enhanced pharmacist involvement. This study will provide the groundwork for understanding and enhancing the role of community pharmacists in Sri Lanka, providing pharmacy owners and pharmacists to develop strategies to improve patient counselling in community settings.

Knowledge and practices of government pharmacists and dispensers regarding pharmaceutical care in Northern Province, Sri Lanka: A cross-sectional study

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Introduction: Pharmaceutical care is a patient-centered approach aimed at optimizing medication therapy outcomes through collaboration between healthcare professionals,

including pharmacists and dispensers. It involves a comprehensive process where pharmacists and dispensers work closely with patients and other healthcare providers to ensure safe, effective, and appropriate use of medications. The importance of pharmaceutical care lies in its potential to improve patient outcomes, enhance medication adherence, and reduce the risk of adverse drug events. Understanding the knowledge and practices of government pharmacists and dispensers is crucial for improving pharmaceutical care delivery. These professionals play a vital role in ensuring the accessibility and quality of medication management, particularly in a region with unique healthcare needs. Therefore, assessing their knowledge and practices is essential to identify gaps and implement strategies to enhance pharmaceutical care services in this context.

Aim: This study aimed to assess the knowledge and practices related to pharmaceutical care among government pharmacists and dispensers in the Northern Province of Sri Lanka.

Methods: A descriptive, quantitative, cross-sectional study was conducted at Government hospitals and healthcare settings within the Northern Province, Sri Lanka. A validated, self-administered questionnaire was administered among government hospital pharmacists and dispensers employed in the Northern Province of Sri Lanka. Ethical clearance was obtained from the Ethics Review Committee at the Open University of Sri Lanka.

Results: A total of 135 (71.8%) participants, comprising 88 Government pharmacists and 47 dispensers, responded to the study. Among the total participants, the majority of participants were female (60.7%). Pharmacists exhibited good knowledge levels compared to the dispensers, which was 56.8% for pharmacists and 51.1% for the dispensers. However, 10.6% of dispensers scored poor knowledge compared to 2.3% of pharmacists regarding pharmaceutical care, with 66.4% of pharmacists familiar with the term "pharmaceutical care" versus 33.6% of dispensers. Pharmacists also scored higher in accurately defining pharmaceutical care when compared with dispensers (67.8% vs. 32.2%). Additionally, Pharmacists' knowledge of its collaborative nature was higher (76.0%), in contrast to dispensers (36.7%). In practice, both groups were actively involved in medication counseling (Mean score of 4.46, and SD 0.667). Both pharmacists and dispensers were moderately involved in communication with other healthcare professionals (Mean score of 3.79, and SD 0.838). However, regarding reporting adverse drug reactions, it exhibited the lowest mean and high variability (Mean score of 3.57, and SD 1.026). In addition, practices like taking medication history (Mean score 3.92, and SD 0.650) and monitoring adherence (Mean score 3.9) showed moderate engagement towards the practices by pharmacists and dispensers.

Conclusions: Pharmacists reported better understanding and engagement in pharmaceutical care. While both groups were actively involved in key practices, the lower performance in adverse drug reactions reporting and the higher proportion of dispensers with "Poor" knowledge scores indicate a need for improved training. Addressing these gaps through targeted educational initiatives is essential to enhance the quality of pharmaceutical care services in the Northern Province of Sri Lanka, ultimately leading to better patient outcomes.

Impact of continuing education on immunization rates in a community pharmacy setting

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Immunizations are one of the most impactful interventions within the context of preventative medicine. However, in many areas of the world, immunization rates for many vaccine-preventable diseases are often suboptimal. Factors contributing to this include a lack of awareness of immunization recommendations on the part of both healthcare providers and patients. Nonetheless, community pharmacists are healthcare providers who are highly accessible to the public and often interact with patients more often than other healthcare providers. Accordingly, pharmacists are therefore uniquely positioned to engage in health promotion initiatives to their patients in relation to immunizations in order to help optimize health outcomes. Hence, an initiative was implemented at 4 community pharmacy sites in Ontario, Canada in which pharmacy professionals participated in a continuing education program between 2023 and 2024. The education program involved routine learning activities where pharmacy professionals learned about updated immunization guidelines and recommendations, availability of various vaccinations, and instruction on best practices relating to discussing and promoting immunizations with patients in a community pharmacy setting. Accordingly, overall immunization rates for various vaccine-preventable illnesses such as Shingles, COVID-19, influenza, RSV, and pneumococcal disease were tracked at the 4 pharmacy sites where the pharmacy professionals worked. Moreover, surveys were used to collect feedback from the participating pharmacy professionals on their perceived knowledge and competence in relation to immunizations.

Ultimately, over 30 pharmacy professionals participated, and each professional reported a notable improvement in their knowledge on immunization recommendations and self-confidence in discussing and recommending immunizations with patients at the pharmacy. Furthermore, in comparison to previous years, it was also noted that there was an increase by over 25% in the number of vaccinations administered and dispensed at the 4 pharmacy sites after the continuing education program had been implemented.

Therefore, this initiative highlighted the important role which continuing education programs can play in supporting the professional development of pharmacy staff and the potential impact on improving immunization rates and health outcomes in patient populations.

Patient practices and attitudes toward disposal of unused pharmaceuticals: A cross-sectional study at District General Hospital, Kegalle, Sri Lanka

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Introduction: Improper disposal of expired or unused pharmaceuticals significantly contributes to environmental pollution, posing risks to human, animal, and plant health. Currently, Sri Lanka lacks established procedures for collecting and disposing of unused pharmaceuticals from the public. Moreover, research addressing medication disposal practices within the Sri Lankan context remains limited.

Aim: This study aimed to investigate the practices and attitudes toward expired and unused pharmaceuticals among patients attending the District General Hospital in Kegalle, Sri Lanka.

Methodology: A cross-sectional descriptive study was conducted among 377 patients attending five clinics at the District General Hospital, Kegalle. The sample size was determined using Raosoft sample size calculator software (Version 2014), assuming a 95% confidence level and a 5% margin of error. Data collection was performed through a self-administered questionnaire. Ethical approval was obtained from the Ethics Review Committee, Faculty of Allied Health Sciences, University of Peradeniya. Data analysis was carried out using SPSS (Version 26).

Results: Out of 377 participants, 366 (97.1%) completed the questionnaire. The majority identified as Sinhalese (90.7%), with females comprising slightly more than half (53.0%) of respondents. Common chronic conditions among participants included hypertension (56.0%), hyperlipidemia (36.1%), diabetes (28.1%), and respiratory tract infections (26.8%).

Remarkably, 360 participants (98.6%) reported having expired or unused medications and medical devices at home. The predominant disposal methods reported for prescribed medicines were discarding into household garbage (75.7%), open land disposal (65.0%), and disposal in sinks (21.0%). For medical devices, disposal into household garbage (35.2%), burning (17.5%), and open land disposal (12.0%) were the most frequent practices.

The primary reasons cited for accumulating unused medications included forgetfulness (67.8%), receiving excess medications (46.2%), lack of clear usage instructions (35.5%), symptom relief after taking doses without completing the prescribed doses (29.2%), and discontinuation due to side effects (21.9%). Many respondents retained unused medications for personal future use (73.5%), emergencies (48.6%), or because they lacked knowledge of appropriate disposal methods (42.9%).

Importantly, almost all the respondents (98.9%) acknowledged that improper disposal of pharmaceuticals contributes to environmental pollution in Sri Lanka. To improve disposal practices, they had positive attitudes toward establishing collection centers at community pharmacies or healthcare settings (53.8%) and secure disposal containers at local shopping malls (26.8%).

Conclusion: The prevalent accumulation of unused or expired pharmaceuticals is primarily due to forgetfulness and inadequate patient information. Also, inappropriate disposal methods observed pose significant health and environmental risks, which underscores the critical need for the initiation of patient education programmes regarding medication waste management, the necessity of structured disposal programmes, and the introduction of safer disposal practices. Future research is needed to investigate effective strategies for implementing sustainable medication disposal practices, while targeted interventions and clear national policies are critical for establishing effective pharmaceutical waste collection systems in Sri Lanka.

The vital role of clinical pharmacists in improving the application of Guidelines Directed Medication Therapy (GDMT) in the heart failure program

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Introduction & Objective: Initiating Guideline-Directed Medical Treatment (GDMT) is essential in the management of heart failure (HF) patients. Recent studies emphasize the crucial role played by clinical pharmacists in improving outcomes for individuals with chronic diseases. The objective of this study is to evaluate the impact of implementing GDMT by clinical pharmacists on the clinical outcomes of HF patients.

Method: A retrospective cohort study on 1690 HF patients, at the Medical City of King Saud University, in Riyadh, Saudi Arabia. after a comprehensive, multidisciplinary program for HF patients has been established in 2018 to deliver high-quality care. this program incorporates clinical pharmacists to optimize the utilization of guideline-directed medical therapy (GDMT), Initially, the GDMT program consisted of three

groups of medications out of four: 1) Angiotensin-Converting Enzyme inhibitors (ACE inhibitors), 2) Beta-blockers (Beta-adrenergic receptor blockers), and 3) Mineralocorticoid Receptor Antagonists (MRAs). This study was done to investigate the effects of incorporating clinical pharmacists into the multi-disciplinary HF program and implementing GDMT on the HF patients' outcomes.

Results: A total of 1690 HF patients were treated, out of which 445 were evaluated -before the establishment of the multi-disciplinary HF program with the involvement of clinical pharmacists, and 1245 patients were evaluated after the establishment of the HF program. Baseline characteristics in post-intervention groups were comparable. After the program, there was a statistically significant improvement in the rate of impaired ejection fraction (EF) when compared to those admitted before (79.9% vs 82%, P<0.001), with significantly lower odds of having impaired EF (OR= 0.69, 95%CI: from 0.506 to 0.941, P=0.019). There was a significantly lower probability of mortality than those evaluated before the program with HR of 0.394, 95%CI: from 0.213 to 0.73, P value=0.003. In addition, the readmission rates were statistically significantly lower (95%CI) of 0.372 (0.245 to 0.565), 0.01 (0.001 to 0.164), 0.001 (0.0001 to 0.223) respectively, with a (P<0.001) were lower, compared to those admitted before establishing the multidisciplinary HF program. It's worth noting that in 2021, a fourth pillar of HF medications, Sodium-glucose co-transporter 2 inhibitors (SGLT2 inhibitors), was introduced. However, for the purposes of participating in this conference, this fourth group of medications is not included in the analysis.

Conclusion: The inclusion of a clinical pharmacist specializing in cardiology within the framework of the multidisciplinary (HF) program played a pivotal role in enhancing outcomes for HF patients. This involvement resulted in a notable reduction in prognosis rates and the necessity for re-admission, concurrently minimizing both mortality and morbidity rates.

Association between inhaled corticosteroid particle size and respiratory tract infections in asthma patients

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Introduction: Inhaled corticosteroids (ICS) are the cornerstone of asthma management, significantly reducing the risk of severe exacerbations and asthma-related mortality. While pharmacokinetic and pharmacodynamic properties influence ICS response variability, drug formulation characteristics—particularly particle size—also affect clinical safety outcomes. This study aims to evaluate the impact of ICS particle size on the risk of respiratory tract infections in patients with asthma.

Method: We conducted a retrospective cohort study using the US Collaborative Network in TriNetX, encompassing 35 healthcare organizations. Patients diagnosed with asthma (ICD-10-CM: J45) who were naïve to ICS therapy were included between January 1, 2020, and March 17, 2025. Based on their initial ICS prescription, patients were categorized into extra fine-particle or fine-particle ICS groups. Study outcomes, including upper and lower respiratory tract infections and influenza, were assessed one year after ICS initiation. A 1:1 propensity score matching approach was applied to adjust for potential confounders, and risk ratios (RR) with 95% confidence intervals (CI) were calculated.

Results: A total of 94,768 patients were matched in each group, with a mean age of 39.7 years, and 61.3% were female. The extra fine-particle ICS group had a significantly higher risk of overall respiratory tract infections compared to the fine-particle ICS group (RR: 1.017, 95% CI: 1.002–1.033). The risk of lower respiratory tract infections was also significantly elevated (RR: 1.053, 95% CI: 1.016–1.092). However, the increase in risk for acute upper respiratory infections (RR: 1.012, 95% CI: 0.995–1.029) and influenza (RR: 1.002, 95% CI: 0.950–1.057) was minimal.

Conclusion: Patients using extra fine-particle ICS may have a higher risk of lower respiratory tract infections. Clinicians should carefully weigh the therapeutic benefits of ICS against potential risks to optimize asthma management.

Grading outcomes of pharmacy self-inspections vs. Inspection: A risk-based approach to pharmacy inspections in South Africa

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Background: Monitoring pharmacies' adherence to good pharmacy practice (GPP) is essential to ensure patient safety. In 2020, the South African Pharmacy Council (SAPC) implemented self-inspections as part of a risk-based approach (RBA) to pharmacy inspections. This approach assigns a grading outcome of A, B, or C based on the self-inspection conducted by the responsible pharmacist (RP) or an inspection performed by an SAPC-appointed inspector.

Purpose: This study aimed to assess compliance with GPP standards among South African pharmacies by comparing grading scores from self-inspections conducted by RPs to those obtained from SAPC inspector-led inspections.

Methods: A cross-sectional research design was employed to evaluate the self-inspection and inspection data of 5,725 pharmacies from 1 January 2021 to 28 February 2025. Self-inspection results were available for 1,455 (25%) of the pharmacies inspected. Data analysis was conducted using SAS 9.4 (TSIM3) (SAS/STAT software, Version 14.1 for Windows). Two-tailed statistical tests were performed with a type-I error rate set at 5% (α=0.05). Cramer's V was calculated to assess effect size, indicating practical associations as follows: Non-significant association ≤ 0.1; Visible association >0.1 and ≤ 0.3; Significant association ≥ 0.5.

Results: A significant practical association (p > 0.0001; Cramer's V = 0.5) was established between grading from self-inspections and those from inspections. Of the pharmacies (N = 979) that achieved grade A during self-inspection, 87% (n=868) also received grade A in the inspection. Among those that attained grade C in the self-inspection (N = 407), 29% (n=118) of pharmacies' grades improved to an A during the inspection. The grading status stayed at grade C in 65% (n=268) of cases. Additionally, 43% (n=29) of those who, in the self-inspection, received grade B (N = 68) achieved an A in the inspection. These findings were consistent across different pharmacy categories (community, institutional, and wholesale) and inspection types (disciplinary, monitoring, training, and new premises). Distinctions emerged regarding non-compliant areas identified during self-inspections compared to formal inspections. The top five non-compliant sections noted during self-inspection included: pharmacy staffing (15%), promotion of public health (12%), registration details (10%), written standard operating procedures (9%) and continuing professional development and training (7%). Conversely, inspections revealed non-compliance in areas including control of Schedule 6 substances (22%), pharmacy details (16%), continuing professional development and training (15%), counselling areas/waiting spaces (7%), and control of medicines, scheduled substances and active pharmaceutical ingredients (7%). These areas of non-compliance were aligned with specific failures in mandatory criteria regarding pharmacy details availability (pharmacy licensing number (6%) and responsible pharmacist registration number (19%)) and maintaining an up-to-date register of all Schedule 6 purchases and sales (50%).

Conclusion: The findings indicate that the self-inspection results from RPs align closely with those from inspections conducted by inspectors. RPs can enhance their grading score by addressing deficiencies identified in self-inspections before the formal inspection by SAPC.

Operational workflow and learnings from first national central fill pharmacy under national pharmacy strategy initiative 3.2

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Introduction: The National Pharmacy Strategy (NPS) Initiative 3.2, "Deliver medicine when patients need it, where patients need it", aims to transform medicine delivery service with National Central Fill Pharmacy (NCFP) and supporting pharmacy services. SingHealth Polyclinics (SHP) and ALPS have jointly set up the first NCFP, NCFP ONE. NCFP ONE began operations since January 2024 and currently serves primary-care patients from SHP and Healthier SG general practitioners.

Purpose: This poster aims to highlight key learnings from NCFP ONE which will contribute towards goal state development, where NCFPs target to serve patients in an institution-agnostic and premise-neutral manner to enable coordinated care across settings.

Method: SHP and ALPS co-developed the operational workflow for NCFP ONE which offloads pick-pack and last-mile logistics from healthcare institutions. In this model, healthcare institutions remain responsible for all clinical activities. ALPS is responsible for contract management, procurement, and inventory management. ALPS also manages third-party vendors for processing orders and for last-mile courier services.

Results: NCFP ONE has been processing and delivering an average of 320 prescriptions/day. Teething issues involving IT systems and insufficient inventory holding have largely been resolved. Key learnings included the importance of framing of messages in patient change management to engender trust and avoid miscommunications. The importance of staff change management to reassure and educate staff on NCFP work processes and training to upskill them was highlighted.

Conclusion: NCFP ONE was able to successfully offload most additional activities related to medication delivery service from SHP and HSG GPs with minimal issues. The current experience highlighted that key drivers for success include well-designed IT systems, sufficient resources for change management and clear communication to patients and staff. These are valuable lessons as diverse stakeholders develop the goal state to meet population needs and achieve system-wide benefits.

How can community pharmacists support comprehensive geriatric assessment

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Introduction: Promoting interprofessional healthcare is essential for optimizing outcomes in older adults. Collaboration among members from multiple healthcare professions is associated with improvements in various biomedical markers, medication safety, and satisfaction with care. Comprehensive Geriatric Assessment (CGA) is considered a multidisciplinary approach for assessment and subsequent management of the biomedical, psychosocial, functional and environmental needs in older adults. However, lack of pre-configured teams in the community poses challenges for implementing CGA. While older adults may visit a family physician, these practices often do not integrate other healthcare professionals. Worldwide, access to primary care is in decline, and an estimated 22% of Canadians do not have a family physician. Community pharmacists are increasingly addressing the needs of those who have no regular primary care provider. Recognizing patients' easy access and longitudinal relationship with community pharmacists, our pilot project explored what tools could pharmacists use to facilitate CGA screening in community.

Methods: A modified Delphi panel approach was employed to identify and recommend CGA tools for pharmacist use for domains such as, functional capacity, nutritional status, cognition, psychological status, and social support. Medication-related tools for CGA were excluded as community pharmacists are already familiar screening for polypharmacy and inappropriate prescribing as part of usual care for older adults. The 12-member expert panel, comprising multidisciplinary members (dietitian, occupational therapist, nurse, physiotherapist, psychologist, geriatricians, social worker, and pharmacists) and three patient partners, independently rated the importance of selected assessment tools using a 7-point scale. Consensus was set at 75% agreement of panel members voting at any level of positive agreement about the importance of the tool (rating choices of 1 through 3 on the scale). The expert panel met twice to discuss findings after two rounds of rating.

Results: Highly rated tools were noted for their brevity and nuanced response options. These included, Older Americans Resources and Services Instrumental Activities of Daily Living scale (OAR IADL), Timed Up and Go (TUG) test, Mini-COG™ test, and Medical Outcomes Study (MOS) Social Supports survey. Patient partner panelists largely agreed with health professional ratings but emphasized the need for personalized answers and consideration of the older adults' preferences in tool design and use. Health professional panel members did offer several cautionary remarks about how the individual administering the tool would enact the next steps as referrals for specialty geriatric care are not always feasible or available to older adults in all communities.

Conclusions: Strategies are proposed for pharmacists in primary care environments to contribute to CGA. A multidisciplinary group identified potentially useful geriatric assessments for pharmacist use in community settings. However, incorporating these assessments into practice requires further feasibility testing, including the identification and consent of eligible patients and the time needed for screening. Ensuring older adults have access to the necessary multidisciplinary expertise and services within their community following pharmacist assessment is essential.

Effect of pharmacist-led interventions in patients with heart failure: A systematic review and meta-analysis of randomized controlled trials

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Introduction: Heart failure (HF) is a chronic, progressive condition characterized by the heart's inability to pump blood efficiently, leading to systemic congestion and reduced organ perfusion. It remains a significant public health burden, contributing to high rates of hospitalization and mortality worldwide. Despite advancements in both pharmacological and non-pharmacological treatments, optimal management of HF remains challenging, often due to poor medication adherence, inadequate patient education, and the increasing complexity of guideline-directed medical therapy (GDMT). Pharmacist-led interventions, including medication reconciliation, patient education, adherence monitoring, and therapy optimization, have emerged as valuable strategies to improve HF management. While previous studies have investigated the effects of pharmacist care on HF patients, the findings regarding quality of life and clinical outcomes have been inconsistent. Furthermore, there is a lack of studies exploring the impact of different pharmacist intervention programs. Therefore, we conducted a systematic review and meta-analysis to assess the effect of pharmacist-led interventions on mortality and the Minnesota Living with Heart Failure Questionnaire (MLHFQ) scores in this population and explore potential effect modifiers.

Method: In this systematic review and meta-analysis, we searched Medline, Embase, and Cochrane Central Register of Controlled Trials from inception to March 2, 2025, for randomized controlled trials evaluating the efficacy of pharmacist-led interventions in HF patients. Two reviewers independently screened articles for inclusion and extracted data from eligible studies. Outcomes of interest included all-cause mortality and MLHFQ scores. Random-effects meta-analyses were conducted to compare these outcomes

between pharmacist-led interventions and usual care in patients with heart failure. Subgroup analyses were conducted based on follow-up durations (≥1 year versus <1 year).

Results: A total of 18 trials were included, comprising 4,632 patients with HF. Pharmacist-led interventions were associated with significantly reduction MLHFQ scores than usual care (Mean difference (MD): -9.09; 95% CI: −15.12 to −3.05; I2 = 86.3%; 7 studies). No significant difference in all-cause mortality was observed between the usual care and pharmacist-led intervention groups (Odds ratio (OR): 0.90; 95% CI: 0.73 to 1.12; I^2 = 0%; 13 studies). In subgroup analyses, a significant reduction in MLHFQ scores was observed only in studies with follow-up durations of ≥1 year (MD: -13.32; 95% CI: −20.36 to −6.27; I^2 = 81.2%; 4 studies), whereas studies with follow-up durations of <1 year showed no significant difference (MD: -2.29; 95% CI: −7.30 to 2.72; I^2 = 86.3%; 3 studies).

Conclusion: Pharmacist-led interventions significantly improve health-related quality of life (MLHFQ scores) in heart failure patients, but do not reduce all-cause mortality. Notably, the benefit on quality of life was observed only in studies with ≥1 year of follow-up, suggesting the need for long-term and continuous pharmacist involvement. These findings highlight the crucial role of pharmacists in optimizing heart failure management. Future research should focus on refining intervention strategies and evaluating their long-term clinical impact.

The impact of pharmaceutical care on quality of life in patients using psychotropic medicines

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Background: Achieving mental health and providing safe and effective treatment of mental disorders are key global health priorities. The prevalence of mental disorders is rising in many countries with negative effects on quality of life (QoL), hospitalization, mortality and morbidity. Published data indicate various drug-related problems (DRPs) in the pharmacotherapy treatment of mental disorders, which can be associated with many challenges. Side effects and adverse effects, drug interactions, comorbidities and non-adherence can compromise patient safety and treatment effectiveness. Community pharmacists have an important role in addressing the DRPs related to psychotropic medicines. Recent studies imply that pharmaceutical care can improve QoL in different medical conditions.

Purpose: This study aims to assess QoL in patients using psycholeptics and psychoanaleptics and to describe the outcome of pharmaceutical care on patients´ QoL.

Method: The study was conducted in community pharmacies in the Istrian County in Croatia. Participants were recruited by community pharmacists during their dispensing process from December 2021 to April 2024. The intervention consisted of pharmaceutical care in optimizing psychotropic medicine use. The participants were randomized into interventional (A) and control group (B). Patients' QoL was assessed before and after pharmacists´ intervention over a period of three months, using the World Health Organization Quality of Life-BREF (WHOQoL-BREF) questionnaire. Participants in group A received pharmaceutical care including Medication Review (MR) and Medication Therapy Management (MTM). In group B, basic counseling during dispensing the medication was provided. To record the prevalence of DRPs, the validated PCNE Classification for Drug-Related Problems, version 9.1. was used.

Results: 97 participants were included in this study. The groups were homogenous regarding sex (p=0,379), age (p=0.683), employment (p=0.281), marital status (p=0.230) and educational degree (p=0.677). Prior to the intervention, no statistical significance in the QoL domains between groups was observed, except in the environment domain (p=0.043) with higher domain scores in the A group. Relation between sociodemographic characteristics and QoL revealed higher scores in social relationships for participants under 50 years of age (p < .001). In addition, employed participants had higher scores for physical (p=0.018) and social domain (p < .001). In both groups, a number of identified DRPs per participant was higher in older participants (age ≥ 50 years, p=0.025). More DRPs were identified (p=0.018) in participants who were unemployed as marital status and level of education degree showed no statistical significance in the number of identified DRPs. There was no statistically significant difference in QoL between the two groups after the intervention. However, the changes in the psychological domain were significant in group A, i.e. the participants from this group had higher scores after the intervention (median 56 vs. 69, before and after counseling respectively, p=0.019).

Conclusion: Pharmaceutical care based on standardized protocols can have a measurable impact on patients using psychotropic medicines, improving the psychological domain of QoL.

Embedding Inclusive Pharmacy Practice (IPP) in 2025: Creating a sense of belonging across pharmacy teams in England

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Introduction: In 2021, following a roundtable event, NHS England (NHSE), Royal Pharmaceutical Society, Association of Pharmacy Technicians UK and 13 partner pharmacy organisations published a 'Joint national plan for Inclusive Pharmacy Practice (IPP)' in England1. The Chief Pharmaceutical Officer's (CPhO) IPP delivery plan focuses on embedding inclusive practices within the workplace for pharmacy professionals. The delivery plan comprises of projects including NHSE inclusive Recruitment checklist, talent management tool, reverse mentoring program and Pharmacy Workforce Race Equality Standard (PWRES).

IPP involves promoting an ongoing commitment to foster a culture of equality, diversity and inclusion within the pharmacy profession in alignment with national strategies and frameworks. This includes promoting diverse senior leadership, developing a culture of belonging within pharmacy teams, and ensuring that all staff feel valued and supported.

This project aims to assess progress and challenges in embedding IPP across NHS England regions.

Method: A thematic analysis of the Strengths, Weaknesses, Opportunities, and Threats (SWOT) related to the implementation of IPP initiatives across England was conducted. Anonymised summaries from each NHS England region detailing their progress with IPP were analysed using ChatGPT version 4. The generated themes were then reviewed and categorised by the CPhO clinical fellows under the appropriate SWOT framework subheadings. This approach provides valuable insights to inform strategies for advancing IPP across the profession and identifying areas for further development.

Results: Combined SWOT Analysis for IPP Across NHS England Regions

Strengths: Strong involvement of senior leaders and establishment of IPP steering groups in several regions, adaptable IPP toolkits, cross-Regional best practice and resource sharing, ensuring diverse leadership to foster a culture of belonging.

Weaknesses: Limited engagement with sectors like community pharmacy and primary care networks (PCNs), issues with accessing and analysing workforce data, including gaps in key data, missing integration efforts external to the pharmacy workforce.

Opportunities: Expanding outreach to broader pharmacy sectors community pharmacy and PCNs, streamlining data access and analysis for better progress tracking, continued sharing of resources and learning between regions, involving broader teams (e.g. Workforce, Education).

Threats: Risk of engagement fatigue and inconsistent participation, cultural resistance from leadership or staff, inconsistent data and difficulties with analysis, lack of clear governance structures in some regions may lead to misalignment and inefficiencies.

Conclusion: Across NHS England regions, there are strong foundational efforts in place to drive IPP, with notable leadership commitment, toolkit development, and collaborative approaches. However, challenges such as sector-specific engagement, data gaps, and leadership resistance need to be addressed to ensure wider adoption and effective implementation.

Opportunities lie in improving data accessibility, expanding cross-sector engagement, and leveraging cross-regional learning to enhance the consistency and reach of IPP efforts. At the same time, threats such as sustainability concerns, change resistance, and data limitations must be mitigated to ensure the continued success of IPP initiatives across England. Further research is needed to explore and enhance the engagement of IPP to broader pharmacy sectors such as community pharmacy and PCNs.

The Northern Ireland Medicines Optimisation Innovation Centre (MOIC): A decade of impact

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Introduction: Suboptimal medicines use is a global challenge, leading to adverse health outcomes, inefficiencies, waste and environmental impact. Established in 2015 by the Department of Health (DH), the Medicines Optimisation Innovation Centre (MOIC) in Northern Ireland (NI) has been driving innovation in healthcare, pharmacy practice, medicines optimisation and associated technologies for a decade. MOIC works across 4 strategic themes. The objective was to evaluate MOIC's impact over the last decade.

Method: The impact of MOIC was evaluated across 4 key categories: Research and Innovation, Strategic partnerships, COVID-19 response, Communication and dissemination and Workplace health and wellbeing.

Results: Research and Innovation Projects: MOIC has partnered in three large EU-funded projects: SHAPES, iSIMPATHY, SIMPATHY and has commenced a further project (iMPROVE) focusing on pharmacogenomics, diagnostics and medicine review. Other European projects include: ENABLE Adherence focusing on adherence technologies and a COST application on the environmental impact of medicines.

MOIC has led the evaluation of cross-sector reform projects in Health and Social Care (HSC), subsequently scaled and spread, including post-discharge telephone follow-up and Consultant Pharmacists for Older People input in Nursing Homes and Intermediate Care. Others include GP Practice-based Pharmacist case management, Pharmacy First Services in Community Pharmacy using rapid diagnostics in the management of sore throats and urinary tract infections, and new models of prescribing by non-medical prescribers.

Strategic Partnerships: MOIC has established over 27 cross-sector agreements, Memoranda of Understanding and partnerships across Ireland and internationally. Examples include working with the Polish Society of Clinical Pharmacy to develop clinical pharmacy; Commonwealth Pharmacists' Association, on antimicrobial stewardship and clinical pharmacy; Cluster Saude de Galicia, Spain on pharmacogenomics; Health Innovation Hub Ireland on clinical pharmacy and innovative technologies. Partnerships focusing on the environment and sustainability have also been established.

MOIC manages the NI HSC Industry Partnership (HSCIP), which ensures joint working between the Pharmaceutical Industry and HSC to deliver 'Triple Win' benefits for patients, HSC and the economy. MOIC is a knowledge provider for Invest NI, the regional business development agency of the Department of Economy, and works directly with industry partners of all sizes. Projects completed include cardiovascular priority pathways, smart procedure packs and evaluation of an adherence technology to support adherence in respiratory disease.

Covid-19 Response: MOIC was agile during the Covid-19 pandemic. Leading work on Personal Protective Equipment procurement and informing the modelling of critical care drugs, MOIC supported the NI Covid-19 response. Since 2020, MOIC has completed 4 reviews of the pharmacy response to Covid-19 for DH.

Communication and Dissemination: Disseminating extensively, including 72 journal publications, 22 reports, 130 oral and 78 poster presentations, MOIC has maximised reach.

Health, wellbeing and inclusion: These have been prioritised in the MOIC Team and in 2024 MOIC was accredited as a Take 5 Health and Wellbeing Workplace.

Conclusion: MOIC has demonstrated considerable impact and success over the last decade and has been recognised as an example of best practice internationally. Going forward the Centre aims to build upon its achievements and deliver further impact to optimise patient care.

Medication management of patients with cancer undergoing surgery from preadmission to discharge: A multi-method study

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Introduction: Effective medication management and reconciliation are critical to ensure the safety of patients with cancer undergoing surgery. Medication discrepancies, particularly during transitions of care, can lead to adverse drug events (ADEs) and negatively impact postoperative outcomes. This study explored the processes of medication management and the association between medication discrepancies and ADEs.

Method: A multi-method design, comprising a retrospective descriptive and prospective cohort design, was conducted at a cancer centre in Australia. The timing of medication reconciliation and the health care professional involved in undertaking medication reconciliation were explored in the retrospective study, while the prospective study examined medication discrepancies during hospitalisation, the type, and association with ADEs that occurred during the first five postoperative days and up to 30 days postoperatively.

Results: Five hundred patients were selected for inclusion. The mean age of the participants was 62.6 years, with 53.8% being male. The most common cancer types were gastrointestinal (27.4%), reproductive (16.2%), and breast (15.4%) cancers. Polypharmacy (≥5 medications) was observed in 31.2% of patients, mainly those with higher comorbidities. Approximately 33% of patients (n=167) experienced at least one unintentional medication discrepancy during their admission, most commonly omissions (25%) and dose changes (11%). Increased medication burden (OR = 1.26, 95% CI: 1.16–1.37, $p < 0.001$) and longer hospital stays (OR = 1.08, 95% CI: 1.03–1.14, $p = 0.001$) were identified as significant risk factors for unintentional medication discrepancies. Logistic regression

analysis further demonstrated that both unintentional (OR = 1.15, 95% CI: 1.06–1.26, p = 0.001) and intentional (OR = 1.04, 95% CI: 1.00–1.08, p = 0.036) medication discrepancies, as well as prolonged hospital stays (OR = 1.08, 95% CI: 1.02–1.14, p = 0.007), were significantly associated with an increased risk of adverse drug events (ADEs) after adjusting for multiple patient and clinical characteristics.

Conclusion: These findings highlight the critical role of medication reconciliation in surgical oncology patients, with unintentional discrepancies, particularly omissions and dose changes, significantly associated with ADEs. Patients with polypharmacy and longer hospital stays experience an increased risk of unintentional medication discrepancies and ADEs, emphasising the need for structured medication management practices across transitions of care. Future research should explore targeted interventions to mitigate medication discrepancies and ADEs in this vulnerable population.

A clinical pharmacist approach to alcohol: Implications for training

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Background information: We have been supporting clinical pharmacists to overcome the many challenges of discussing alcohol with patients by highlighting alcohol within existing clinical reviews. Despite the widespread risks and harms from alcohol, it remains a challenging topic to discuss. People can be reluctant to disclose drinking in part because they fear being judged. Time pressured practitioners can easily overlook the potential impacts of alcohol on health, compounded by uncertainties about their role, knowledge and skills to address the issue. Thus, pharmacists have typically avoided exploration of alcohol in their practice.

Our premise is that alcohol (ethanol) is an addictive, neurotoxic drug with important implications for medication adherence, safety and effectiveness. It is a central nervous system depressant, a teratogen, a carcinogen and an immunosuppressant. Framed thus, alcohol becomes both a legitimate and necessary subject for pharmacists to raise when discussing medicines with patients, and as part of a well-conducted medication review.

Purpose: To provide a high-level overview of key learning from a six-year research programme with community and clinical pharmacists in England, with an emphasis on implications for attention to alcohol in an international clinical pharmacy context.

Method: A synthesis of findings from a mixed-methods intervention development and evaluation programme.

Results: delivering medicine review services have avoided opportunities to explore alcohol. They have little detailed professional understanding about the effects of alcohol on health and in clinical populations, its relevance to medicines optimisation or how to discuss drinking with patients. We developed an alcohol practice development programme to support pharmacists to integrate discussion of alcohol in everyday clinical practice by reframing alcohol as a drug and enhancing person-centred clinical skills. This involves exploring alcohol and health more widely, and deeply where appropriate, even at seemingly low levels of consumption. In community and general practice settings, we found this approach was welcomed by patients and pharmacists and found to be helpful in highlighting the relevance of alcohol to clinical discussions about medicines and health.

Conclusion: We have demonstrated extensive 'proof of concept' for a new approach to alcohol delivered in routine medicine reviews. There are unavoidable barriers to implementing practice development support for pharmacists working in over-burdened health systems. There is a need to equip pharmacists with the skills to discuss alcohol in their initial pharmacy education and this presents important challenges given competing demands.

Vaccine compliance and prevention of related infections during Lebanon's hardships in a tertiary hospital

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Introduction: Immunizations play a major role in preventing deaths and reducing healthcare costs. In Lebanon, the Ministry of Public Health (MoPH) mandates several vaccinations for children prior to schooling and to have them documented in a designated booklet. Since 2019, Lebanon has been facing hardships that affected its economy. The devaluation of the currency resulting from these hardships made a negative effect on the healthcare sector and medication shortage including vaccines. This has negatively impacted the vaccine administration in both public and private sectors. The objectives of this study are to examine the completion rate of Lebanese mandatory childhood vaccination among pediatric population admitted to a tertiary care hospital in Lebanon, identify potential factors associated with low vaccination rates, and report the number of hospital admissions related to vaccine-preventable diseases (VPD).

Methods: This is a single-center cross-sectional study conducted at a 120-bed tertiary care hospital on patients

admitted to the pediatric ward between September 2023 and March 2024. Included patients were those aged between 1 month and 18 years old, consented to participate by the patient's parent/ legal guardian, and carried with them the MoPH booklet as documentation. Excluded patients were those who failed to provide documentation and patient's parent/ legal guardian didn't speak one of the country's spoken languages. Data were collected through face-to-face questionnaire-based interviews with the parent/legal guardian of the patient. Vaccines were divided by age groups as recommended by the Center of Disease Control (CDC). Patients' information was extracted from the booklet, which includes all mandatory vaccines (Hep B, Diphteria Tetanus Acellular Pertussis (DTAP), Inactivated Polio, Hemophilus influenza b (Hib), Pneumococcal (PCV23), Measles, Measles Mumps Rubella (MMR)) and other administered vaccines per the pediatrician's discretion.

Results: A total of 150 participants were included in the study. The majority were children aged 1 to <12 years (64.7%), 50% were females, and 7.1% were born pre-term. Percentage of legal guardians who held a bachelor's degree was 56.3%, 56% of participants' parents were employed, and 19.3% reported current or previous work in the healthcare system. Household monthly income varied, with 46.7% preferred not to disclose or did not know it. Among those who reported their income, 20.7% earn < $150 per month, only 4% earn > $1600. Regarding healthcare coverage, 46.7 % held private insurance and 16% had no insurance. The completion rate of mandatory vaccines was 18.7%, and the completion rate of all CDC recommended vaccines was 11.3%. The most advanced degree of the parent was found as the only significant predictor in the final model. Holding a Bachelor degree decreased the likelihood of completing mandatory vaccination. (OR = 0.173, p = 0.005). Admissions due to VPD were 28% of the total admissions related to infections.

Conclusion: This study showed a low completion rate of vaccinations during the hardships in Lebanon. Education plays an important role in children's vaccinations and vaccines might have an important role in preventing hospital admissions related to VPD. Larger scale studies are needed.

What can be learned about problems in medication use in Denmark through medication talks in Danish pharmacies?

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Introduction: Danish pharmacies offer medication talks to chronically ill patients. Medication talks are offered to patients within the first six months of diagnosis and after a minimum of 12 months after diagnosis. Medications talks with patients after more than 12 months of treatment are meant to uncover and address problems with compliance. The things discussed during medication talks can, however, uncover other issues such as unsolved problems with the treatment itself. The purpose is to uncover what medication talks can tell us about the use of medication including any unsolved problems that should be further investigated and delt with.

Method: The study took place at Skørping pharmacy in Denmark. Data was collected from 169 medication talks with patients after a minimum of 12 months of treatment. The medication talks took place from April through December 2024. The data was analysed for any recurring themes, any patterns relating to the age and gender of the patients as well as the type of medication.

Results: The findings in this study can be sorted in two categories: 1; differences in between genders and 2; issues with the treatments unsolved by primary care physicians. Category nr. 1: Out of the 169 medications talks registered 107 were with women, 57 were with men and 5 had no gender registered. The 169 medication talks regarded treatments with seven different types of medication. Compared to the gender-ratio of the medication talks, a larger number of medication talks with men regarded blood pressure medication, statins or proton pump inhibitors, whereas more medication talks with women regarded antidepressants or pramipexol. Category nr. 2: A total of 19 different themes were discussed during the medication talks, but three of them stand out. In 81 medication talks it was discovered that changes could be made to improve the treatment. In further 41 cases the possibility for termination of treatment was evaluated with the patient. In 47 cases the pharmacist found that the dosage or type of medication was no longer appropriate. In many cases the treatment was unchanged for years without thorough evaluation by the physician. In most of the cases the irrelevant or inappropriate treatment led to side effects, noncompliance or lower quality of life.

Conclusion: The study found some significant differences between genders relating to the kinds of treatments that lead to a need for medication talks at the pharmacy. It was also uncovered that more than half of the patients engaging in a medication talk would benefit from an adjustment or termination of treatment. The findings of this study could be used to evolve the way pharmacies handle the medications talks focusing not only on issues with compliance but also on unsolved issues with the treatment itself. It could also be used to strengthen the cooperation between pharmacies and physicians leading to a better use of medications for chronic illnesses.

Pharmacy services in South Africa: Who performs them?

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Introduction: In South Africa, in terms of the Pharmacy Act 53 of 1974, as amended, pharmaceutical services offered in pharmacies are stipulated in the Regulations relating to the Practice of Pharmacy, with extended services also found in the Rules relating to services for which a pharmacist may levy a fee. Pharmacies employ various pharmacy personnel who perform their scopes of practice as outlined in these regulations to deliver quality pharmaceutical services. Community pharmacies also employ nurses to provide primary healthcare services. This study highlights who performs various services in institutional and community pharmacies in South Africa and whether they are acting within their legislated scope of practice.

Methods: A cross-sectional survey was conducted from 1 July 2022 to 30 November 2022, using an online self-administered questionnaire sent to all responsible pharmacists (N = 4 334) of pharmacies in the different categories of pharmacies registered according to the Pharmacy Act 53 of 1974..A total of 201 responses were received from responsible pharmacists of community pharmacies (N=110), corporate community pharmacies (N=26), institutional pharmacies (private) (N=22) and institutional pharmacies (public) (N=43).

Results: A statistically significant proportion ($p < 0.0001$) of pharmacies performed the following dispensing-related activities: evaluation of a prescription (90%); preparation of medicine(s) as per a prescription (93%); handing medicines to the patient/caregiver, including providing advice/instructions (92%); and compounding an extemporaneous preparation for a specific patient (81%). Pharmacists were primarily involved in the evaluation of prescriptions (75%). The other dispensing activities, such as preparation of medicine (65%), handing medicines and providing advice/instructions (57%) and compounding (57%), were done mainly by pharmacists and post-basic pharmacist assistants.

Pharmacist-initiated therapy was mainly provided in community pharmacies (93%; $p < 0.0001$) by pharmacists (68%) primarily. Emergency post-coital contraception was provided in 97% ($p < 0.0001$) of community pharmacies and 94% ($p < 0.0001$) of corporate community pharmacies. In corporate community pharmacies, it is mainly provided by pharmacists and post-basic pharmacist assistants (78%), and in 44% of community pharmacies pharmacists were involved and 43% by pharmacists and post-basic pharmacists' assistants together. Screening and preventative services such as blood glucose (80%), blood pressure monitoring (81%), and immunisation services (71%) were primarily provided in community pharmacies ($p < 0.0001$) by both pharmacists and nurses employed in pharmacies.

The results further indicate a statistically significant proportion ($p<0.0001$) of pharmacies in all sectors were not involved in the preparation of sterile products (76%), intravenous admixture or parenteral solution (83%), total parenteral nutrition preparation (TPN) (93%), cancer chemotherapy (92%) or performance of therapeutic medicine monitoring (68%). It only happened in a few private and public institutional pharmacies.

Conclusion: The study shows that most pharmacies, especially community and institutional, do not offer all the services they may offer as allowed by law. The reason for this should be further investigated, as it is an opportunity to offer comprehensive services in pharmacies, especially primary healthcare services.

Reimbursement of pharmaceutical services provided in pharmacies in South Africa

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Introduction: In South Africa, pharmaceutical services provided in institutional and community pharmacies are reimbursed through medical insurance (known as medical schemes) or out of pocket; or if services are accessed through the public sector, the services may be free. The South African Pharmacy Council annually publishes Rules relating to the services for which a pharmacist may levy a fee and guidelines for levying such fee or fees in terms of sections 35A(b)(iii) and 49(4) of the Pharmacy Act 53 of 1974. This study aims to determine which services are offered for free and which services medical schemes, patients, or their caregivers pay for in institutional and community pharmacies in South Africa.

Methods: A cross-sectional survey was conducted from 1 July 2022 to 30 November 2022, using an online self-administered questionnaire sent to all responsible pharmacists (N = 4 334) of pharmacies in the different categories of pharmacies registered according to the Pharmacy Act 53 of 1974. A total of 201 responses were received from responsible pharmacists of community pharmacies (N=110), corporate community pharmacies (N=26), institutional pharmacies (private) (N=22) and institutional pharmacies (public) (N=43).

Results: The results reveal that most pharmacies are reimbursed for traditional pharmacy services such as dispensing (N= 77; 83%), pharmacist-initiated therapy (N=54; 81%) and emergency post-coital contraception (EPC) (N=53, 85%) but only 69% (N=61) are reimbursed for compounding of extemporaneous preparation for a specific patient. Medical schemes are mainly responsible for the payment of dispensing (71%), compounding (85%), and PIT (56%); however, patients themselves paid for EPC (98%).

More than 75% of pharmacies received payment for screening and preventative services such as blood glucose (N=42), blood cholesterol and/or triglycerides (N=36), urine analysis (N=26), blood pressure monitoring (N=45), HIV and AIDS pre-test counselling (N=33), testing and post-test counselling (N=31), pregnancy screening (N=27), peak flow measurement (N=17), administration of an intramuscular or subcutaneous injections (N=36), and administration of immunisation (N=38). In most cases (>75), the patients pay for these services. The only exception is immunisation services, where medical schemes were responsible (55%) for paying the pharmacy.

Primary care drug therapy (PCDT) was free in 57% (N=39) of pharmacies, and if a fee was asked, it was mostly paid by the patient (67%).

Regarding administrative services, 58% of pharmacies ask a fee for callouts (N=33) and after-hours services (N=36). Approximately 96% of pharmacies did not ask a fee for chronic medicine authorisation assistance (N=48). The patient (>50%) mainly paid the fees for these administrative services.

Conclusions: Although the Medical Schemes Act 131 of 1998, as amended, set prescribed minimum benefits that determine services medical schemes will reimburse and the maximum amount they will reimburse, it seems that patients were primarily responsible for paying screening and preventative services, PCDT, EPC and administrative services.

Do community pharmacies unnecessarily recommend oral emergency contraception? A nationwide mystery caller investigation in Germany

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Introduction: To prevent unwanted pregnancy following unprotected intercourse, oral emergency contraceptives (ECs) have been available in Germany without a prescription as over-the-counter medicines only in community pharmacies (CPs) since 2015. Apart from the co-payment, costs are only covered by statutory health insurance under certain conditions, which can result in financial burdens. Due to the high hormone load and potential side effects, there may also be adverse health consequences. This underscores the importance of adequate counselling by CPs to avoid unnecessary recommendations of oral ECs. The primary aim of the study was therefore to ascertain whether essential questions are asked by pharmacy staff and what the corresponding recommendation behaviour is for a scenario that does not include a recommendation of oral EC as an "appropriate outcome" (AO). Secondarily, the potential influence of various independent variables on the AO was assessed.

Method: The study was conducted from 15th July to 22nd August 2024 and is based on the "simulated patient methodology" recognised as the "gold standard", in the form of covert "mystery calls". This is the first study worldwide to implement such an approach nationwide for the stated study objectives. The study was carried out in a random sample of CPs stratified by federal states and representative of the whole of Germany. Each CP (n = 376) was called once by one of eight trained, female "mystery callers" (MCs) aged between 21 and 24. A second observer was used in every case to ensure the quality of the mystery calls and to collect data. The MCs simulated a situation in which the regular combined contraceptive pill was forgotten once and intercourse occurred. However, the regular pill can be taken within a twelve-hour time window to maintain contraceptive protection. The possible recommendation of oral EC by pharmacy staff is therefore unnecessary according to the guidelines and checklist of the German Federal Chamber of Pharmacists (BAK). The quantitative data was analysed descriptively and using a multivariate logistic regression model. The qualitative data was collected based on a free text field and analysed using inductive categorisation.

Results: All 376 planned "mystery calls" were conducted. In 14.4 % (54/376), a premature termination of the mystery call by the CPs was recorded. Consequently, 322 cases were included in the analysis. The AO was achieved in 44.4 % (143/322) of the mystery calls. The regression model indicated that a higher questioning score and certain MCs were significant predictors for the AO. Additional qualitative information revealed refusal of telephone advice, misinformation, inappropriate comments, and unfriendliness of pharmacy staff.

Conclusion: The results indicate a lack of advice. Therefore, explicit recommendation and consistent use of the BAK checklist for consultations should be considered in the relevant guidelines to ensure correct counselling for those affected. Further improvement regarding professional and communicative deficits could be appropriate training for pharmacy staff. Despite numerous standardisation measures, some MCs were surprisingly shown to have a significant influence on the AO. There is a need for further research, particularly regarding the influence of the MCs' voice.

Future Initiation of pharmacist-led nonprofit ambulatory care clinics in remote areas of South Asia and the Middle East

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Background information: Pharmacists are commonly underutilized in developing countries due to cultural stigma. Pharmacists are commonly employed in community, hospital, or industrial settings outside of Western countries (U.S., U.K., and Australia). Due to the reduced utilization of pharmacists in a clinical setting such as providers offices or ambulatory care clinics, there is a reduced emphasis of medication management which in turn can increase unnecessary hospital visits and long-term consequences of preventable situations. Healthcare infrastructure gaps commonly exist in developing countries due to newly graduated healthcare professionals seeking jobs in Western countries, economic and political disparities, and reduced supply chain efforts.

Purpose: Pharmacist-led nonprofit ambulatory care clinics can reduce healthcare infrastructure gaps through point-of-care testing services and collaborating with local medical doctors to initiate clinical measures such as medication reconciliation, optimization of current therapy, and lifestyle/preventative interventions.

Method: A comprehensive literature search was performed through databases from January 2022-January 2025, using key search terms. Key search terms included 'pharmacist-led,' 'clinical pharmacy services,' 'nonprofit clinics,' 'ambulatory care,' and 'outpatient pharmacy services.' This method was an extraction for general research.

Results: Pharmacist-led nonprofit ambulatory care clinics are non-existent in remote areas of underdeveloped countries.

Conclusion: Initiating pharmacist-led services in underdeveloped countries can help attest to the need of utilizing graduated healthcare professionals that are not 'medical doctors' by degree. Enhancing the scope of practices for pharmacists can mitigate healthcare gaps to create a cascade of positive outcomes in patients.

Primary care facility use of antimicrobial during management of respiratory tract infection and diarrhoea in Zimbabwe: Promoting stewardship at primary care

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Background: Antimicrobial resistance (AMR) poses a critical global health threat, disproportionately impacting low-middle income settings like sub-Saharan Africa, where AMR-attributed mortality rates are the highest (27.3 deaths/100,000) [1]. Irrational antimicrobial use (AMU) drives AMR, with approximately 50% of medicines being inappropriately prescribed [2]. Diarrhoea and respiratory tract infections (RTIs) are common conditions where antimicrobials are often prescribed though often of viral origin [3]. Antibiotic misuse remains rampant, with 23.1% of diarrhoea cases in sub-Saharan Africa [4] and 54% of RTI cases in Harare, Zimbabwe, involving unwarranted antibiotics [5]. In primary care, antibiotic prescriptions frequently target self-limiting viral infections, exacerbating resistance [6]. Rational antibiotic use is vital to curb AMR, reduce costs, and improve outcomes [2]. The project assesses prescriber practices (nurses/doctors) to identify gaps and inform targeted stewardship.

Purpose: The aim of this project is to establish trends in antibiotic use and compliance with guidelines in the management of respiratory tract infection and diarrhoea at facility outpatient departments within selected districts. The specific objective is:
●To assess types of antibiotics used in the management of diarrhoea and RTIs
●To evaluate the rational use of antibiotic in compliance with Standard Treatment Guidelines (STGs)

Method: A cross-sectional retrospective study, which evaluated antimicrobial use (AMU) patterns for diarrhoea and respiratory tract infections (RTIs) in public primary healthcare facilities and district hospital outpatient departments in two provinces, Zimbabwe. Data were collected from clinical records of patients diagnosed with diarrhoea or RTIs between March 2022 and February 2023. The study focused on primary healthcare clinics, rural/urban health centers, and outpatient of secondary-level district hospital.

Results: A total of 12308 records from were reviewed. Of the 12167 which had sex recorded, 54% (6557) were females while 46% (5610) were males. The cases were made up of 71% adults and 29% children.

Prevalence use of antibiotics was 61% (1322/2173) among diarrhoea, 78% (2290/2927) among those with mild respiratory tract infection, 94% (3634/3857) among those with moderate respiratory tract infection and 94% (33/35) with severe respiratory tract infection. Of the 2118 diagnosed

with pneumonia 93% (2118/2165) had antimicrobials prescribed.

Other diagnosis included lower and upper respiratory tract infection. The list of antibiotics varied between diarrhoea and respitatory infection. Those with diarrhoea had metronidazole, amoxycillin, benzylpenicillin, cotrimoxazole and ciprofloxacin as the top five medicines prescribed. For those who had mild respiratory tract infection (as proxy) the top five used antibiotics included amoxycillin, benzylpenicillin, gentamycin, and cotrimoxazole prescribed. The prescribed antibiotics for diarrhoea differed in adults (metronidazole, amoxycillin and ciprofloxacin) and paediatrics amoxycillin was major antibiotic prescribed

Conclusion: There is high use of antibiotics during management of diarrhoea and respiratory tract infection at primary health care facilities in zimbabwe. Mild respiratory tract infection and diarrhoea are conditions which are most viral and therefore do not warrant use of antibiotics. Stewardship is a key strategy to be considered at primary health care facilities

Identifying factors of success in implementing an intervention for management of inpatient bacteriuria in four regional hospitals in Nova Scotia

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Antimicrobial resistance (AMR) represents a critical global health threat, primarily driven by the inappropriate use of antimicrobials. Mismanagement of bacteriuria, particularly asymptomatic cases, significantly contributes to antimicrobial overuse, resulting in negative patient outcomes and increased resistance. To address this issue, a multifaceted intervention incorporating education, audit, and feedback was implemented across four regional hospitals in Nova Scotia, Canada. The intervention aimed to enhance prescribing practices for inpatients with bacteriuria. However, success varied across sites, underscoring the necessity of understanding local barriers and facilitators that influence the effectiveness and sustainability of such interventions. This study sought to identify the factors affecting the successful implementation of an audit and feedback intervention for inpatient bacteriuria management, focusing on individual, hospital unit, and organizational levels.

A qualitative descriptive design was employed. Semi-structured virtual interviews were conducted with pharmacists involved in the development, implementation, or delivery of the intervention. Interviews were transcribed verbatim and analyzed using the Consolidated Framework for Implementation Research (CFIR). Data analysis involved deductive coding based on CFIR constructs, followed by inductive thematic analysis to identify local implementation factors within each domain.

All eight pharmacists invited to participate consented to interviews, providing insights from a range of practice settings. Barriers to implementation included staffing challenges, such as limited pharmacist availability to conduct audit and feedback, and the overuse of microbiology testing, which introduced complexities in interpreting diagnostic data and maintaining intervention sustainability. Variation in organizational resources and competing priorities further influenced intervention uptake. Facilitators included strong interprofessional relationships that promoted collaborative problem-solving and the tailoring of the intervention to professional roles, ensuring feedback was relevant and actionable for physicians, nurses, and other healthcare staff. The engagement of local champions further facilitated implementation success by fostering a sense of ownership and adaptability. Most identified factors were situated within the CFIR's inner and outer setting domains, reflecting the complex interplay between organizational culture, resource availability, and external influences on prescribing behavior.

This study identified multi-level barriers and facilitators affecting the implementation of an audit and feedback intervention for inpatient bacteriuria management. Findings highlight the importance of adapting interventions to local contexts, addressing resource limitations, and leveraging inter-professional relationships to enhance engagement and sustainability. These insights will inform strategies to optimize antimicrobial stewardship initiatives at the provincial level, contributing to improved prescribing practices, policy development, and health outcomes within Nova Scotia's regional hospitals. The study underscores the critical need for flexible, context-sensitive approaches in implementing stewardship interventions to ensure their long-term success.

Perspectives on pharmacist-physiotherapist collaboration for acute musculoskeletal injuries

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Background: Acute musculoskeletal (MSK) injuries are prevalent and a leading contributor to reduced mobility, well-being, and social participation. Many patients experience challenges in accessing timely primary care for MSK injuries.

Barriers surrounding access often lead patients to seek support from community pharmacists or physiotherapists. Pharmacists in community and primary care settings are accessible, medication therapy experts. Physiotherapists are experts in the assessment and management of MSK injuries. Collaborative practice between the two professions is not formally in place in most (if not all) primary care/community settings. By studying collaboration between pharmacists and physiotherapists, there is an opportunity to develop strategies to optimize management of acute MSK injuries to improve equitable access and patient outcomes.

Purpose: This study aimed to evaluate the perspectives of patients, pharmacists, and physiotherapists on the potential for collaborative practice between pharmacists and physiotherapists for the management of acute MSK injuries in primary care. The goal is to use the results to develop implementation strategies for collaborative practice that enhances equitable and timely access to MSK care by optimising and aligning scopes of practice.

Methods: This qualitative study involved two rounds of semi-structured, virtual focus groups. Patient focus groups explored patients' experiences and expectations of a collaborative MSK care model. Separate focus groups with pharmacists (RPhs) and physiotherapists (PTs) examined their current practices, views on collaboration, and the feasibility of implementation. Data was analysed deductively using the APEASE criteria (Affordability, Practicability, Effectiveness, Acceptability, Safety, and Equity) to evaluate the intervention design. An inductive analysis was then conducted to identify key themes and framework components.

Results: All participant groups indicated strong support for a collaborative framework, identifying reduced emergency department utilization and expedited access to care as potential benefits. Recommendations included: implementing the framework in community pharmacy clinics (RPhs) and mobile clinics (patients), and utilizing virtual care platforms (RPhs, patients) to enhance accessibility, particularly in underserviced rural areas. Identified barriers and potential solutions included: lack of understanding of each professional's scope of practice requiring educational materials to clarify (RPhs, PTs); lack of seamless communication requiring secure, electronic communication tools (RPhs, PTs); privacy concerns in pharmacy settings requiring private consultation rooms (patients), physician referral requirement for physiotherapy necessitating education around when referrals are not required/eliminating referral requirements (PTs, patients), and financial concerns around physiotherapy requiring funding changes (PTs, patients).

Conclusion: This study provides support for a pharmacist-physiotherapist collaborative framework to address gaps in primary care for acute MSK injuries. The findings indicate that collaboration has the potential to enhance access, reduce system strain, and improve patient outcomes while offering actionable strategies for supporting implementation that may improve equitable access to care. The results of this study will be used to inform implementation and evaluation of a pilot collaboration between pharmacists and physiotherapists in primary care in Nova Scotia, Canada.

Patient perceptions of pharmacist-led primary care

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Background: Pharmacists play an important role in delivering primary care (e.g., prescribing, immunization), but there is limited understanding of how this care impacts patient experiences and outcomes. Existing literature focuses on patient willingness to seek care and their satisfaction with the care received. The health outcomes (e.g., improved quality of life) that matter most to patients when seeking primary care from pharmacists remain unknown.

Purpose: This study aims to identify and describe the patient-reported experience and outcome measures that matter most to patients when receiving pharmacist-led primary care.

Methods: A qualitative study design, using virtual interviews and focus groups, was carried out with diverse adult populations who received clinical care from a pharmacist or pharmacy primary care clinic in the Maritime Provinces in Canada in the last year. Interviews aimed to understand experiences with pharmacist-led care, the perceived value of care, other primary care services patients would like from pharmacists, and to identify outcome measures that are most important. An inductive thematic analysis was carried out to identify themes, which were further refined through focus groups.

Results: Findings from interviews (n = 8) identified six main themes: access to care (e.g., accessibility, cost, location), clarity and consistency of experience (e.g., types of care offered, role clarity, expectations of access to care), coordination of care (e.g., navigating the healthcare system, follow-ups), medication expertise and accuracy (e.g., thoroughness, problem-solving, medication education and expertise), connection and trust (e.g., friendly, attentive, patient-centric), and primary care delivery (e.g., 'health hub', wanting more from pharmacists). Focus group (n = 5) findings supported interview themes, and introduced new perspectives on feeling safer from infection than other care settings, accessing care for children, and rural experiences. Participants in rural areas reported needing to travel for various services or risk facing longer wait times compared to urban participants who described having many pharmacies in close proximity. Concerns were also raised about broadening

pharmacists' scope without providing additional system support.

Conclusion: Overall findings suggest there are several dimensions of quality (e.g., access, consistency, care coordination) that policymakers should consider in primary care redesign. Patients identified key experience measures that matter most to them, many of which have international applicability in pharmacist-led primary care delivery. Key outcomes of interest were more challenging to determine and will be evaluated further in a widely disseminated follow-up survey with members of the public. It is anticipated that this work will generate frameworks and tools that better assess the provision of primary care by pharmacists and improve patient experiences and quality of life. These results may also inform policy changes, including where and what type of care is provided by pharmacists and/or funded by the government. The results will be used in future implementation studies to evaluate the outcomes of pharmacist provided care.

Barriers and facilitators to access and acceptance of digital health interventions among people experiencing homelessness: a systematic scoping review

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Introduction: People experiencing homelessness (PEH) are at higher risk of diseases and severe health outcomes. Healthcare services often present barriers that hinder access by this vulnerable population. Digital interventions, such as mobile apps, offer alternative strategies to improve engagement and care. However, synthesized evidence on their impact remains limited, restricting conclusions about their uptake and effectiveness.

Method: This study is part of the HOME Project that aims to explore barriers faced by PEH in accessing healthcare. A systematic scoping review was conducted following the Cochrane Collaboration and Joanna Briggs recommendations and reported according to Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-Sc) checklist. Searches were performed in PubMed, Embase and Web of Science (January 7, 2025). Peer-reviewed primary scientific articles (interventional or observational studies) that assessed access, acceptance, service coverage or barriers/facilitators to the implementation and use of digital health interventions (delivered independently or guided by health-related strategies or frameworks) among PEH at the time of the study (in any setting) were included. Data on general study characteristics (e.g., authors, publication year), type of intervention, barriers, facilitators and acceptability rates were extracted in a standardized spreadsheet. Results were summarized in accordance with the information provided by the authors into tables and graphs.

Results: The search strategy identified 3,751 unique records, of which 3,723 were excluded during the screening process (i.e., irrelevant), leaving 28 for full-text eligibility assessment. Of these, four studies (n=291 PEH) were included, two qualitative studies and two randomized clinical trials published between 2019 and 2022, all performed in the United States. Three different text messaging applications (two for smoking cessation and one for HIV prevention) were evaluated; one study assessed the impact of real-time telehealth. The average follow-up period of the studies was 6 to 8 weeks. Facilitators for the use of the intervention included structural factors (e.g., no need to travel, user-friendly app navigation, training on technology use) and acceptability factors (e.g., accessible language, relevant information provided). Multiple barriers were identified, also including structural (e.g., lack of access to phone charging, stolen devices, limited privacy for consultations) and acceptability factors (e.g., triggering survey questions, inconvenient survey timing, recommendations failing to consider life circumstances), in addition to financial (e.g., no internet access, no access to a phone) and individual factors (e.g., cognitive, behavioral, and health challenges, and limited digital literacy). Overall, according to the authors, the interventions had a moderate to high acceptability among PEH(>60%).

Conclusion: Digital interventions seem overall well-accepted by PEH who have access to electronic devices, largely because they eliminate the need to travel for healthcare appointments. However, the use of these interventions may be hindered by financial and structural barriers, which require combined efforts from multiple stakeholders to be overcome. Further research is needed on effective strategies to enhance the accessibility of digital health interventions to better serve PEH. Cross-sectoral collaboration (e.g. health, social services and education), including across public and private sectors (e.g. involving telecommunications and technology companies) may be needed to find suitable solutions.

Assessing the knowledge, attitudes and practices of healthcare staff and students regarding disposal of unwanted medications: a systematic review

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Introduction: The disposal of unwanted medications is a growing concern due to its environmental and public health impacts. Healthcare professionals and students play a pivotal

role in promoting safe disposal practices. Understanding their knowledge, attitudes, and practices (KAP) is crucial for identifying gaps and informing policy and educational interventions. This systematic review aims to assess healthcare staff and students' KAP regarding medication disposal, explore associated barriers, and identify recommendations for improving disposal practices.

Method: A systematic review was conducted following PRISMA guidelines. Six databases — MEDLINE, Embase, CINAHL, Web of Science, PsycINFO, and Google Scholar — were searched up to 23 February 2024. Qualitative, quantitative, and mixed-method studies exploring KAP related to medication disposal among pharmacists, doctors, nurses, and students in any country were included. Four researchers independently extracted and categorised data into KAP domains and synthesised findings into overall themes, such as challenges and recommendations.

Results: Thirty-seven studies from 18 countries (Asia n=21, the USA n=7, Africa n=5, Europe n=2, South America n=2) were included. The majority of studies (86.5%, n=32) assessed participants' knowledge, revealing good awareness of environmental impacts but significant gaps in understanding correct disposal methods, available services, and guidelines. Although 30 studies indicated generally positive attitudes towards safe disposal, 35 studies found that actual disposal practices were inconsistent, especially outside healthcare settings. Barriers included limited access to take-back programmes, lack of clear policies, and insufficient training. Even when take-back services were available, they were often poorly advertised or logistically difficult to access.

Conclusion: Despite positive attitudes and some awareness, healthcare staff and students often do not adhere to correct medication disposal practices. Addressing this gap requires policy changes, increased access to take-back services, and enhanced education on disposal guidelines. Strengthening training programmes and promoting national disposal policies could help ensure safer practices, reducing environmental harm and public health risks. Future research should explore tailored educational interventions and assess their long-term impact on disposal behaviours.

Digital transformation in medicines management in Malawi: A user-centered approach to eMMS development

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Background: Effective medicines management is essential for optimizing healthcare delivery, especially in resource-limited settings where supply chain inefficiencies and stockouts can compromise patient care. As part of the Surveillance and Prescribing Support for Antimicrobial Stewardship Resource Capacity Building (SPARC) program, led by the Commonwealth Pharmacists Association and funded by the UK Department of Health and Social Care's Fleming Fund using UK Aid, this initiative focuses on strengthening antimicrobial medicines management in Malawi. The development and implementation of a novel electronic medicines management system (eMMS) aims to enhance medication availability, streamline supply chain processes, and support antimicrobial stewardship efforts, specifically antimicrobial consumption data and antimicrobial use patient-level data. To ensure successful adoption and implementation it is critical to understand existing challenges, user needs and system requirements within Malawi's healthcare system.

Purpose: This study aimed to identify and explore the needs and expectations of healthcare professionals in Malawi to inform the user-centered design of the eMMS ensuring its relevance, feasibility and sustainability.

Methods: A series of interactive workshops were conducted with key stakeholders, selected using purposive convenience sampling, including healthcare providers, supply chain managers, policymakers, IT specialists and healthcare professionals involved in antimicrobial-related activities (e.g. prescribing, stock management, dispensing and administration). Data were collected using surveys, focus group discussions, and real-time feedback tools. Participants engaged in structured, moderated discussions and process mapping exercises to assess the current medicines management landscape, identify system gaps and explore barriers to digital implementation. Needs assessment exercises encouraged participants to articulate their expectations regarding digital health systems, helping define essential eMMS features. A mixed-methods analysis was applied, integrating qualitative insights with quantitative responses to identify common themes and prioritize system functionalities.

Results: Findings revealed several critical areas requiring attention, including the need for real-time inventory tracking, improved interoperability with existing health information systems, and user-friendly interfaces tailored to varying digital literacy levels. Infrastructure challenges, such as inconsistent internet connectivity and limited access to electronic devices, were identified as potential barriers to implementation. Stakeholders emphasized the importance of system integration to enable prescribing controls guided by microbiology data and enforcing national guidelines, as well as comprehensive user training and continuous technical support to facilitate adoption. The results informed the development of key system specifications and training strategies to ensure effective implementation and user adoption.

Conclusion: The workshop-based approach provided valuable insights into user expectations, system design requirements, and implementation challenges for the eMMS in Malawi. Addressing identified barriers through infrastructure support, capacity building, and user-centered design will be critical for system success. These findings will guide the next phase of eMMS development and deployment, ensuring its alignment with local healthcare needs and sustainability goals.

Pharmacist attendance on ward rounds: A survey of medical officer and pharmacist perspectives

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Introduction: During ward rounds the medical consultant or registrar will make diagnoses, confirm management plans, and clinical review medications. A post-take ward round is when the treating medical consultant is present to review patients admitted under their care within the previous 24 hours. It normally takes place the next morning following the patient's admission to hospital.

The inclusion of pharmacists on medical ward rounds is established practice. Pharmacists on ward rounds have shown to reduce significant or potentially lethal adverse events, improve medication appropriateness, increase communication within the interdisciplinary team and increase the number of in-depth high-risk medication related discussion. However, the specific role of the pharmacist on the ward round is not as clearly defined as other non-ward round activities such as medication reconciliation. This may impact attendance and participation in high-turnover general medicine units with competing patient flow priorities. Opinions of medical officers and pharmacists may provide valuable insights regarding how to improve pharmacist attendance and participation on ward rounds.

Method: The primary focus of this small scoping survey was to investigate pharmacist attendance and participation on general medicine ward rounds. The survey was designed to determine pharmacist and medical officer perspectives on what activities a pharmacist should perform on a ward round, and attitudes and barriers to ward round attendance. Pharmacists and medical officers who had attended a general medicine ward round in a metropolitan hospital were invited to participate in an online anonymous, voluntary survey. The survey collected demographic information plus included questions regarding the expectations and roles of a pharmacist on ward rounds, using five-point Likert scale statements and free-text comments. Surveys were circulated via email and posters.

Results: 27 pharmacists and 13 medical officers completed the survey. 46% of medical officers were General Medicine Consultants responsible for leading. Less than 50% of all respondents reported that they had been informed of the expectations of a pharmacist on a general medicine ward round. Pharmacists and medical officers both ranked clinical review/medication chart review as the most important activity a pharmacist should perform during the ward round. Pharmacists and medical officers agreed that pharmacist attendance on the post-take ward round should be prioritised, however, only 32% of pharmacists reported attending regularly. 77% of medical officers reported that the pharmacist usually or always contributed on the ward round, higher than pharmacists self-reported rate of 60%.

Conclusion: Pharmacist attendance and participation on ward rounds is valuable to the interprofessional team and patient care. Pharmacists and medical officers' expectations of pharmacist activities on ward rounds were similar. Medical officers' perceptions regarding the frequency of pharmacists' contributions were higher than that self-reported by pharmacists. These results informed the development of an orientation package for pharmacists to be upskilled in partaking in the general medicine ward rounds. The orientation package included rostering a supervisor with the learner for 2 weeks, the inclusion of a ward round entrustable professional activity and educating the general medical teams.

Healthcare professionals' insights on interprofessional collaboration in the myCare Start service

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Background information: In 2023, about half of the Swiss population (48%) lived with at least one chronic disease , with most of them following long-term medication regimens. Optimizing outcomes for chronic disease patients remains a key priority in the Swiss Federal Council's health strategy. To do so, frameworks focusing on integrated ambulatory care underline the importance of strong interprofessional collaboration crossing organizational boundaries, continuity of care, and support for patients' self-management. Research to promote interprofessional collaboration in ambulatory care must be encouraged. This is why the myCare Start service, inspired by the New Medicine Service (NMS), a proven service in the United Kingdom for improving patients' adherence, was piloted in community pharmacies in Switzerland by the Swiss Pharmacists' Association (pharmaSuisse) and the University of Bern. myCare Start is an interprofessional service designed to support patients starting a new chronic treatment, offering required information and fostering active engagement in their therapeutic journey.

Purpose: The aim of this study, a sub-analysis of the myCare Start pilot study, is to identify the key determinants of success in the pharmacy setting, as well as the factors influencing interprofessional collaboration between pharmacists and physicians, to support the efficient and effective nationwide implementation of the myCare Start service.

Method: The cohort involved 176 pharmacies across Switzerland, considered early adopters, who volunteered to offer myCare Start in their community pharmacy between March 2023 and December 2024. In each participating pharmacy, one pharmacist and one pharmacy technician received tailored training to administer the myCare Start service to patients with a newly prescribed chronic treatment. Before launching myCare Start, each volunteer pharmacist recruited physicians, with whom they have an interprofessional collaboration and/or for whom they frequently validate prescriptions. Using a self-controlled case series design, the trained pharmacists and the recruited physicians filled in three online questionnaires at three different time points (before starting to provide myCare Start and at 3 and 6 months after the service's implementation).

Results: Out of 176 recruited pharmacists, 135 (76.7%) completed the second questionnaire, and 116 (65.9%) responded to the third one. Pharmacists evaluated key determinants of success, including the healthcare setting of their pharmacies, their interprofessional interactions with physicians, and their perceived legitimacy in primary care. Physicians also assessed the legitimacy of pharmacists in this setting. A total of 19 physicians were recruited, with 15 (78.9%) completing the second questionnaire and 14 (73.7%) responding to the third. Analysis of the key determinants of the myCare Start's success are ongoing and will be presented at the conference.

Conclusion: The ongoing sub-analysis of the interprofessional collaboration within the myCare Start will identify key factors that contribute to successful chronic disease management. The findings will guide the efficient nationwide implementation of the service, focusing on interprofessional settings most likely to succeed.

Identification of medication therapy problems through a patient medication counseling program in a tertiary government hospital

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Introduction: Patient medication counseling (PMC) is an essential pharmacy service across the healthcare system to deliver comprehensive medication management. Implementation of the PMC program in a clinical setting was executed to promote optimal medication management. The objective of this study is to describe the medication therapy problems (MTPs) of out-patients referred to a pharmacist-initiated patient medication counseling service in a tertiary government hospital.

Methods: The study implemented a retrospective cross-sectional records review of PMC sessions conducted by student and faculty-preceptor pharmacists in the General Medicine service of the Internal Medicine Outpatient Department of a tertiary government hospital. MTPs identified during the counseling session were categorized using the Pharmacy Quality Assurance MTP Categories

Framework. The study utilized frequency statistics and logistic regression to analyze the collected data.

Results: There were 121 counseled patients included in the study. Most are practicing polypharmacy (76.03%), described by WHO as taking 5 or more medications, and less than half (41.31%) are using pharmaceutical devices like respiratory devices and insulin pens. Patients with an increasing number of medications have 1.18 odds (95%CI [1.0256-1.3576]; p=0.021) of experiencing MTPs in their drug regimen. Out of all included patients, 86 (71.07%) were identified to have at least one MTP with adherence-related MTPs being the most common (39.31%). Among these, the most frequently encountered problem is patients do not understand the directions (47.22%) provided to them by their healthcare provider.

Conclusion: This study shows that a pharmacist-led medication counseling program is an effective intervention to identify and correct MTPs especially for polypharmacy. Continuity of the program is important to observe if pharmacologic and clinical outcomes of pharmacist recommendations are met by patients receiving medication counseling.

A single-center observational study on treatment satisfaction In patients with psoriasis and vitiligo

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Background: Skin diseases such as psoriasis and vitiligo significantly impact the quality of life. Psoriasis, a chronic inflammatory condition, affects approximately 125 million people worldwide, with a prevalence of 0.44%-2.8% in India. Vitiligo, an autoimmune depigmenting disorder, has a global prevalence of 0.5%-2%, with Indian cases ranging from 0.25%-4%. While several studies have explored the pathogenesis and treatment of these conditions, there is limited data on the treatment satisfaction of these patients. This study aims to identify the treatment satisfaction of these patients through a well-structured validated questionnaire.

Purpose: The purpose of this study is to evaluate treatment satisfaction, of psoriasis and vitiligo in a single center study. Along with this treatment management challenges, dietary triggers and effect of covid 19 vaccines on these patients are also studied.

Methodology: This one year observational study (03 Sep 2024 – 03 Sep 2025), has been approved by Ethics committee of Sri Ramachandra Institute of Higher Education and Research [CSP/24/JUL/150/311] and is registered under CTRI [REF/2024/09/091939]. A validated proforma consisting 34 questions was designed to primarily assess the satisfaction of the treatment. The study is conducted at the Dermatology Clinical Facility, SRIHER.

Results: Till date, 82 patients have been screened, out of which 65 have been enrolled in the study based on the inclusion and exclusion criteria. Approximately 96.92% (63 subjects) reported patches on their skin, varying in characteristics such as being silvery, shiny, or raised. Additionally, 54% of the subjects experienced itching before the appearance of a new patch, and 65% noted that the rash spread to different parts of the body upon scratching. Regarding treatment, 74% use allopathic medicine, while 23% follow a combination of allopathic, homeopathic, and Ayurvedic treatments. Overall, 54% of the subjects reported satisfaction with their current therapy. In terms of patch onset, 36 subjects noticed them before 2021, while 27 (41.54%) developed them after 2021. Additionally, 7 subjects reported that their condition worsened after receiving the COVID-19 vaccination. Furthermore, 40% of the subjects reported disrupted sleep patterns, and 29.23% mentioned food allergies, particularly to fish, brinjal, chow chow, pasta, mutton, chicken, groundnuts, and green chili.

Conclusion: This observational study so far revealed that most participants are undergoing treatment with a preference for allopathic medicine. Encouragingly more than half are satisfied with the current therapy. Interestingly 42% of participants reported the new onset of symptoms following a COVID-19 vaccination, while 10% experienced a worsening of their condition after the vaccination. These findings highlight the need for further investigation into vaccine-induced immune modulation and its role in triggering dermatological conditions.

Precision in practice: Evaluating chemotherapy dose adjustments in cancer patients at a major Sydney tertiary hospital

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Introduction: Chemotherapy remains a cornerstone of cancer treatment worldwide. However, patient-specific factors frequently necessitate dose adjustments to balance efficacy and toxicity. Age, body surface area (BSA), sex, and

comorbidities play a critical role in chemotherapy dosing, often leading to deviations from recommended guidelines. In Australia, chemotherapy dosing guidelines are provided by eviQ, a national online resource developed by the Cancer Institute NSW, which provides evidence-based treatment protocols for health practitioners in oncology. Despite its standardised guidelines, real-world clinical practice often requires modifications to accommodate individual patient variability. Understanding these deviations is essential for improving personalised treatment approaches and optimising healthcare resource allocation. This study examines chemotherapy dose adjustments among cancer patients at Royal North Shore Hospital (RNSH), a major tertiary hospital in Sydney, Australia, throughout 2023, with a focus on adherence to recommended protocols, demographic trends, and the key factors influencing dosing decisions.

Method: A retrospective cross-sectional study was conducted using medical records of cancer patients who received chemotherapy at RNSH between January and December 2023. Eligible patients had a documented ICD-10 cancer diagnosis and underwent at least one chemotherapy cycle. Data were extracted from the hospital's MOSAIQ electronic dispensing system, capturing demographic information, treatment regimens, dose reductions, and records of adverse events. Descriptive statistics summarised chemotherapy doses and patient characteristics, while comparative analyses (Chi-square tests, t-tests, and ANOVA) assessed the associations between these characteristics and dose modifications. Pearson and Spearman correlation analyses evaluated relationships between continuous variables (age, BSA) and dose adjustments. Odds ratios estimated the likelihood of dose reductions based on demographic factors.

Approximately 1,000 patients were included, with dose reductions observed in a substantial proportion. Older patients (≥65 years) and those with lower BSA were significantly more likely to receive reduced chemotherapy doses, consistent with pharmacokinetic considerations. Female patients experienced more frequent dose adjustments than males, reflecting potential differences in drug metabolism and tolerance. Comorbidities, particularly renal impairment and cardiovascular disease, emerged as strong

Results: predictors of dose modifications, highlighting the clinical necessity of individualised treatment approaches. In some cases, initial prescribed doses deviated from eviQ guidelines, indicative of variability in real-world prescribing patterns. Adverse event-related dose reductions were most common in regimens utilising platinum-based and taxane chemotherapy, with haematological and gastrointestinal toxicities being key contributing factors.

Conclusion: This study highlights the significant impact of patient characteristics on chemotherapy dosing and adherence to treatment protocols. The findings emphasise the importance of personalised dosing strategies to ensure both treatment efficacy and patient safety. The observed variations in dose reductions inform future efforts to standardise chemotherapy prescribing while accommodating individual patient needs. Additionally, this research provides valuable insights for forecasting chemotherapy drug demand and healthcare budgeting by integrating patient-level clinical data into predictive models. Further research should explore strategies to enhance adherence to guideline-based dosing while reducing variability in chemotherapy practices.

Capacity building for pharmacists and other healthcare professionals in advanced therapy medicinal products: a systematic review

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Introduction: The application of advanced therapy medicinal products (ATMPs) to meet clinical needs is a highly complex process that requires pharmacists and other healthcare professionals (HCPs) to develop specialized competencies. However, the evidence on capacity building for HCPs in the context of ATMPs and its effectiveness remains limited. The study aimed to summarize the current practices of developing HCP capacity in ATMPs and to identify the effectiveness of capacity-building actions.

Method: Four databases (PubMed, ScienceDirect, Web of Science, Scopus) were searched following PRISMA guidelines to retrieve publications dated since 2005 to the present.

Results: A total of 27 studies were included from the 3,534 records initially retrieved. Capacity building in ATMPs was primarily implemented through formal undergraduate/graduate education (n=15) and continuing professional development (CPD) training (n=16). Training content covered ATMP-related disease knowledge (n=7), therapies (n=14), manufacturing (n=10), laboratory skills (n=11), clinical translation (n=12), research ethics (n=10), regulatory affairs (n=17), and data science (n=5). The main delivery formats included face-to-face courses, networking events, and workshops.

Nine of the 27 studies were empirical studies which either surveyed 1,308 HCPs such as physicians (n=611), laboratory staff (n=182), interdisciplinary students (n=156), industry professionals (n=149), physician trainees (n=123), academic fellows (n=60), pharmaceutical care experts (n=17), clinical

scientists (n=10), or interviewed 27 stem cell network trainees investigating the availability, equity, and accessibility of training and education. None of studies included pharmacists as participants. Only 2 studies reported the training effectiveness among medical students in terms of improved self-perceived knowledge of translational process and patient care, increased interest in attending education activities and willingness to work in interdisciplinary teams. No study reported the training outcomes among practicing HCPs. Capacity building was expected to focus more on cell science, manufacturing operation management, and regulatory issues.

Conclusion: Current capacity-building practices for HCPs in ATMPs for primarily emphasize regulatory affairs, clinical translation, and laboratory skills through formal education and CPD training. However, compared to other HCPs, evidence on capacity-building specifically for pharmacists remains limited. As indispensable members of multidisciplinary teams, pharmacists should be incorporated into all relevant ATMP capacity-building initiatives, particularly within hospital settings. Furthermore, ATMP education has been increasingly used to enhance HCPs' self-perceived knowledge, confidence, and practice in developing and using ATMP, but the evidence about the impact of capacity-building on clinical practice for both pharmacists and other HCPs is still unclear and warrants further investigation. Moving forward, strengthening pharmacists' roles in ATMP practice, along with the integration of comprehensive interprofessional education and outcome-based competency assessments, will be essential to address the complexities of clinical translation and enhance patient access to ATMPs.

Pharmacists' knowledge, attitudes, and confidence in recommending mobile health applications to patients: What we learned from the literature

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Introduction: Numerous studies have demonstrated the benefits of utilizing mobile health applications (m-health apps), to improve patient care. However, no guidelines exist as a reference for pharmacists when making recommendations of m-health apps to patients. The objective of this project was to characterize the factors that pharmacists and patients prioritize when assessing m-health apps. These factors may help determine pharmacists' knowledge, attitudes, and confidence in recommending m-health apps to patients.

Methods: A literature search was conducted in MEDLINE and EMBASE. Ten studies were reviewed and analyzed for factors related to using/recommending m-health apps, positive/negative attitudes on m-health app use/recommendations, and confidence/readiness in recommending a m-health app to a patient.

Results: A factor that influenced pharmacists' knowledge on m-health apps was age. Pharmacists less than 35 years old have better perceptions of apps and their use in patient care. Factors that promote positive attitudes in app recommendation included features such as notifications or reminders, of which their use have improved patient adherence to medication use. Factors that prompted negative attitudes included lack of scientific evidence behind information provided within the app. Other barriers involved a lack of usability, unfamiliarity with using mobile apps, and security concerns. Factors that improved confidence in making app recommendations included whether the app was accessible in various app stores, visually appealing, easy-to-use, and presentation of information in a patient-friendly manner.

Conclusion: From being aesthetically pleasing and user-friendly to being able to improve medication adherence and patient communication, all studies illustrated similar preferred factors in m-health apps. While further studies are necessary to elucidate factors influencing pharmacists' recommendations of m-health apps, what we learned from the literature can serve as a starting point for future guideline development and continuing professional development.

Pharmacy professionals' perception of best practices and challenges in fulfilling the national association of pharmacy regulatory authorities model standards for pharmacy compounding in Canada

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Introduction: Unlike manufactured drugs, compounded medications do not require quality testing through Health Canada. Consequently, concerns were raised about potential gaps in regulations and standards for quality control, assurance, and formulation consistency of compounded products. Recognizing this, the National Association of Pharmacy Regulatory Authorities (NAPRA) in Canada published the NAPRA Standards for Pharmacy Compounding. These standards were adopted and implemented by the Ontario College of Pharmacists between 2019 and 2022. Our project was aimed to assess pharmacy professionals' perception of best practices and challenges in fulfilling the

NAPRA Model Standards for Pharmacy Compounding in the province of Ontario.

Methods: We surveyed pharmacy professionals across Ontario through an open-call, online questionnaire distributed via LinkedIn and Facebook. The survey was administered over a 2-month period in summer of 2024 and contained quantitative items using a 5-point Likert scale as well as qualitative, open-ended questions. Quantitative data were analyzed using descriptive statistics, while qualitative data was subject to thematic analysis.

Results: We received 50 responses, of which 60% identified participation in in-house pharmaceutical compounding and 69% was categorized as Non-Sterile Level A compounding (preparing simple and moderate preparations). Most (77%) respondents were familiar with and aware of the NAPRA Model Standards for Pharmacy Compounding for Non-Sterile Compounding, even if they did not participate in compounding at their primary practice site. Half of the respondents who participated in in-house compounding primarily received training/education through other professionals or on-the-job training, with 31% of them updating their compounding knowledge annually. Many (81%) believed that standardizing compounding practices would improve patient safety. However, 52% respondents found it challenging for pharmacies to implement the NAPRA standards, and 44% commented that maintaining compliance with the standards was also challenging. Limitations in implementing the NAPRA Model Standards for Pharmacy Compounding were reported to be associated with financial implications (64%), lack of space (56%), and human resources (52%). Respondents who did not compound at their primary practice site reported similar challenges and barriers that contributed towards the decision of not offering compounding services: lack of space (65%), complexity of compounding practices (60%), financial constraints (55%), and lack of equipment (55%).

Conclusion: While most respondents believe standardizing compounding practices would improve patient safety, limitations exist that make implementing and maintaining the NAPRA compounding standards challenging. Future investigations should explore avenues to help improve compliance to NAPRA compounding guidelines, which may also encourage uptake of compounding practices for other sites to provide this valuable service to patients.

Engaging pharmacists, pharmacy technicians and pharmacy students to take action to tackle antimicrobial resistance: 10-years of the Antibiotic Guardian campaign

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Introduction: The Antibiotic Guardian campaign developed in 2014 by Public Health England (now UK Health Security Agency, UKHSA). The campaign uses an online 'pledge' approach underpinned by models of science communication and behaviour change to engage health workers, health students and the public about antimicrobial resistance.

The campaign was launched to increase engagement from healthcare professionals (HCPs) and the public to tackle antimicrobial resistance (AMR). Through collaborations with Africa CDC and WHO Europe the campaign also has pledges tailored for HCP and the public in Africa and pledges translated into European languages (French, Dutch, Turkish, German and Russian) respectively.

This study examined the campaign after 10 seasons (years) to assess engagement and describe the demographics of pharmacists, pharmacy technicians and pharmacy students who have engaged with the campaign.

Methods: Antibiotic Guardians' demographics were collected from the main website page and used to produce descriptive statistics of pledge group, pledge chosen, geography, and how they heard about the campaign between 24/07/2014–31/12/2023. Website visitors were described using Google analytics data.

Results: From the inception of Antibiotic Guardian to the end of 2023 there were 852,713 unique website visitors resulting in a total of 177,681 pledges recorded via the main website English pledge page. Of these 52% (93,021/177,681) were from pharmacy teams and 6% (11,185/177,681) were from pharmacy students. Pharmacy technicians account for 11% of pharmacy team pledges (10,413/93,021). Of the pharmacy team and pharmacy student pledges, 98,330 were from the United Kingdom; 3,919 pledges were received from outside the UK with India (56%, 2,194/3,919), Nigeria (6%, 222/3,919) and South Africa (5%, 188/3,919) contributing the highest proportions of pledges. The most common pledges selected were within the theme of "Optimising antibiotic use", "which accounted for 27%. Pledges linked to the themes "Prescribing practice and stewardship" and "Safety and environment responsibility" were 25% and 24% respectively.

The most common method of learning about Antibiotic Guardian was through community pharmacy (29.6% (52,620/177,681)) with 4.1% (7,316/177,681) hearing about the campaign through social media.

Conclusion: The Antibiotic Guardian campaign continues to engage HCPs, especially pharmacists, pharmacy technicians and pharmacy students to commit to tackling AMR, especially among those with prior awareness of the topic.

Future work can consider options to further engage other HCPs outside of pharmacy teams and to explore the impact of pledging on pharmacy teams' antimicrobial stewardship practice.

Utilisation patterns and quality of lipid control among patients prescribed lipid-lowering therapies in primary care settings in Kuwait: A nationwide cross-sectional study

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Introduction: Cardiovascular diseases (CVDs) are the leading cause of mortality in Kuwait with a reported rate of 68 per 100,000 inhabitants in 2023. Uncontrolled lipid levels remain a critical modifiable risk factor for CVDs. Primary health care centres (PHCCs) play a pivotal role in managing lipid disorders. this study aimed to evaluate prescribing patterns of lipid-lowering therapy (LLTs) and assess the extent of lipid control among patients attending PHCCs in 2023.

Methods: A nationwide, cross-sectional study was conducted using the WHO STEPwise approach to surveillance (STEPS) across six randomly selected PHCCs. Patients attending chronic clinics and prescribed at least one LLT were included. CV risk categories and lipid treatment goals (low-density lipoprotein cholesterol (LDL-C) and non-high-density lipoprotein cholesterol (non-HDL-C)) were defined using the 2021 Middle East consensus. The primary outcomes included prescribing patterns and the proportion of patients achieving therapeutic goals. Data analysis involved descriptive statistics and multivariate logistic regression.

Results: A total of 434 patients were included, with a mean age of 54.3±9.7 years and comparable gender distribution. Statins were the most commonly prescribed LLTs (98.8%, n= 429), with 3.2% (n= 14) receiving combination therapy with ezetimibe. Moderate-intensity statin therapy was used by 90.4% (n= 388) of patients. Achievement rates for LDL-C and non-HDL-C goals across all CV categories were 20.4% and 26.6%, respectively. CV risk category was significantly associated with achieving LDL-C and non-HDL-C goals ($p< 0.001$).

Conclusion: Despite the widespread use of statins, lipid control remains suboptimal. These findings highlight the urgent need for targeted interventions to optimise lipid management, including improving adherence and adopting more intensive LLT regimens.

Analysis of drug therapy for the treatment of type 2 diabetes mellitus by measuring drug utilization in Bulgaria

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Introduction: According to World Bank data, in developing countries 20-50% of healthcare expenditures are for medicinal products. The rational use of medicines is essential for improving the health of individual patients. In 1985, the World Health Organization (WHO) held a conference to promote it. There are numerous factors that influence rational prescribing, such as: the health status of patients, the prescribing practices of physicians, the drug supply system and the legislation. Incorrect prescribing practices and irrational use of a medicinal products can lead to ineffective therapy, which can cause increased morbidity and mortality.

Aim: Analysis of drug therapy for the treatment of type 2 diabetes mellitus by measuring drug usage at macro level in Bulgaria.

Methodology: It has been conducted a documentary and comparative analysis using data, provided by the National Health Insurance Fund (NHIF) registers, as well as data from the registers of the National Council on Prices and Reimbursement. It is performed an analysis of the drug utilization of glucose-lowering medicinal products for treatment of type 2 diabetes mellitus for the period 2019-2023, using the WHO ATC/DDD methodology.

Results: Regarding the characteristics of the population of patients with type 2 diabetes mellitus and the calculated drug utilization at macro level by various indicators - natural, value and in DDD/ 1000 inhabitants/ per day, we established that in clinical practice in Bulgaria the first choice for therapy are monoproducts. They occupy over 70% of the total share of glucose-lowering medicinal products and over half falls on the representative of the biguanides – Metformin. The most prescribed medicinal products during the analyzed period of 5 years, determined as number of packages, remain the representative of the biguanides Metformin, the sulfonylureas Gliclazide and Glimepiride, as well as the alpha-glucosidase inhibitor Acarbose.

The most prescribed combined medicinal products, determined as number of packages, reimbursed by the NHIF, contain fixed-dose combinations SGLT2 Inh/Metformin (Empagliflozin/Metformin and Dapagliflozin/Metformin) and DPP-4 Inh/Metformin (Vildagliptin/Metformin and Linagliptin/Metformin). An increase in the use of the combination product Insulin degludec/Liraglutide is observed, which according to the pharmacotherapeutic guidelines is a preferred choice over the introduction of insulin therapy. The highest amount, spent by the NHIF for the period 2019-2023, is for the GLP-1 receptor agonists Semaglutide, Dulaglutide and Liraglutide, as well as for Gliclazide as a representative of sulfonylureas. We found a high share of dispensing outside the scope of mandatory health insurance of the medicinal product Semaglutide, administered s.c., as well as its use outside the approved therapeutic indications, which is contrary to the recommendations of international and national pharmacotherapeutic guidelines.

Conclusion: The study of drug utilization of glucose-lowering medicinal products in Bulgaria demonstrates the importance of individualizing the therapy of patients with type 2 diabetes mellitus and the implementation in real clinical practice of the established pharmacotherapeutic guidelines on European and national level for the treatment of the disease in order to achieve rational drug use.

Advancing global pharmacy workforce development: A comprehensive review of competency frameworks

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Introduction: Competency frameworks are essential for standardizing and advancing global pharmacy workforce development. The International Pharmaceutical Federation (FIP) has played a key role in supporting this effort by developing and mapping existing frameworks to guide professional practice. This study aimed to identify, categorize, and analyze global competency frameworks relevant to pharmacy practice, ensuring alignment with international standards, such as the FIP Development Goals and the Global Competency Framework, while addressing regional needs. This initiative supports WHO's global health objectives by ensuring pharmacists possess essential competencies to enhance medication safety and public health outcomes.

A targeted one-month search (February 15–March 15) was conducted using online databases such as PubMed, internet search engines, and FIP network resources. **Methods:** Identified frameworks were categorized by geographical region, practice level, and area of focus. The methodology included an analysis of language accessibility, references to FIP-developed frameworks, and areas of specialization to assess their applicability across diverse pharmacy practice settings.

Results: The search identified six primary competency frameworks developed by FIP, including the Global Competency Framework (GbCF v.1 and v.2), which serve as key references for national and regional competency standards worldwide. A trend toward region-specific frameworks was observed, with higher prevalence in the Americas, Europe, and Southeast Asia, whereas limited development was noted in Africa. Frameworks spanned various practice levels, including foundational, entry-level, early career, and advanced, reflecting the diverse competencies required throughout a pharmacist's professional journey. While many frameworks focus on general pharmacy practice, there is a notable scarcity in specialized domains such as industry, managerial roles, digital health, and pharmacogenomics. Most frameworks are published in English, facilitating cross-regional comparisons.

Conclusion: Centralizing information on competency frameworks aligns with FIP's mission to elevate pharmacy practice standards while addressing regional disparities. Challenges such as limited access to published frameworks, variations in terminology, and cultural differences necessitate strategic solutions, including the establishment of regional networks, the development of a comprehensive framework database, and the expansion of FIP's competency resources. Strengthening and scaling framework development efforts in underserved regions will foster equitable pharmacy workforce development, ultimately improving healthcare delivery and patient outcomes worldwide.

Young pharmacists as tomorrow's decision-makers in Lebanon: Tools validation and perceptions of pharmaceutical policymaking and public service motivation

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Introduction: The perception of pharmacy policymaking among early-career pharmacists is crucial, as it can significantly influence their engagement with and commitment to the profession, reflected through public service motivation (PSM). When young pharmacists have a positive and informed view of policymaking, they are more likely to feel empowered to contribute to the field's advancement and actively participate in shaping its future. This increased engagement can lead to higher levels of public service motivation, driving these professionals to not only serve their immediate patients but also work towards broader improvements in healthcare systems and pharmacy practice. This theory is expected to be affected by pharmacists' attributes, such as leadership, general self-efficacy, strategic thinking, sociodemographic characteristics, and educational background. This study aimed to construct and validate a new tool, the Pharmaceutical Policymaking Perception Scale (PPPS), and assess pharmacy students' and graduates' perception of pharmaceutical policymaking in Lebanon and its correlates, particularly PSM. A secondary objective was to examine the mediating role of PPPS between personal attributes and PSM among early-career pharmacists with different personal attribute profiles.

Method: A standardised questionnaire was disseminated through electronic platforms. It included sociodemographic characteristics, education-related variables, and scales measuring leadership, general self-efficacy, strategic thinking, and PSM. The validity of the newly developed Pharmaceutical Policymaking Perception Scale (PPPS) was established through factor analysis, while its reliability was assessed. Multivariate analyses were conducted to examine conceptual relationships, complemented by cluster, multivariable, and mediation analyses to explore correlations among the assessed constructs further.

Results: Based on a sample of 504 early-career pharmacists, the PPPS tool exhibited excellent psychometric properties, with its items loading on two factors representing the positive and negative perceptions of pharmaceutical policymaking. The scale demonstrated excellent reliability with robust content, construct, structural, and concurrent validity. Only 4% of participants scored above 70, indicating relatively low perceptions of pharmaceutical policymaking in Lebanon. Higher PPPS scores were associated with higher self-efficacy and strategic thinking, while lower scores were linked to reduced PSM. Notably, no association was found between PPPS and leadership. Moreover, PSM was positively associated with personal attributes, particularly leadership, regardless of PPPS. However, among pharmacists with weak personal attributes, the association of leadership and strategic thinking with PSM was mediated by PPPS. No significant associations were found between PSM and general self-efficacy, demographic, or educational characteristics.

Conclusion: The newly validated PPPS scale offers valuable insights into pharmacists' views, enabling a more comprehensive assessment of policymaking perceptions. The potential disconnection between PPPS and leadership and the mediation of PSM by PPPS among some pharmacists raises concerns about the profession's future. The absence of association between the PSM and the educational background is also a consideration. Further research is warranted to confirm these findings, and urgent action by educators and policymakers is essential to effectively engage with early-career pharmacists and enhance their motivation to serve the profession in challenging circumstances.

Point-of-care testing as a tool in community pharmacy practice to identify and flag undiagnosed diabetes and cardiovascular risk factors: An observational study

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Recent data indicates that the global prevalence of chronic medical conditions such as cardiovascular disease and diabetes is increasing. Unfortunately, within this same time,

access to primary care providers in many countries is becoming more limited and many patients are unable to obtain care within a timely manner. Thus, as healthcare systems face increasing pressures, this has opened opportunities for pharmacists to further utilize their clinical trainings and play increasingly prominent roles in the delivery of primary care services. This is evident through recent expansions in the scope of practice for pharmacists in various jurisdictions around the world such as in Ontario, Canada where regulatory bodies have authorized pharmacists to perform certain point-of-care tests to support patients with self-care and management of their chronic diseases. Thus, this study aimed to assess the role which community pharmacists can play in the identification of potentially undiagnosed diabetes, dyslipidemia, and hypertension in adult patients using point-of-care testing technology.

Between September 2024 and January 2025, patients at a community pharmacy in Ontario, Canada who were aged ≥40 years, had no laboratory bloodwork within the past 6 months, and had no prior diagnosis of Type 1 or Type 2 diabetes were invited to participate in a health assessment conducted by a pharmacist. The assessment included a measurement of blood pressure (BP) readings, a calculation of the Framingham Risk Score (FRS), and a point-of-care test for HbA1c and complete lipid panel. A total of 1600 patients participated, and the aggregate results indicated the following key findings:

a) 2.89% of patients had a HbA1c reading ≥6.5% (i.e. diabetic range)
b) 12.51% of patients had a HbA1c reading of 6.0%–6.4% (i.e. pre-diabetic range)
c) 15.36% of patients had a LDL-c reading ≥3.50 mmol/L
d) 38.54% of patients had a FRS of ≥10% (i.e. intermediate to high risk of experiencing a cardiovascular event within 10 years)
e) 32.33% of patients had a systolic BP reading ≥135 mmHg
f) 25.96% of patients had a diastolic BP reading ≥85 mmHg

Moreover, pharmacists do not currently have legal scope to initiate therapy for chronic diseases or formally diagnose patients in Ontario, Canada. Thus, patients with abnormal readings were subsequently referred to a primary care provider for prompt further assessment.

Nevertheless, the results from the study highlighted the high prevalence of undiagnosed diabetes and dyslipidemia as well as increased cardiovascular disease risk factors in the patient population. Accordingly, this also underscores the potential role which pharmacists can play in the screening, early detection, and management of chronic diseases in a community pharmacy setting. Ultimately, incorporating community pharmacists in such initiatives may help improve patient health outcomes, alleviating burdens on the healthcare system, and reduce long-term healthcare costs. Finally, the study also highlights the importance of further research to assess long-term implications of pharmacist involvement in the delivery of primary care.

Assessing intellectual humility among healthcare students: An interprofessional comparative study

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Background: Intellectual humility (IH) refers to an awareness of one's cognitive limitations and a willingness to consider perspectives and ideas that differ from one's own. IH contributes to positive interactions and relationships, essential for successful communication and teamwork. In healthcare settings, where professionals from diverse backgrounds interact and a hierarchy tends to exist, IH may play a pivotal role in promoting collaboration. Assessing baseline IH levels and identifying differences among health profession students are essential steps before implementing IH training to prepare them for multidisciplinary practice.

Purpose: This study aimed to compare baseline IH among various health profession students. Based on our previous findings and published literature, we hypothesized that medical students may exhibit lower IH scores due to traditional hierarchical structures and competitive training environments that may foster overconfidence and reduce openness to alternative views.

Methodology: This cross-sectional study examined baseline IH among various health profession students at Loma Linda University during the first year of each program before any curricular exposure to other professions. IH levels were assessed using the validated 22-item Comprehensive Intellectual Humility Scale (CIHS) survey tool built into Qualtrics. The CIHS includes four domains: Independence of Intellect and Ego (5 items), Openness to Revising One's Viewpoint (5 items), Respect for Others' Viewpoints (6 items), and Lack of Intellectual Overconfidence (6 items). Reverse coding was applied as necessary so higher scores indicated greater IH. Data analysis was performed using SPSS Statistics version 29.0. Kruskal-Wallis tests were conducted to compare overall IH scores and scores for each domain across professions. To identify specific group differences, post-hoc pairwise comparisons with Bonferroni adjustments will be performed. Ethical approval was obtained from Loma Linda University's Institutional Review Board (IRB #5230422).

Results: 553 students completed the survey: undergraduate nursing (n=240), medical (n=127), dental (n=70), pharmacy (n=48), allied health (n=38), graduate nursing (n=17), behavioral health (n=13). Most participants were 18-24 years of age (67.3%), Asian or Caucasian (66.3%), and female (61.2%). Overall IH scores were significantly different across student professions ($p<0.013$) with the following scores reported as median (IQR) in order of highest to lowest: behavioral health 4.30 (0.44), graduate nursing 4.14 (0.43), undergraduate nursing 4.09 (0.55), dental 4.09 (0.70), medical 4.00 (0.64), pharmacy 3.95 (0.36), and allied health

3.95 (0.56). A significant difference was also observed for three of the four IH domains: Independence of Intellect and Ego ($p<0.001$), Openness to Revising One's Viewpoint ($p<0.015$), and Respect for Others' Viewpoints ($p<0.001$). Lack of Intellectual Overconfidence was similar across professions ($p=0.082$). Post-hoc pairwise comparisons are ongoing to identify specific group differences.

Conclusion: Our study found that healthcare profession students begin with varying baseline levels of IH, with behavioral health and graduate nursing students demonstrating the highest scores. Further investigation is warranted into these differences across institutions and factors contributing to these variations. Notably, our findings align with previous research highlighting IH differences among groups. These findings highlight the need for targeted interprofessional education interventions to promote equitable IH development and better prepare health profession students for effective collaboration in multidisciplinary healthcare settings.

The impact of point of care testing in patients with diabetes receiving a medication review

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Background: Point of care testing (PoCT) is a technology that can make the patient's diabetes care journey easier. Regular monitoring can help patients with diabetes feel empowered, make healthier lifestyle choices, and assist in avoiding serious complications. PoCT might also provide that "teachable moment" to engage patients in their care. We evaluated the impact of adding PoCT to government-funded medication reviews, compared to medication review only or no medication review, on the treatment regimen of patients with diabetes.

Methods: This retrospective matched cohort study was conducted in community pharmacies from a single Canadian pharmacy group. We included individuals with diabetes who received at least one medication review and a PoCT. This cohort was then matched, based on age, gender, pharmacy location, and hypertension and dyslipidemia presence, with patients with diabetes who received at least one medication review but did not receive a PoCT, and those who are eligible to receive a diabetes medication review but did not receive either a medication review or a PoCT.

Results: The matched cohort included 9,409 patients from each group. The mean age was 64.6 (SD 13.1) years and almost half (44.6%) of the participants were female. Mean baseline A1C was 7.07% (SD 1.25). Of those patients who received medication review plus PoCT, 28.1% had a diabetes treatment regimen change, vs 22.6% in those who received medication review only and 25.6% who did not receive any interventions, $p<0.0001$. More patients who received medication review plus PoCT had at least one follow up visit when compared to those who received medication review only (83.5% vs 61.3%, $p< 0.0001$). A1C did not significantly change after follow up [7.08 (1.3) to 7.1 (1.27)].

Conclusions: While we observed statistically significant changes in diabetes medication regimen when PoCT was added to a medication review, the absolute level of changes absolute differences was small and likely not clinically relevant. It is important to note that more than half of patients had good glycemic control at baseline, suggesting that pharmacist selection of patients and the criteria for eligibility for diabetes medication review is suboptimal.

An exploration of hospital prescribers' perceptions of design features of electronic health record systems and the impact on decision-making: A multi-site qualitative study

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Introduction: Electronic health record (EHR) systems are widely adopted worldwide. Hospital prescribers are at the forefront of patient care and rely heavily on EHR systems. However, there is limited evidence regarding hospital prescribers' perspectives on different EHR system designs and their impact on prescribing decision-making. This study aimed to explore hospital prescribers' opinions and experiences of different designs of HER systems and their impact on prescribing decision-making in a hospital setting.

Methods: This study was conducted in two large NHS teaching hospitals in London with well-established EHR systems. Semi-structured interviews were conducted with pharmacy, nursing, and medical prescribers. All completed a pre-interview survey that gathered demographic data and previous experiences in clinical practice and with EHR systems. Audio recordings of the interviews were transcribed verbatim and analysed using the inductive thematic analysis approach outlined by Braun and Clarke. The study was approved by the UCL research ethics committee (Project ID 21517.001).

Results: Thirty-four hospital prescribers (13 medical and 21 non-medical) participated. Of these, 74% (n=25) were female, 44% (n=15) were 31-40 years old, 59% (n=20) worked in both outpatient and inpatient settings. Participants expressed that electronic prescribing is a key feature that allows users to prescribe anytime and anywhere. Prescribing workflow in EHR systems varies depending on the user's profession and the clinical setting. Participants noted that the system's interface and functionality may vary for users and across hospitals despite using the same EHR system. Participants reported that EHR systems influenced their communication with other staff and patients. The interviews identified three groups of key factors—system, user, and environment—that were perceived to influence prescribing decisions with various consequences for users, patients, and organisations. The most frequently reported consequences of poorly designed systems were time burden and medication errors. In addition, participants expressed that involving them in EHR design could improve usability and acceptance of these systems in clinical practice. They reported major issues related to EHR system technical and training services, including prolonged reporting and resolution processes for system issues, insufficient time for training, and the necessity for more practical training. Participants also provided suggestions to improve system design and content. The most reported suggestion was a direct link to clinical guidelines from the prescribing window, offering tailored recommendations based on patient data. Furthermore, participants preferred being trained by and providing feedback to someone with in-depth knowledge of the system and clinical workflow. Overall, experiences with the EHR system were largely consistent among prescribers of different professions in the two hospitals.

Conclusion: Hospital prescribers agree that EHR systems are useful tools; however, improvements in design are needed to enhance their usability. Participants suggested integrating patient data, linking to clinical guidelines, and tailored prescription recommendations into EHR systems could support better prescribing decisions. Additionally, they perceived that well-designed, intuitive EHR systems aligning with clinical workflows could enhance care quality, staff satisfaction, and system usability. Further research is needed to explore users' experiences with different EHR system designs to help system suppliers and healthcare organisations develop, evaluate, and optimise these systems effectively.

Risk of severe exacerbation associated with Gabapentinoid use in patients with Chronic Obstructive Pulmonary Disease: A population-based cohort study

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Background: Gabapentinoids (gabapentin and pregabalin) have been linked to adverse respiratory events, with particular concern for individuals with risk factors such as chronic obstructive pulmonary disease (COPD). However, real-world evidence on the risk of adverse respiratory outcomes associated with gabapentinoid use in this population remains limited. Therefore, this study assessed the risk of severe exacerbation associated with gabapentinoid use in patients with COPD.

Methods: A base cohort of patients aged ≥ 55 years newly diagnosed with COPD between 1993 and 2021 was assembled using the UK's Clinical Practice Research Datalink, linked to the Hospital Episode Statistics and Office for National Statistics datasets. Using a time-conditional propensity score (TCPS)-matched new-user design, patients prescribed gabapentinoids with an indication of epilepsy, neuropathic pain, or other chronic pain were matched 1:1 with non-users with the same indication on age, sex, calendar year, COPD duration, and TCPS. Cox proportional hazards models were used to estimate the hazard ratio (HR) and 95% confidence interval (CI) of severe exacerbation associated with gabapentinoid use compared to non-use in the overall cohort, and by indication. Stratified analyses were also conducted to assess potential effect measure modification by age (55 - 69, 70 - 79, ≥ 80 years), sex, and measures of COPD severity including number of prior COPD exacerbations, dyspnea severity and forced expiratory volume in one second (FEV1) measurements. The risks of moderate or severe COPD exacerbation, and respiratory failure were assessed as secondary outcomes.

Results: The study cohort comprised 29,882 gabapentinoid users, including 1,256 with epilepsy, 19,155 patients with neuropathic pain, and 9,471 with other chronic pain matched 1:1 with non-users. Patients were followed for a mean duration of 1.25 years in the overall cohort. Compared with non-use, gabapentinoid use was associated with an increased risk of severe COPD exacerbation in the overall cohort (HR 1.43; 95% CI: 1.35 - 1.52), and among patients with epilepsy

(HR 1.39; 95% CI: 1.11 - 1.74), neuropathic pain (HR 1.43; 95% CI: 1.32 - 1.54), and other chronic pain (HR 1.45; 95% CI: 1.31 - 1.60). An increased risk of severe exacerbation was also observed across all strata of age, sex, and measures of COPD severity. Similarly, an increased risk of moderate or severe exacerbation (HR 1.05; 95% CI: 1.02 - 1.08) and respiratory failure (HR 1.56; 95% CI: 1.44 - 1.69) were observed in the overall cohort, and in the cohorts of patients with neuropathic pain and other chronic pain.

Conclusion: In this large population-based cohort study, gabapentinoid use was associated with an increased risk of severe exacerbation among patients with COPD. This risk remained consistent among patients with neuropathic pain, epilepsy, and other chronic pain. These findings highlight the need for cautious prescribing and monitoring in this population.

Trends in the prescription of central nervous system depressants in patients with Chronic Obstructive Pulmonary Disease in the United Kingdom Primary Care, 2000 – 2022

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Background: Prescribing patterns of central nervous system (CNS) depressants have evolved in recent years, but trends in patients with chronic obstructive pulmonary disease (COPD) remain unknown. Assessing these trends is essential given the potential risk of respiratory depression and other adverse respiratory events in this population. Therefore, this study examined time trends in the prescription of CNS depressants among patients with COPD in United Kingdom (UK) primary care from 2000 to 2022.

Methods: Using the UK Clinical Practice Research Datalink (CPRD), a cohort of all patients with COPD aged ≥ 50 years between 2000 and 2022 was assembled. Crude annual rates and 95% confidence intervals (CIs) of patients newly prescribed CNS depressants, including opioids, benzodiazepines, z-drugs, and gabapentinoids, were estimated. To identify potential disparities in prescribing patterns across different demographic and clinical subgroups, stratified analyses were conducted by age, sex, duration of pharmacological activity (opioids and benzodiazepines), individual medications (z-drugs and gabapentinoids), and COPD severity based on dyspnea measurements.

Results: Among 766,306 patients with COPD, 125,129 (16.3%) were newly prescribed opioids, 100,714 (13.1%) benzodiazepines, 71,883 (9.4%) gabapentinoids, and 61,687 (8.1%) z-drugs. Opioid prescribing rates declined from 13.07 per 100 person-years (PY) (95% CI 12.78 - 13.37) in 2000 to 4.9 per 100 PY (95% CI 4.7 – 5.0) in 2022. Gabapentinoid prescribing rates increased from 0.13 per 100 PY (95% CI 0.12 – 0.16) in 2000, peaking at 2.51 (95% CI 2.46 - 2.57) in 2017. Benzodiazepine and z-drug prescription rates showed little variation over time. In stratified analyses, prescription rates for all CNS depressants were highest among females, and in patients with moderate to severe dyspnea. Overall, opioid, gabapentinoid, and z-drug prescribing rates remained consistent across age groups, with slightly higher prescribing rates in the youngest age group (50 – 59 years). Conversely, benzodiazepine prescribing rates increased sharply in 2010 among the oldest age group (> 80 years), exceeding prescribing rates in younger patients and remaining elevated thereafter. Short-acting opioids were more commonly prescribed than long-acting ones throughout the study period. Among benzodiazepines, long-acting molecules were the most commonly prescribed but declined after the year 2020. Gabapentin was more prescribed than pregabalin during the entire study period with prescribing rates peaking at 2.07 per 100 PY (95% CI 2.02 - 2.12) in the year 2016. Zopiclone prescribing rates were at least four times higher than those of zolpidem and zaleplon across all study years.

Conclusion: Prescribing patterns of central nervous system (CNS) depressants in patients with COPD have evolved over two decades, with notable shifts in opioid and gabapentinoid use, and substantial differences by age, sex, and COPD severity. Given the potential risks associated with CNS depressant use in COPD, ongoing surveillance and evidence-based prescribing are essential to ensure optimal pharmacological management.

Patient-centered clinical practice on Lymphangioleiomyomatosis

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Background: Lymphangioleiomyomatosis (LAM), a rare multisystem neoplastic disorder the incidence is now estimated as 3 persons per million, predominantly affects women of childbearing age. The prevalence of LAM is in fact much higher than estimation. Clinical manifestations including dyspnoea, pneumothorax, and chylothorax impose

substantial disease burden and profoundly impair their quality of life (QoL). Despite incremental improvements in disease recognition, therapeutic options and patient-centered treatment evaluation remain limited. Purpose: This study aimed to: 1) Evaluate the longitudinal effects of off-label sirolimus therapy on pulmonary function improvement and chylous effusion resolution; 2) Quantify QoL changes across different disease progression stages and therapeutic regimens; 3) Assess the health economic burden under pharmacist-led standardised follow-up plan.

Methods: A prospective cohort study was conducted through the hospital clusters of Fudan University School of Medicine, enrolling patients with LAM under longitudinal surveillance (2018-2024). Patients were invited to complete a survey during their face-to-face outpatient visits or on the Internet. This survey included three parts: 1) in part one, some demographic and sociological information were collected; 2) in part two, patient-reported outcomes were measure by two general tariff EuroQol Group Five Dimension Five Level Scale (EQ-5D-5L) and Short-Form 6-Diemnsion version 2 (SF-6Dv2); 3) in part three, one disease-specific tariff St.George's Respiratory Questionnaire (SGRQ) was estimated via a scoring application. Then, comprehensive data, including direct medical costs, therapeutic drug agents, and monitoring clinical characteristic, were collected from electronic medical records.

Results: This cohort comprised 58 LAM patients (mean age 45.6 years; mean diagnostic age 41.1 years). Baseline serum VEGF-D levels averaged at high 2503.98 pg/mL, with 76% of patinets exceeding 800 pg/mL. Seventy-one percent received sirolumab therapy alongside pharmacist-managed follow-up programmes incorporating therapeutic education and remote consultations. From the index of EQ-5D-5L, health utility values significantly improved from 0.74 (95%CI: 0.68-0.81) to 0.86 (95%CI: 0.82-0.91), with pronounced enhancement in patients having severe baseline pulmonary impairment (FEV_1 <70%: 0.58 to 0.87, p<0.05). 34 of the patients have not yet suffered from a pneumothorax, health utility was estimated to be 0.81 (95%CI: 0.74-0.87), and this mean health value still had a slight improvement after sirolimus and supportive treatment after diagnosis. The estimated total disease burden in mainland China ranged €58.66-88.55 million, with annual per-patient treatment costs averaging €7050.28, among which the main cost dominators were drug cost (sirolimus and symptomatic medications) and indirect cost, accounting for 67.67% of the total cost of illness, characterised by high out-of-pocket expenditure.

Conclusions: This study reveals the considerable therapeutic burden of LAM management in China. Off-label sirolimus administration lead to clinical improvements in pulmonary function and patient-reported outcomes, particularly in patients whose pulmonary function show sever damage. Pharmacist-driven rare disease management programmes emerge as critical components in optimising long-term outcomes. These findings advocate for structured multidisciplinary care models to address both clinical and socioeconomic challenges in LAM treatment.

Healthcare professionals' perceptions and practices of medication reconciliation as a medication safety strategy

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Introduction: Medication reconciliation is a critical component of patient safety, as it helps provide an updated list of all medications a patient has been taking. The Institute for Healthcare Improvement and The Joint Commission have recognised its contribution to improving post-discharge outcomes and reducing adverse drug events. However, its implementation remains inconsistent worldwide due to challenges such as inadequate integration into clinical workflows, difficulties in using electronic health record systems, and patient-related factors.

In Middle Eastern countries, medication reconciliation faces additional obstacles, including a lack of standardised policies and procedures, noncompliance, insufficient training for healthcare professionals, and limited patient involvement. These factors contribute to a high rate of medication discrepancies and an increased risk of medication-related problems. Furthermore, Egypt faces a shortage of physicians due to brain drain, leading to an increased workload for healthcare professionals.

Purpose: This study aims to examine the perceptions of healthcare professionals regarding medication reconciliation and assesses their compliance with performing medication reconciliation at admission, discharge, and upon patient transfer.

Method: A cross-sectional study was conducted among healthcare professionals at Alexandria Main University Hospital, a teaching hospital with a capacity of 1,260 beds. An electronic questionnaire was developed based on literature articles addressing key aspects of the medication reconciliation process. A total of 57 responses were collected, comprising 34 pharmacists and 23 physicians, as part of an exploratory study.

Results: Pharmacists were most commonly recognised as key figures in medication reconciliation, though physicians also played an essential role. Most participants (87.7%) agreed or strongly agreed that medication reconciliation should be provided to all admitted patients. However, in practice, reconciliation was most frequently performed at admission and discharge.

Awareness of hospital policies varied; some respondents were unsure, while others were entirely unaware of the policy's existence. A lack of knowledge and insufficient training emerged as major barriers to effective implementation. While 43.9% reported receiving formal training at university, most participants expressed a need for additional training. Limited access to patient records was another significant challenge affecting reconciliation efforts. Despite these barriers, nearly half of the participants believed that Artificial Intelligence (AI)-based systems could improve medication reconciliation and reduce medication errors.

Conclusion: These findings highlight the strong recognition of medication reconciliation's importance among healthcare professionals. However, variability in practice and policy awareness indicates areas for improvement. The identified gaps in knowledge, training, and policy awareness highlight the need for structured educational programmes and standardised policies to ensure consistent implementation. Moreover, the high interest in AI-driven tools for medication reconciliation suggests a promising role for AI in optimising the medication reconciliation process and enhancing medication safety in clinical practice.

The effect of weight-lowering drugs on natural fertility in women with overweight and obesity: A systematic review

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Introduction: Overweight and obesity are increasing global health concerns with significant health implications, including impaired female fertility due to hormonal imbalances, anovulation, and metabolic dysfunction. Weight-lowering drugs provide an alternative for individuals who struggle to achieve target weight loss through lifestyle modifications, however, the effect of these agents on natural female fertility remains unclear. This systematic review summarises the available literature on the impact of weight-lowering drugs on fertility outcomes, including ovulation, conception, pregnancy, and live birth rates.

Method: The clinical question was developed using the Population, Intervention, Comparator, Outcomes, and Study Design (PICOS) framework. The population included overweight and obese women. The intervention was the use of United Kingdom-approved weight-lowering drugs, with comparators including non-users, lifestyle modifications, other weight-lowering drugs, or metformin. Outcomes of interest were ovulation, conception, pregnancy, and live birth rates. Eligible study designs included interventional trials and observational studies. Women undergoing assisted reproductive technology were excluded. The protocol was registered with PROSPERO (CRD42024597638) and followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. A systematic search was conducted across Medline, EMBASE, Cochrane Central Register of Controlled Trials, CINAHL, and ClinicalTrials.gov for human studies published in English up to October 16, 2024. Screening was performed independently by two reviewers, and the risk of bias was assessed using the Cochrane Risk of Bias tool (RoB 2). A meta-analysis was planned to synthesize data quantitatively; however, its feasibility depended on the quality and comparability of included studies.

Results: Six clinical trials published between 2009-2022 met the inclusion criteria. Sample sizes ranged from 40-120 women, with a mean age of 25.9–29.7 years. All six studies assessed ovulation rates, while conception rates were reported in three studies, and pregnancy rates in one study. None of the studies evaluated live birth rates. Three studies compared orlistat with lifestyle interventions, two compared it with metformin, and one included three groups comparing orlistat, metformin, and lifestyle modifications. Across all comparisons, ovulation rates were generally higher in the orlistat group, except in one study where metformin showed a higher ovulation rate. When comparing conception rates, two studies reported higher conception rates with orlistat, and one study reported no significant difference. In the study assessing pregnancy rates, pregnancy was higher in the orlistat group (23.3%) compared to lifestyle modifications (6.7%) (p= 0.044). When assessed using RoB 2, two studies had some concerns of bias and four studies had high risk of bias. Therefore, a meta-analysis could not be conducted, as pooled data might not provide reliable conclusions.

Conclusion: In the current literature, orlistat was associated with higher ovulation rates in overweight and obese women; however, its overall impact on female fertility remains inconclusive due to small sample sizes and methodological limitations. In addition, effects on conception, pregnancy and live birth remain unclear due to scarcity of data. Furthermore, no studies evaluated the effects of glucagon-like peptide-1 receptor agonists on natural female fertility. Future research should focus on assessing the role of newer weight-lowering drugs in improving pregnancy and live birth rates.

Pharmacy students' and professionals' knowledge, perception and attitude of sustainability in pharmacy practice: A systematic review

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Background: The environmental impact of healthcare systems, especially the pharmaceutical sector, represents a significant global challenge. Evaluating how pharmacy professionals and students understand and perceive sustainable practices is crucial for reducing the healthcare industry's ecological footprint.

Aim: To systematically review and synthesise evidence on the knowledge, attitudes, and perceptions of pharmacy students and professionals regarding environmental sustainability in pharmacy practice.

Methods: A systematic review was conducted following PRISMA guidelines. Eight databases were searched using a pre-specified search string, for studies published, in English, between 2011 and 2024. Quality assessment was performed using the NHLBI tool for cross-sectional studies and COREQ checklist for qualitative research. Data were synthesised narratively due to methodological heterogeneity.

Results: Fifteen studies were included (14 cross-sectional, 1 mixed methods) conducted in 11 countries. While most pharmacy professionals and students recognised environmental risks associated with pharmaceutical waste, significant knowledge gaps existed regarding proper disposal practices and broader sustainability concepts. Hospital pharmacists demonstrated better understanding compared to community pharmacists. Despite positive attitudes toward sustainability, participants often struggled to translate awareness into action, citing barriers such as lack of formal training, unclear guidelines, and limited systemic support. Both professionals and students expressed strong interest in enhanced sustainability education and training.

Conclusions: This review revealed substantial gaps between awareness and implementation of sustainable practices in pharmacy, highlighting the need for comprehensive integration of sustainability principles in pharmacy education and practice. Future efforts should focus on developing clear guidelines, enhancing professional training, and establishing supportive infrastructure for sustainable pharmacy practices.

Underlining the pharmaceutical waste problem in the United Kingdom and the strategies in place to combat it

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Background: Pharmaceutical waste refers to any medicines that are expired, unused and or contaminated that are not required or no longer safe to use. This medication can be of varying legal categories thus general sale list, over the counter and prescription only medicines and also a range of different formulations. Each year in England, 156 000 tonnes of pharmaceutical waste is disposed. Pharmaceutical waste is disposed by incineration under high temperature treatments or via alternative treatment. This has become a huge problem as it costs over £32 million a year. Strategies have been employed by the National Health Service to help reduce the pharmaceutical waste burden.

Purpose: The main objective of this resource is to highlight the problem of pharmaceutical waste in the United Kingdom and what has been put in place to deal with it. Additionally, illuminating this will propel further research into more methods that can be employed to tackle the pharmaceutical waste problem in the United Kingdom.

Method: An analysis of the National Health Service (NHS) England literature titled; Pharmaceutical waste education in NHS and NHS clinical waste strategy and a PubMed research paper on factors affecting the development of healthcare waste management in the United Kingdom over the past 60 years was carried out.

Results: Literature showed an undeniable problem of pharmaceutical waste in the UK as it reveals the financial burden its disposal pauses. This problem also exposed an environmental detriment pharmaceutical waste produces. The World Health Organisation notes that open burning and low temperature incineration of pharmaceutical was can emit

dioxins, furans and particulate matter thus harming the environment and human health. The National Health service has therefore implemented a clinical waste strategy which involves training and education for all professionals. Other strategies also include improving compliance, reducing waste by increasing resource utilisation, improved decision making and finding new ways to reuse, remanufacture and recycle. It is estimated that by employing these strategies, the National Health service can save approximately £11 million every year in recurrent revenue costs and we can reduce our carbon emissions from waste by approximately 30% – equivalent to removing 2 million road miles a year.

Conclusion: The United Kingdom faces a huge burden of pharmaceutical waste but with implementation of the clinical waste strategy in place, the burden can be hugely minimised.

Effect of Metformin on the risk of post-COVID-19 condition among individuals with overweight and obesity in the United Kingdom: A population-based retrospective cohort study

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Background: A secondary analysis of the COVID-OUT trial showed that starting metformin within three days of a COVID-19 diagnosis and continuing it for 14 days reduced the incidence of post-COVID-19 condition (PCC) by 41% in overweight and obese individuals, compared to a placebo. However, these findings were limited to individuals aged 30–85 years, and PCC was a secondary outcome in the trial. Further studies are needed to assess whether metformin's preventive effects can be generalised to a broader population with alternative definitions of PCC. Therefore, the objective of this study was to evaluate the effectiveness of metformin in preventing the development of PCC in adults with overweight or obesity who had a recent COVID-19 infection.

Methods: We conducted a retrospective cohort study using a sequential target trial emulation framework, utilising primary care data from the Clinical Practice Research Datalink (CPRD) Aurum database (March 2020–July 2023). Adults with overweight or obesity (BMI ≥ 25 kg/m²) and a record of SARS-CoV-2 infection were included. Individuals with contraindications for metformin (hepatic or renal impairment or lactic acidosis) or those prescribed metformin within the year prior to diagnosis were excluded. The primary outcome was PCC, defined by a PCC diagnostic code or at least one WHO-listed symptom between 90–365 days after diagnosis, with no prior history of the symptom within 180 days before infection. We calculated the pooled hazard ratio (HR) and risk difference for the incidence of PCC, adjusting for baseline characteristics.

Results: A total of 624,308 patients with overweight or obesity with a record of SARs-CoV-2 infection were included in the analysis. Of these, 2,976 patients who initiated metformin within 90 days after COVID-19 diagnosis date were included in the metformin treatment group. The mean age of this study cohort was 49.64 years. During follow-up, 288 metformin users and 413,686 non-users developed PCC. The estimate 1-year risk difference for PCC events in the intention-to-treat analysis was -12.58% (95% confidence interval -13.77 to -11.58%) with hazard ratio (HR) of 0.36 (95% confidence interval 0.32 to 0.41); in the per-protocol analysis it was -12.74% (95% confidence interval -13.89 to -11.76%) with HR of 0.36 (95% confidence interval 0.33 to 0.41). Subgroup and sensitivity analyses yielded consistent estimates.

Conclusions: Our findings support the protective effect of metformin treatment within 90 days of SARS-COV-2 infection on developing PCC in people with overweight/obesity in real-world settings. Implementing metformin as an early treatment strategy for individuals with overweight or obesity and COVID-19 may be a viable approach to mitigate the risk of developing PCC, though further study is needed to evaluate its efficacy in treating PCC.

Through Lebanese eyes: Understanding Multiple Sclerosis knowledge and attitudes

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Introduction: Multiple Sclerosis (MS) is a chronic autoimmune disease affecting the central nervous system, with a significant impact on patients' quality of life. In Lebanon, MS affects approximately 63 per 100,000 individuals; however, public awareness and attitudes towards the condition remain understudied. This research aimed to assess knowledge levels and attitudes regarding MS among the general Lebanese population and to identify correlations between demographic characteristics, knowledge scores, and attitudes towards MS.

Methods: A cross-sectional study was conducted using a bilingual (English-Arabic) questionnaire administered to Lebanese adults (≥18 years). The survey comprised three sections: demographic information, knowledge assessment (25 items evaluating understanding of MS pathophysiology, epidemiology, diagnosis, and treatment), and attitudes evaluation. Data were analysed using descriptive statistics. Correlation analyses were performed to examine relationships between demographic factors, knowledge scores, and attitudes towards MS.

Results: Of the 749 participants, the majority were female (61.5%), with a mean age of 32.4 years (±11.3). Overall knowledge about MS was moderate, with a mean score of 14.6/25 (±5.8). Higher educational levels were positively correlated with knowledge scores ($r=0.42$, $p<0.001$). Health-related occupations were associated with better MS knowledge compared to non-health sectors (mean difference=3.8, $p<0.001$). Regarding attitudes, 54.2% of respondents demonstrated negative attitudes towards MS, with significant correlations between knowledge scores and positive attitudes ($r=0.38$, $p<0.001$). While 73.6% believed that people with MS could lead normal lives, 41.3% expressed discomfort about working with someone with MS. Sources of information significantly influenced both knowledge and attitudes, with those relying on scientific sources (medical literature, healthcare professionals) exhibiting more positive attitudes than those relying primarily on social media ($p=0.023$).

Conclusion: This study revealed moderate knowledge levels and predominantly negative attitudes towards MS among the Lebanese population. Educational level, occupation type, and information sources significantly influenced both knowledge and attitudes. These findings highlight the need for targeted public awareness campaigns, particularly through reliable information channels, to enhance understanding of MS and reduce stigma. Healthcare providers should focus on patient education and community outreach to improve public perception and support for individuals with MS in Lebanon.

Filling prescriptions but missing outcomes: Lithuania's E-adherence dilemma

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Introduction: Medication adherence significantly influences patient outcomes, particularly in chronic disease management. Lithuania has disproportionately high cardiovascular disease (CVD) mortality compared to other European countries, potentially linked to medication adherence issues. Understanding this relationship is critical for improving public health strategies and patient outcomes.

Methods: This observational population-based cohort study analysed 110,732,514 electronic prescriptions issued between 2017–2024. Data from Lithuania's Information System of Electronic Health Services and Collaboration Infrastructure (ESPBI IS) was used and included patient demographics, prescription specifics, and dispensing status. Medications were categorised using the Anatomical Therapeutic Chemical (ATC) classification. Adherence was calculated as the proportion of prescriptions dispensed relative to prescriptions issued, stratified by therapeutic class and reimbursement status (reimbursed vs. non-reimbursed medications).

Results: Data from 110,732,514 individual prescriptions from 2017 to 2024 were included. During the study period, the total number of electronic prescriptions increased from 2,697,945 in 2017 to 20,262,705 in 2024 with most of the prescriptions (63%) reimbursed by National Health Insurance (NIH). Throughout the study period, cardiovascular medicines were the most prescribed drug group with a total of 42,924,453 prescriptions (39%),

Overall adherence rates for prescriptions were between 82 and 97% with the lowest adherence in medicines for respiratory system and dermatological medicines, and the highest adherence for antineoplastic and immunomodulating agents. Adherence for medicines not reimbursed by NIH was between 2 and 27% lower for all ATC groups. Adherence to cardiovascular medicines was between 91% and 94% during the study, surpassing European benchmarks (e.g., Fischer et

al., 2010 reported ~72% adherence for chronic medications). While adherence for cardiovascular medicines not covered by NIH was ~16% lower, these prescriptions comprised only ~13% of all cardiovascular medicine prescriptions.

Conclusion: Despite high adherence to cardiovascular drugs and a substantial increase in statin utilisation observed in Lithuania (1060% increase from 2010 to 2021), the country continues to have one of the highest cardiovascular mortality rates in Europe (56% of total deaths). This finding parallels international observations where high adherence alone does not translate directly into improved clinical outcomes, highlighting multifactorial influences such as medication persistence, patient education, and healthcare system efficiency. Importantly, primary adherence data does not confirm actual medication consumption, indicating a potential gap between prescription collection and proper medication use.

Additionally, the study demonstrates Lithuanian e-prescription systems' capability to connect prescribing and dispensing data ensuring adherence visibility, particularly for reimbursed medicines.

Future studies will comprehensively analyse the entire patient journey from initial diagnosis to cardiovascular events, evaluating medication adherence's impact on health outcomes such as cholesterol, blood pressure, glucose levels, medication interactions, and preventive health measures like influenza vaccination. These findings will help develop targeted pharmaceutical and policy interventions to improve patient persistence, medication consumption accuracy, and overall cardiovascular health outcomes.

We want to engage in projects where our customers truly benefit: Attitudes among pharmacy staff towards research in the Danish community pharmacy setting

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Background information: The role of community pharmacies has evolved beyond traditional medication dispensing to include active participation in research. However, the extent of engagement and the perceived benefits and barriers remain underexplored. This study investigates the attitudes and experiences of Danish community pharmacy staff toward research participation, examining its impact on professional identity, work dynamics, and integration into the broader healthcare system.

Purpose: This study aims to explore the motivations, challenges, and professional implications of research engagement among pharmacists and pharmaconomists in Danish community pharmacies. Understanding these factors can inform strategies to strengthen research participation within this setting.

Method: We conducted a qualitative study through four focus groups with community pharmacy staff, including pharmacists (n=13) and pharmaconomists (n=3). The interviews were recorded using Microsoft Teams, transcribed verbatim and analyzed according to Reflexive Thematic Analysis by Braun and Clarke.

Results: Three key themes emerged: 1) "This is what motivates me to conduct research": Staff is motivated by customer-centered benefits, enhanced job satisfaction, professional growth, and strengthened connections with the broader healthcare system. 2)"This is how I would like us to conduct research": Practical challenges include time and resource constraints, with participants emphasizing the need for research projects that are relevant, outcome-oriented, and focused on professional development. 3) "Beyond the counter: The transformative role of research in community pharmacy": Research contributes to professional fulfillment, validation, and a shift in perceptions of the role of the community pharmacy. Participants desire recognition for their expertise, positioning themselves as integral healthcare providers.

Community pharmacists' contribution to lifestyle improvements: Insights, perspectives, and best practices from the lifestyle pharmacist network in the Netherlands

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Introduction: Our society is experiencing a significant lifestyle crisis, largely attributed to unhealthy behaviors that contribute to conditions such as cardiovascular disease and type 2 diabetes. In response, there is an urgent need for effective initiatives that promote healthier lifestyle choices

among patients. Research has demonstrated the effectiveness and feasibility of pharmacy-based health promotion services; however, barriers to their implementation have also been noted. In the Netherlands, a network of dedicated pharmacists has emerged to facilitate initiatives supporting lifestyle improvements within pharmacies. Given the absence of research on these services in the Dutch context, this study aims to explore the practices, experiences, and perceptions of this lifestyle pharmacist network.

Methods: Eligible pharmacists (n=67) completed a 43-question structured survey covering themes ranging from current initiatives and preferred methods of communication to facilitators and barriers to implement these initiatives. Additionally, a subset (n=9) of participants participated in qualitative, semi-structured interviews for an in-depth analysis of these themes. Data were analyzed by frequency tables and Mann-Whitney U, Fisher's exact and Chi-Square tests to determine significant associations.

Results: Findings indicated a strong desire among pharmacists to initiate their own health projects, with 86.4% either (strongly) agree with being motivated to do this. Most of the pharmacists (74.6%) reported to have currently implemented any form of lifestyle related interventions with activities on the topics of healthy nutrition (28.4%) and smoking cessation (25.4%) being the most prevalent. Services focusing on weight reduction (10.4%) and alcohol or drug use (1.5%) were least offered. Written information (34.9%) and Very Brief Advice (VBA) (20.1%) were the mostly used intervention types. In case pharmacist were involved in one or more lifestyle initiatives, 66.1% of pharmacists reported to reach at least 0-5 patients per week on lifestyle interventions. A total of 6 larger projects were mentioned on the website: 77% of pharmacists were familiar with at least one of these national projects, but less than 25% reported that they were currently running or had completed one of the projects. Key barriers to offer more services identified included lack of reimbursement (87.5%) and time constraints (51.8%). Conversely, facilitators such as the pharmacies' accessibility and pharmacy teams' interest were noted as positive influences on the implementation of lifestyle interventions with 80.3% to 65% either agree or strongly agree. No relevant statistically significant associations between gender, level of experience and location and any outcome were found.

Conclusion: The network of pharmacists exhibits a strong motivation to engage in lifestyle interventions; however, implementation is hindered by several barriers. To facilitate future integration of these interventions, strategies such as enhancing reimbursement models and promoting the availability of health promotional activities within pharmacy settings are essential. Addressing these challenges will optimize the role of pharmacists in public health.

SHAP-based predictive modeling of all-cause readmission risk in heart failure patients during the post-discharge vulnerable period

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Objective: Heart failure (HF) is a significant global public health issue, characterized by high readmission rates, particularly posing a substantial threat to the health of the elderly population. The post-discharge vulnerable period of heart failure (the first 3 months after discharge) is a critical phase in HF management, during which the risk of readmission for patients significantly increases. Although several studies have developed all-cause readmission risk prediction models for HF patients using machine learning (ML), few have combined ML-selected features with features chosen by human experts to assess readmission risk during the post-discharge vulnerable period of HF. This study aims to develop a feature model using machine learning (ML) to evaluate the risk of readmission during the post-discharge vulnerable period for HF patients, providing a stratified management strategy for clinical pharmacists involved in HF medication therapy management.

Methods: This study conducted a retrospective analysis of 11,377 HF patients admitted to the Second Affiliated Hospital of Chongqing Medical University from January 1, 2016, to June 30, 2021. Features were selected by combining recursive feature elimination (RFE) and the opinions of cardiovascular experts. Models were constructed to predict readmission risks at 30, 60, and 90 days. Seven machine learning algorithms, including XGBoost, CatBoost, LightGBM, RandomForest, Lasso, Ridge, and SVC, were used to develop the prediction models, and model performance was assessed using the area under the receiver operating characteristic curve (AUC). The SHapley Additive exPlanations (SHAP) method was employed to interpret the model results, clarifying the impact of each feature on the model and providing visual representations.

Results: In the prediction models for 30-day, 60-day, and 90-day readmissions, XGBoost achieved the best performance with AUC values of 0.910, 0.913, and 0.887, respectively. Other models such as CatBoost (AUC = 0.896, 0.906, and 0.885), LightGBM (AUC = 0.897, 0.904, and 0.885), and RandomForest (AUC = 0.864, 0.889, and 0.896) also demonstrated good predictive capabilities. SHAP analysis

revealed that glycated hemoglobin (at admission), left ventricular ejection fraction, creatinine clearance (at discharge), NT-proBNP, troponin T (at admission), and diabetes were the five most important features influencing readmission risk. The study also developed nomograms to predict readmission risk for discharged patients.

Conclusion: By integrating cardiovascular expert experience with the recursive feature elimination algorithm, the readmission prediction model developed in this study for the vulnerable period of heart failure exhibited excellent performance. The application of the SHAP method enhanced the interpretability of the model, assisting clinicians in identifying risk factors associated with HF readmission and thus enabling the formulation of personalized treatment strategies. This advancement enables the formulation of personalized treatment strategies, enhancing the management of patient medication therapy.

The roles and responsibilities of healthcare professionals in collaborative medication reviews: A Delphi consensus study

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Background: Collaborative medication reviews (CMRs) have become more common, but the roles and responsibilities of healthcare professionals (HCPs) involved are still unclear, weakening CMRs' effectiveness and scalability. Clarifying division of duties of HCPs is vital in implementing pharmacotherapy, and determining how each profession's special expertise could best be utilized in care teams. The goal has been to change healthcare structures and clinical pathways to support and facilitate transition towards collaborative practices. Driving forces for these interprofessional practices are safety and effectiveness: they are found to be safer and more effective for providing care than traditional physician-centric practice.

Purpose: The aim of this study was to create evidence for defining the roles and responsibilities of physicians, nurses, and pharmacists involved in collaborative medication reviews.

Methods: The study was conducted using the Delphi consensus method with two interprofessional expert panel rounds in September–December 2020. The preset consensus rate was 80%. Experts defined the roles and responsibilities of HCPs in CMR using predefined duties (n=24) which were based on the systematic international and national inventory of medication review definitions. The first Delphi round reported the expert panel consensus on 1) the HCPs primarily responsible for performing each duty, and 2) the HCPs that could perform the duty instead of/in addition to the HCP primarily responsible for it. The second round focused on defining the HCPs that could perform the duties in an ideal situation with sufficient infrastructure and resources. The expert panel (n=41) involved 12 physicians, 13 pharmacists, 10 nurses, and six information management professionals. The rounds' response rates were 66–76%.

Results: The highest consensus was reached for physicians' roles and responsibilities. These duties were based on the Finnish legislation regarding prescribing, deciding to continue or discontinue a medication, and confirming medication changes. Nurses' most clearly defined duties pertained to implementing physicians' clinical decisions, such as performing follow-ups. The most explicit consensus on pharmacists' duties was obtained for medication counselling which is consistent with the statutory duties of pharmacists in Finland. The second-round findings yielded almost the same result as the first round, confirming the quite fixed division of roles and responsibilities. Thus, ideal infrastructures and resources alone do not necessarily lead to changes in the division of labour. The ideal situation findings, however, indicated a slight shift towards shared duties so that pharmacists could be involved in care team responsibilities previously carried out in close collaboration between physicians and nurses.

Conclusions: This Delphi study defined the roles and responsibilities of HCPs in CMRs providing guidance for clarifying division of duties for future development of CMR practices. Healthcare is moving towards collaborative practices, which will allow for the further development of HCPs' duties. In the future, it will be necessary to research further how the roles and responsibilities of HCPs are evolving and how they can meet society's needs, not forgetting the global healthcare workforce shortage.

A review of the role of artificial intelligence in pharmacovigilance and patient safety in Egypt

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Background information: Pharmacovigilance (PV) is crucial for maintaining drug safety by recognising, assessing, and minimising adverse drug reactions (ADRs). In Egypt, the healthcare system faces unique challenges, including a growing population, increasing prevalence of chronic diseases, and a high burden of infectious diseases. Traditional PV techniques, which depend on manual documentation, are time-consuming, susceptible to human errors, and may not be sufficient to handle the volume and complexity of data generated in Egypt's healthcare system. Artificial Intelligence (AI) is providing a solution through automating data analysis, improving ADR identification, and increasing adherence to regulations. AI technologies such as machine learning (ML), natural language processing (NLP), and big data analytics can facilitate faster and more accurate drug safety observation, ultimately enhancing patient results and healthcare efficiency in Egypt.

Purpose: The purpose of this study is to explore how AI and ML technologies can perform drug safety monitoring by detecting adverse drug reactions (ADRs) from various data sources, revealing unknown patterns. AI can also facilitate real-time pharmacovigilance. This is particularly crucial in Egypt where patient populations are diverse and polypharmacy is now more common. AI driven models are being used to predict adverse drug reactions (ADRs), identify drug-drug interactions (DDIs), and improve the general effectiveness of pharmacovigilance procedures.

Methods: To enhance drug safety monitoring and problem detection, a number of important AI techniques can be applied.
1.Natural language processing (NLP): NLP aids in extracting and analyzing adverse drug reactions from unstructured data sources such as scientific studies, medical records, and even social media. This is particularly useful in Egypt, where a significant portion of healthcare data may be in Arabic, requiring language-specific NLP models.
2.Machine Learning (ML): ML algorithm improves signal detection and risk assessment by identifying patterns in large datasets, enabling the prediction of potential ADRs. This is of great importance to the Egyptian healthcare system, gathering vast amounts of data from both public and private healthcare providers.
3. Deep Learning: This technique can enhance the detection of rare and unidentified adverse drug reactions by investigating complex relationships between medications and adverse events using neural networks.
4. Robotic process automation (RPA): RPA can streamline routine tasks such as gathering information, case entry, and regulatory reporting, reducing the manual workload and increasing efficiency in Egypt's pharmacovigilance processes.

Results and conclusion: Automating pharmacovigilance processes marks an assortment of outcomes that significantly affect the field, offering an abrupt change in how adverse events are managed and analyzed. There are various outcomes that solve the challenges of pharmacovigilance such as: enhanced efficacy in possessing data, increased accuracy in reporting adverse effects, recognized error reduction and cost savings, and improved patient safety. In conclusion, Automated pharmacovigilance not only improves the efficiency of data analysis but also contributes to enhancing data quality, ensuring that regulatory requirements are met and patient safety is prioritized throughout the drug development lifecycle.

Pharmacist prescribing support for antiviral drugs for new Coronavirus infections in outpatient fever clinics

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Introduction: Novel coronavirus infection (COVID-19) is an emerging infectious disease that was reported as an endemic pneumonia in Wuhan, Hubei Province, China, around December 2019.
In Japan, oral monuravir (M) was launched in December 2021, nilmatrelvir/ritonavir (N) in February 2022, and encitrelvir (E) in November 2022.
N should be reduced to half the usual adult dose for patients with moderate renal dysfunction, and dosing is not recommended for patients with eGFR less than 30mL. N and E have a wide variety of contraindications and precautions for concomitant medications, so it is essential to check the medications taken when prescribing.
M and E are also contraindicated in women who are pregnant or possibly pregnant.
We report a retrospective study of prescribing support provided by pharmacists for COVID-19 antiviral drugs in the outpatient fever clinic of the Daidainooka Clinic (this clinic) after confirming age, gender, medications taken, and renal function.

Method: Survey period: one year from December 5, 2023, when the clinic began providing outpatient services, to December 4, 2024.
Target patients: Patients who visited our outpatient fever clinic
Survey items: age, gender, coronavirus antigen test results, renal function, medications taken, prescribed antiviral medications

Results: Of the 235 patients who visited our fever outpatient clinic, 83 (27 males and 56 females) had positive coronavirus antigen tests.

Of these, 39 patients were prescribed antiviral drugs (10 N, 9 M, and 20 E). Six patients had known renal function values, and only one of the patients for whom N was prescribed. There were 5 patients (5 N, 4 E, duplicates) who were taking contraindications. Of these, three patients were prescribed M, one was followed-up without prescription, and the remaining was conditionally prescribed E. Of the 9 patients prescribed M, 6 were female with a median age of 65 years (53-97) and of the 20 patients prescribed E, 12 were female with a median age of 70 years (26-89).

Consideration: As an outpatient clinic for fever, many of the patients were first-time visitors to our clinic. So, we estimated renal function with reference to "Estimated Glomerular Filtration Rate (eGFR) by Age in Japanese" by the National Health Insurance Association.

A 21-year-old male patient was taking Sporexant (S), a contraindicated drug. However, his clinical symptoms required a prescription for E. Since the half-life of S is about 12 hours, the blood concentration at the time of prescription was determined to be about 1/3 of the peak. This clinic pharmacist called the dispensing pharmacy and requested guidance from the patient and his family regarding the S to take a break from the medication. All women who visited the outpatient fever clinic answered "no" or "none" to the "pregnancy or possibility of pregnancy" item in the medical questionnaire conducted at the clinic.

Conclusion: Pharmacists' prescribing support to physicians and medication orientation to patients for oral COVID-19 medications can be beneficial.

Does medicine optimisation work for older people from ethnic minority communities with polypharmacy and their informal carers in primary care?

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Background: For many older people from ethnic minority communities (EMCs) in the UK, managing multiple medications is a daily challenge, often compounded by language barriers, health knowledge gaps, and systemic barriers. Medicine optimisation (MO) plays a crucial role in ensuring that medications are safe, effective, and aligned with patients' needs, yet achieving this can be complex. Informal carers (spouses, children, and relatives) become the hidden backbone, supporting medication adherence, advocating for patient needs, and navigating healthcare systems. However, their voices remain unheard in research and practice. This study explores how, why, and under what circumstances MO works (or doesn't work) for older people from EMCs and their carers in UK primary care. By identifying the mechanisms influencing MO, this ongoing study aims to generate evidence-based recommendations to inform pharmacy and primary care practices.

Method: A realist evaluation was adopted, involving semi-structured interviews with older people (aged 60+) from EMCs and their informal carers. Data are being collected and analysed iteratively using Context-Mechanism-Outcome (CMO) configurations, informed by an earlier realist review. Analysis is in progress to explore how contextual factors impact medication adherence, and older person-carer interactions with their practitioners.

Results: While data collection and analysis are still in progress, emerging themes highlight key contexts and mechanisms that shape MO in primary care. Many older people from EMCs struggle to understand complex medication instructions, often feeling excluded from decision-making. This leads to reliance on family, friends, or non-medical sources, increasing the risk of misinformation and suboptimal medicine use. Additionally, religious and cultural beliefs strongly influence attitudes toward medications, illness, and healthcare interactions. Some older people view illness as God-given, believing recovery is in divine hands, leading to hesitation or delays. Others may see reliance on medicine as a lack of faith in spiritual healing, affecting adherence. Some older people may be hesitant to take medications containing alcohol or gelatine-derived products due to religious dietary restrictions, leading to delayed or modified adherence. Others may prioritise traditional remedies over prescribed medicines, reflecting deep-rooted cultural practices.

Language barriers may result in misunderstandings and reduced trust between older people, carers, and practitioners. Some carers report difficulties in advocating for medication changes, while others express concerns about side effects that go unaddressed.

Informal carers often experience emotional and physical stress, juggling multiple medications alongside work and caregiving duties. Many feel underprepared and report limited structured support from their practitioners and the system in primary care.

As interviews and data analysis continue, CMO configurations will be refined to provide deeper insights into how MO can be improved for older people from EMCs and their carers. The final analysis will inform practical recommendations for primary care practitioners.

Conclusion: This study highlights the complex interplay of cultural, religious, and systemic factors influencing MO. Understanding the language barriers, health knowledge gaps, and medication beliefs is key to improving adherence and patient-practitioner engagement in primary care.

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Potential cost-effectiveness of pharmacist-led benzodiazepine deprescribing for elderly

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Introduction: Benzodiazepines (BZD) is associated with increased risk of falls in elderly, and the severe consequences of falls include hospitalization and mortality. Findings of pharmacist-led BZD deprescribing service showed high acceptance rate of deprescribing. The objective of this study was to evaluate the potential cost-effectiveness of pharmacist-led BZD deprescribing in elderly from the perspective of public healthcare provider in Hong Kong.

Methods: A one-year decision tree was designed to simulate outcomes of a hypothetical cohort of elderly on BZD with (1) pharmacist-led deprescribing service, and (2) usual care. Model inputs were obtained from published literature and public data. Model outcome measures were quality-adjusted life year (QALY) loss and direct medical cost. Sensitivity analyses were conducted to evaluate robustness of model results.

Results: In base-case analysis, the deprescribing group was less costly (HKD9,425 versus HKD9,464) (USD1=HKD7.8) with lower QALY loss (0.02367 versus 0.02373) when compared to usual care group. Relative risk of falls with BZD and relative risk of acceptance of deprescribing were the two most influential factors identified in sensitivity analysis. At a willingness-to-pay of 3-time GDP per capita of Hong Kong (1,186,926 HKD/QALY), the deprescribing group remained cost-effective if the relative risk of fall with BZD was >1.40, and the relative risk of acceptance of BZD deprescribing was >1.76.

Conclusion: Pharmacist-led BZD deprescribing service for elderly appears to save both QALYs and direct medical cost in Hong Kong. The cost-effectiveness of deprescribing service is subject to the risk of falls with BZD and relative acceptance of BZD deprescribing by the service.

A systematic review of pharmacist-administered paediatric vaccinations in low- and low-middle-income countries.

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Introduction: Vaccines are among the most life-saving health interventions in human history and prevent an estimated 3.5-5 million deaths globally each year. However, the United Nations Children's Fund estimates that 25 million children globally miss routine vaccines annually. The World Health Organization's Immunization Agenda 2030 includes a strategic priority for integration of life course vaccination in all member states. This strategic priority includes establishing "integrated delivery touchpoints" for vaccinations administered to patients of all ages. In many countries pharmacies are effective vaccination delivery touchpoints but information about pharmacy services in low- and low-middle-income countries (LMICs) is limited. The objective of this work is to describe published literature regarding pharmacist-provided vaccination services for paediatric patients in LMICs.

Methods: A systematic literature review was conducted utilizing methods from the Cochrane Handbook for Systematic Reviews and the Preferred Reporting Items for Systematic Reviews and Meta-Analyzes reporting guidelines. Articles found in PubMed, Cochrane Central Register of Controlled Trials, Cumulative Index to Nursing and Allied Health Literature, Web of Science, Embase, and Medline were reviewed for eligibility based on several criteria: studies must have been available in English and published between January 1 2005 and June 5 2024; studies must have occurred in LMICs, defined using the World Bank country classification list; pharmacy personnel must have been directly involved in the vaccination process; and studies must have included vaccination services for paediatric patients ages 12 years or younger.

Results: One hundred eighty-two articles were identified from six databases and grey literature. After eligibility criteria were applied, a total of five studies from four different countries were included, representing Ethiopia, India, Jordan, and Ukraine. Two studies evaluated pharmacy readiness to administer vaccinations. Results showed that a lack of vaccine storage capabilities, sufficient funding and resources, and vaccination training programs were barriers to administering vaccinations in pharmacies. Three studies described the role of the pharmacist as a vaccinator. A study from the Ukraine identified that although pharmacists are not legally allowed to administer vaccinations, there is a need to increase education about vaccinations and pharmacists would be well-positioned to address this need. A study from India demonstrated the value of having a clinical pharmacist involved in the vaccination process. The study pharmacist was engaged in providing information to the patients' guardians and results showed an increase in guardian knowledge, attitudes, and practice after meeting with the pharmacist. A study from Jordan showed that the public generally had a positive opinion about pharmacists administering vaccinations. The majority also agreed or strongly agreed they would be willing to allow a pharmacist to vaccinate their children.

Conclusions: Few publications exist describing paediatric vaccination services provided by pharmacists in LMICs, despite substantial need for a larger vaccination workforce. Pharmacies have repeatedly proven themselves as effective integrated delivery touchpoints, providing accessible points

of care for patients globally. Expanding pharmacist vaccination services could increase the number of available vaccinators and reduce low paediatric vaccination rates in LMICs.

Rural community vaccination barriers during the COVID-19 pandemic

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Introduction: People living in rural communities of the United States have lower vaccination rates than their urban counterparts. Previous research has indicated this rate is as much as 40% lower in rural communities. Despite wide availability of vaccines and immunization services, outbreaks of vaccine-preventable diseases continue to occur. Rural populations experience increased disparity of care for both general healthcare services and access to routine vaccines. This research sought to evaluate the opinions of people who live and work in rural areas regarding barriers to COVID-19 vaccine uptake. Having a better understanding of factors contributing to lower vaccination rates in rural areas could aid public health officials in being prepared to address future pandemics.

Methods: A semi-structured qualitative key informant interview design was utilized by researchers to gather opinions from University Extension staff in Washington State. Interview transcripts were analyzed using the Theory of Planned Behavior (ToPB) framework to evaluate COVID-19 vaccination-related intentions and motivational factors that the Extension staff observed among rural populations in their communities. University Extension has 40 locations in Washington State, including one office in every county and one located on the Colville Native American Reservation. Researchers chose to interview representatives from University Extension because they work and often also live in rural communities throughout the state. A semi-structured interview script was developed and piloted. Extension staff from each of the 40 locations were contacted via email and invited to participate. Resulting transcripts were coded using qualitative coding methods and organized into the constructs of the ToPB. These research methods were found to be exempt from the need for board review by the Institutional Review Board at Washington State University.

Results: Interviews were conducted with 21 participants representing 34 out of the 40 Extension offices during Fall 2023. Using the ToPB constructs, nine barriers were identified. Attitude-related barriers included the following: inherent social distancing in rural location negating vaccine necessity; lack of early vaccine availability in rural locales; concerns regarding ineffectiveness of the vaccine; and inadequate dissemination of vaccine information to non-English language speakers and those with limited access to technology. Subjective norm barriers included the following: perception of exclusion of rural populations' unique needs during design and implementation of vaccine mandates; exertion of social pressures on rural individuals' vaccine uptake decision; and highly visible breakdown in standard trust in core community institutions and leadership. Barriers related to loss of perceived behavioral control included vaccine mandates impacting self-perceived loss of autonomy and limitations in vaccine technology information impacting perception of vaccine safety.

Conclusions: This research sought to identify factors among rural community inhabitants that influence their choice to become vaccinated against COVID-19. Results showed this issue was multifaceted and involved personal feelings of autonomy, a breakdown of trust in governmental and public health organizations, and inadequate provision of information. By identifying barriers from the COVID-19 pandemic, future outreach efforts can be designed to improve intention and ultimately lead to vaccination.

Behavioural skills in community pharmacy: Exploring their role in patient care and interactions from the perspectives of patients and pharmacists

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Background information: As the role of pharmacists continues to evolve, the acquisition of behavioural skills is crucial in providing person-centred care. Behavioural skills, often referred to as non-technical skills, are essential for decision-making, collaborative working, and building rapport between pharmacists and patients. While the importance of these skills in pharmacy practice is widely acknowledged, research is needed to better understand which behavioural skills experienced pharmacists apply during patient consultations and how these skills influence patients' overall experience of care.

Purpose: This qualitative study aims to explore the perspectives of patients and pharmacists on behavioural skills, focusing on understanding their perceptions, expectations, and alignment on key behavioural skills in pharmacy practice.

Method: As part of the interim phase, qualitative data were collected through a focus group discussion with seven experienced community pharmacists from Perth. Further data collection is planned for March and April 2025 and will include additional focus groups with pharmacists and semi-structured interviews with community pharmacy patients across Australia. The interview guide, developed from a preliminary literature review, was refined by the research team and field experts to ensure clarity and relevance. Open-ended questions and prompts were used to explore participants' perspectives on behavioural skills in a community pharmacy setting. With participants' prior consent, all focus group discussions and interviews will be audio-recorded. The initial focus group was transcribed verbatim and checked for accuracy. GitMind software was used to classify, sort, and manage the data. Reflexive thematic analysis was employed to analyse the data, following these steps: (1) preliminary exploration of the data through transcript review and memo writing; (2) coding by segmenting and labelling relevant text; (3) developing themes by grouping similar codes; (4) connecting and interrelating these themes; and (5) constructing a narrative based on the findings.

Interim Results: The interim analysis of the focus group indicated that participants view behavioural skills as intrinsic qualities shaped by early life experiences and family. However, these skills can be developed through self-reflection and professional growth. Participants highlighted the importance of real-world experiences in learning behavioural skills, stressing the need for more practical training and placements in university settings. Key behavioural skills identified include effective communication and interaction techniques, such as establishing patient needs through open-ended questions, explaining the purpose of the interaction for transparency, creating a relaxed environment, and reducing tension. Building patient trust was seen as crucial, with empathy and humanising the patient at the core of the interaction. One pharmacist stated, "[…] they [patients] are not a disease, they are not a condition, they are not a piece of paper. They are a person." Cultural sensitivity and contextual understanding were considered essential, particularly in recognising cultural differences and understanding patient contexts, such as age, illness, and mental health.

Conclusion: By understanding pharmacists' and patients' perceptions, expectations, and alignments on behavioural skills, we can ensure that future pharmacists develop the right competencies to meet patients' needs. This insight can help improve the quality of care, support pharmacists' professional development, and enhance the overall patient experience.

New indication, more use: Amplifying early positive signals for tirzepatide in Spain

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Introduction: Tirzepatide is a new dual GIP/GLP-1 receptor agonist, initially approved in Europe for the treatment of Type 2 Diabetes Mellitus and more recently for weight loss in adults with overweight and obesity. This active ingredient has a particular administration pattern. The starting dose for both indications is 2.5 mg once weekly, after 4 weeks, the dose should be increased to 5 mg once weekly. If necessary, the dose can be increased in 2.5 mg increments after a minimum of 4 weeks at the current dose. The recommended maintenance doses are 5 mg, 10 mg, and 15 mg. The maximum dose is 15 mg once weekly. Due to this regimen, a thorough assessment of its safety profile is necessary, and identifying early safety signals is crucial to minimizing risks.

This study aims to analyze suspected adverse drug reactions related to new indications for weight loss along with the indication in Type 2 Diabetes Mellitus reported through the national database of the Spanish Agency of Medicines and Medical Devices to detect new early positive signals.

Method: This is a data mining study following the Bayesian methodology applied by the Uppsala Monitoring Center, which belongs to WHO for searching positive signals in databases of suspected adverse drug reaction reports. Data of all reported adverse events for the chemical subgroup 'Other blood glucose lowering drugs, excluding insulins' (A10BX) from the national Spanish Agency of Medicines and Medical Devices repository were analyzed. In this database, information is reported following MedDRA terminology, and data was extracted in aggregated form by Preferred Terms (PTs). Suspected adverse events reported for repaglinide (ATC: A10BX02) were used as a control. The main outcome measures were early positive signals of adverse drug reaction candidates to be analyzed in specific clinical trials or post-marketing studies. The statistical analysis performed is based on a validated adaptation of the data mining Bayesian Confidence Propagation Neural Network (BCPNN) methodology extended to the multiple comparison setting. The threshold of the estimator false discovery rate (FDR) equal to or lower than 0.050 implies a positive signal for the active ingredient and a candidate to follow up. The adaptation consists of comparing each pair active ingredient-adverse event against all obtained for its specific ATC subgroup isolated from the entire database.

Results: The active ingredient-suspected adverse drug reaction pair with a clear signal was repaglinide-hypoglycaemia (FDR<0.001) reported in fact sheets and serving as a control for the method. Positive signals obtained for tirzepatide and not reported in the Summaries of Product

Characteristics were a wrong technique in the drug usage process (FDR=0.026) incorrect dose administered (FDR=0.040). It also obtained a positive signal for injection site erythema, which is reported as frequent in the technical brochure (FDR=0.048).

Conclusion: Early positive signals detected for tirzepatide and not reported in the Summary of Product Characteristics are strongly related to its drug administration and performance. These findings highlight the importance of adequate training in self-administration and monitoring for this treatment by healthcare professionals to avoid risks.

Developing pharmacist-led anticoagulation clinics in primary care settings in Qatar: A multiphase mixed-method study

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Introduction: Primary care is an integral part of the healthcare system. Patients have better accessibility and continuity of care. However, studies have reported low-quality warfarin management in these settings. Pharmacist-led anticoagulation clinics have evolved as an effective practice to improve anticoagulation control. Pharmacists demonstrated better outcomes compared to usual care. Hence, it has been recommended to implement this model in Primary Health Care Corporation (PHCC) health centres in Qatar. Our objectives were to assess the quality of warfarin management at PHCC and to explore the perceptions of key stakeholders about implementing a specialised pharmacist-led anticoagulation clinic in primary care settings.

Method: A multiphase mixed-method design was conducted between June and August 2023. The first phase was a retrospective cross-sectional study that assessed the quality of warfarin management by measuring the percentage of time-in-therapeutic range (TTR). In phase two, a convergent-parallel mixed-method study was conducted to fulfil the second objective. The quantitative strand explored the perceptions of patients, pharmacists, and physicians at PHCC through an online survey. The qualitative strand was a semi-structured interview with healthcare administrators. Inferential and descriptive analyses were performed as appropriate.

Results: The mean (SD) TTR of the 494 patients included in the study was 45.33% (17.52%). This was lower than the recommended 70% value (P<0.001). Pharmacists and physicians value the importance of the clinic. Training, cooperation, and established guidelines were shown to be the main facilitators. Lack of support from physicians and doubts from patients about the quality of care were the main barriers. Patients believe that the service will improve convenience and that appointments will be easier. Most believed that pharmacists would provide proper care; however, they preferred to be managed by their physicians. Healthcare administrators identify two main obstacles: staffing and availability of integrated INR monitoring devices. The main facilitators were effective communication and management support.

Conclusion: The management of patients taking warfarin at the PHCC is suboptimal. Stakeholders believe that a pharmacist-led anticoagulation clinic could be an effective strategy to ensure safe and effective therapy. Actions are needed to maximise facilitators and overcome barriers to implementing the clinic.

The cost of treating selected psychiatric conditions from the provider's perspective in a public tertiary academic hospital in South Africa

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Introduction: Mental health's role in achieving global development goals is increasingly recognised. Understanding the costs of psychiatric conditions is crucial for decision-making and budget allocation in resource-limited settings. As South Africa transitions to the National Health Insurance (NHI) fund, this study aims to assess the costs of treating outpatient psychiatric conditions at a public tertiary institution.

Objectives: To determine the direct cost of every procedure involved in diagnosing, investigating, managing, and treating the selected psychiatric conditions for outpatients at a tertiary public hospital's psychiatric clinic.

Methodology: The study employed a retrospective quantitative approach, using data from patient files at a public tertiary hospital in Gauteng. Data were captured in Microsoft ExcelTM and analysed in SPSS®. Direct medical costs were assessed using a micro-costing method to determine the yearly average total cost of care per psychiatric patient. Ethics approval (SMUREC/P/411/2023:PG) and permission to conduct the study were obtained.

Results: Schizophrenia and bipolar disorder account for over two-thirds of diagnoses, with schizophrenia (38.13%) being

the most expensive to treat at R7,248.25, followed by bipolar disorder (29.14%) at R5,762.10 per patient annually. Anxiety disorders and depression cost R4,853.14 and R4,792.79 per patient annually. Treatment of adverse effects was generally low, except for schizophrenia, which had higher associated costs. The cost of consumables was negligible, while supportive care therapies, like cognitive behavioural therapy, added a moderate cost, with psychiatric medications as the main cost drivers across the four psychiatric conditions.

Conclusions: The high cost of treating psychiatric conditions highlights the need for continued research into more effective and affordable treatment options. A comprehensive cost-benefit analysis considering the long-term implications of each condition, including productivity loss and quality of life, would provide a more refined understanding of the economic burden of psychiatric conditions.

Tablet administration and associated factors in elderly dysphagic patients in Norwegian nursing homes

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Background: Dysphagia has a higher prevalence among the elderly. Older adults with swallowing difficulties often resort to methods to facilitate tablet swallowing, with tablet crushing being the most common solution. However, many are unaware of which tablets can be crushed, potentially leading to reduced treatment adherence due to diminished drug efficacy or enhanced side effects.

Aim: This study aimed to investigate how elderly dysphagia patients administer their tablets and identify any associations between tablet intake and factors such as age, gender, education, and polypharmacy. The findings are intended to guide nursing home staff and pharmacists in ensuring safe medication management.

Method: A cross-sectional study was conducted using a quantitative approach, with a digital survey created via Google Docs. The questionnaire included questions on medication use by dysphagia patients, their administration methods, and adherence. It was distributed to 25 nursing homes. Data were analyzed using chi-square tests.

Results: The survey was completed by 13 elderly dysphagia patients from various nursing homes. Chi-square analysis revealed no significant associations between sociodemographic variables (age and education) and tablet administration methods among dysphagia patients. However, significant associations were identified between gender and the frequency of tablet crushing ($p = 0.02$), as well as between the number of medications and tablet crushing ($p = 0.031$). The findings highlight that dysphagia affects the intake of solid oral medications, with tablet crushing being the most common practice.

Conclusion: Dysphagia significantly impacts the administration of solid oral medications, with tablet crushing as the most frequently used intervention. However, inappropriate crushing of extended-release or enteric-coated tablets can alter drug release profiles, potentially compromising safety and efficacy.

Pharmacists' role in reducing medicine waste: Barriers, solutions, and sustainable practices in Norwegian community pharmacies

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Introduction: Medicine waste poses a significant challenge with economic and environmental consequences. Pharmacists play a crucial role in mitigating this issue through medication management, patient counselling, and policy implementation. Understanding pharmacists' knowledge, attitudes, and practices regarding medicine waste is essential for identifying challenges and developing targeted solutions. This study explores these aspects among Norwegian community pharmacists and pharmacy students, focusing on key contributing factors and strategies for promoting sustainable pharmacy practices.

Method: A cross-sectional survey was conducted using an anonymous online questionnaire distributed to pharmacists and pharmacy students across Norway. The questionnaire comprised 21 items categorised into five thematic areas: demographic background, knowledge, attitudes, practices, and recommendations. A total of 202 responses were collected. Quantitative data were analysed using regression and chi-square tests to assess correlations and trends. A comparative literature review supplemented the findings to contextualise the results.

Results: Most respondents (55%) perceived reducing medicine waste as "very important". However, only 22.3% reported prioritising it in practice due to resource and time constraints. Key contributors to medicine waste included excessive dispensing (78.2%), patient non-adherence (61.9%), and overprescription (55.9%). Pharmacists identified potential solutions, such as reducing packaging sizes (66%), increasing pharmacist training (66%), and implementing improved disposal routines (46%). Awareness of antibiotic waste and bacterial resistance was high (73%), but this awareness did not correlate significantly with prioritisation efforts.

Conclusion: While pharmacists acknowledge the importance of reducing medicine waste, systemic barriers hinder its prioritisation in practice. This study shows the need for targeted training, regulatory interventions, and public awareness initiatives to encourage sustainable medicine management in community pharmacies. Future research should evaluate the long-term impact of these interventions to optimise waste reduction strategies within pharmacy practice.

A multisite implementation-efficacy trial of a community pharmacist-led model of collaborative care for medication assisted treatment for opioid dependence: 6-month outcomes of the EPIC-MATOD trial

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Introduction: Opioid dependence treatment which includes methadone, buprenorphine, and buprenorphine-naloxone (previously commonly referred to as Medication Assisted Treatment for Opioid Dependence [MATOD]), is considered the gold standard for treatment for opioid use disorder. Australia faces a critical challenge with access to opioid dependence treatment, particularly in regional areas where treatment shortages are amplified. We aimed to assess the outcomes of a collaborative care model for opioid dependence treatment where community pharmacists work to their full scope of practice, in partnership with prescribers. The current study reports outcomes of an implementation-effectiveness trial of the EPIC-MATOD model, to address knowledge gaps regarding how a prescriber-pharmacist collaborative model could be implemented in an Australian context, and used to inform the development of similar models of care in other states or countries. Specifically, we aimed to:

1.Evaluate clinical effectiveness outcomes following the implementation of EPIC-MATOD in community-based settings.
2.Gather knowledge on requisite factors for implementation, such as time, resources and communication systems.
3.Assess the cost per patient of delivering care using the EPIC-MATOD model, including how it compares to current treatment and its effects on health care service use.
4.Assess the acceptability of the model from the perspective of the prescriber, pharmacist, and patient.

Methods: Community pharmacists and prescribers were recruited from the south-eastern suburbs of Melbourne, Victoria, Australia, to take part in a prospective, multisite, implementation-effectiveness trial. Patients received collaborative prescriber/pharmacist care over a 6-month period, with outcomes compared to a non-randomised comparison group receiving usual care. Data was collected using a mixed methods approach with outcomes mapped to the RE-AIM framework. A health economics evaluation established time and costs associated with collaborative care.

Results: Collaborative care provided comparable outcomes on retention, with retention in the control arm (n=44; 89.8%) not significantly different to the intervention arm (χ2(1)=1.745, p=0.187). There was no significant difference in the number of missed doses at 6 months (ATE=3.68, SE=9.16, 95% CI: [-14.27, 21.63], control mean = 15.40). Similarly, there was no significant differences between groups on substance use or mental or physical health outcomes. Collaborative care was associated with significant increases in treatment satisfaction and quality adjusted life years (QALYs) and was cost-effective when compared to treatment as usual. The model was implemented with relatively high fidelity, with high levels of satisfaction among pharmacists, prescribers, and patients. Considerations for broader implementation included pharmacist workload, the need for secure communication software, and a mechanism to remunerate pharmacists for their time providing clinical care.

Conclusion: Pharmacist-led collaborative care for opioid dependence is feasible and acceptable and can provide an at least equivalent standard of care to usual care. Further research is required to establish how collaborative care can maximise prescriber capacity at scale.

Clinical Trial registration: ACTRN12621000871842

Advancing pharmaceutical immunization services through continuing education in community pharmacies

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Immunization is a key strategy for preventing diseases, disabilities, and mortality across all ages. Pharmacies serve as accessible healthcare facilities, providing opportunities to enhance vaccination programs. The International Pharmaceutical Federation (FIP) highlights the growing role of community pharmacies in expanding global vaccination coverage.

The College of Pharmacists of Costa Rica recognizes the importance of pharmacists, pharmacies, and professional organizations in this field. Aligned with its principles and regulatory mandates, it has implemented initiatives through the project "Development of Pharmaceutical Services in Immunization from Community Pharmacies: Contributing to Public Health in Costa Rica."

Objective: To develop a continuing education strategy to strengthen pharmaceutical immunization services in community pharmacies within the comprehensive project.

Method: The project focused on five key areas targeting professionals and the general public. Two areas specifically addressed continuing education for pharmacists, including developing webinars and a modular training program on immunization-related pharmaceutical services. The project ran from 2020 to 2024.

Results: Webinars were conducted between 2021 and 2023 in collaboration with specialists. Topics included available COVID-19 vaccines (three webinars), influenza vaccination, the pharmacist's role in immunization, vaccine counterfeiting prevention, vaccination of pregnant women and nursing children, and immunization in older adults. A total of 756 participants attended.

A self-paced modular training curriculum was also developed, covering immunization fundamentals, best practices in cold chain management, and pharmaceutical immunization services. Each module lasted four weeks, totaling 12 weeks. The program was launched from September to December 2024, with 28 participants in the first module, 16 in the second, and 9 in the third. Other sessions are planned for 2025.

Conclusions: The College of Pharmacists of Costa Rica's continuing education initiatives covered various aspects of pharmaceutical immunization services. Findings highlight the importance of professional organizations in supporting immunization services in pharmacies.

Comprehensive projects are essential for strengthening pharmacists' roles in public health and improving national vaccination coverage.

Advancing hospital pharmacy in Sri Lanka: An online survey on pharmacists' perspectives on their roles in public sector hospitals

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Background: Pharmacy is a vital component of healthcare, and pharmacists play a key role in ensuring the safe, effective, and appropriate use of medicines. The role of pharmacists is well-established in developed countries. Yet, pharmacists in Sri Lanka play a limited set of roles. Identifying the existing gaps is timely to enhance the profession's alignment with global standards.

Purpose: This study aimed to assess the perspectives of government hospital pharmacists on their professional roles within the government-sector hospitals in Sri Lanka.

Method: An online survey was conducted among registered pharmacists working in government-sector hospitals in Sri Lanka from September 2024 to February 2025. A validated questionnaire covering socio-demographics and pharmacists' role perceptions was adapted from a Pakistani version, following an assessment of content validity for the Sri Lankan context. Descriptive analysis was used to interpret the responses. Ethical approval was obtained from the Ethics Review Committee, Faculty of Allied Health Sciences, University of Peradeniya, Sri Lanka.

Results: A total of 121 pharmacists from all nine provinces and various hospital types participated, giving a response rate of 36.4%. The participants included 79 females (65.3%) and 42 males (34.7%), with age distribution ranging from 25 to 57 years. Pharmacist-doctor interactions on medications were common, with 89.3% of pharmacists reporting direct interactions with doctors. These interactions primarily focused on drug availability queries (90.7%). Other interactions were centred around questions on drug alternatives (61.1%), drug dosage (64.8%), side effects (17.6%) and drug interactions (22.2%).

A part of the survey assessed pharmacists' expectations regarding their professional roles within hospitals. All pharmacists (100%) expressed a strong expectation to educate patients and caregivers on the safe and appropriate use of medicines. A majority of pharmacists were expected to dispense and confirm the accuracy of medicines provided to patients (98.3%), collaborate with other healthcare professionals to facilitate patient care (94.2%), participate in ward rounds (84.3%), and conduct formal medication reviews (86.8%). Furthermore, they expected to monitor prescriptions for dose accuracy (98.3%), contraindications (92.6%), and drug interactions (93.4%).

Pharmacists were widely recognised as reliable sources of medication information by other healthcare professionals (88.4%), and 65.3% were actively involved in patient counselling. A majority (74.4%) expressed willingness to take personal responsibility for addressing medication-related issues, and pharmacists regularly communicate with doctors when they encounter clinical problems with prescriptions (83.5%). However, challenges identified were perceived patient reluctant to accept expanded pharmacy services (22.3%), resistance from doctors regarding pharmacist involvement in medication management (44%), insufficient time to engage with doctors on patient medication concerns (34.7%) and lack of confidence in training to work with doctors on medicine-related issues (57.0%) and clinical knowledge (20.7%). The majority of pharmacists (94.2%) reported that introducing a 5-year Pharm-D program in Sri Lanka would help develop more competent pharmacy practitioners.

Conclusion: This study highlights Sri Lankan pharmacists' readiness for an expanded role in healthcare. Addressing

existing barriers and enhancing clinical education could empower pharmacists to contribute more effectively to patient care.

Hydroxyurea therapy in Sickle Cell disease patients: Availability, adherence and treatment outcomes

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Introduction: Sickle Cell Disease is a significant global health issue, predominantly affecting individuals of African descent. It is the most common inherited blood disorder in children, with potential to impact critical organs. Hydroxyurea is a key medication in Sickle Cell Disease management, with high adherence improving patient outcomes and preventing complications.

Purpose: This study aimed to assess hydroxyurea therapy in Sickle Cell Disease patients; availability, adherence and treatment outcomes.

Methods: The study was conducted in four phases. Phases 1-3 were conducted in the hospital setting and phase 4 in the community setting. Phase 1 involved a hospital-based cross-sectional study at the SCD clinic, Komfo Anokye Teaching Hospital from May 3 to October 10, 2022. A semi-structured questionnaire based on the 10-item Medication Adherence Rating Scale was administered to randomly selected patients and caregivers. Phase 2 was a retrospective assessment of 256 patient medical records with data extracted from August 24th 2022 to January 31st 2023. Phase 3 included qualitative interviews with healthcare professionals at the SCD clinic, conducted between May 12 and December 22, 2023. Phase 4 was a community-based cross-sectional study involving registered Community Pharmacists across Ghana from August 13 to November 6, 2022. Data were analyzed using STATA version 16, employing descriptive statistics, Chi-square tests, and ordinal logistic regression. Clinical parameter differences before and after Hydroxyurea initiation were assessed using the Wilcoxon Signed Rank test, while interviews were transcribed and thematically analyzed.

Results: In Phase 1, 302 patients participated, with a mean age of 11.08 ± 6.72 years, and 273(90.4%) had caregivers. The SS genotype was predominant (237, 78.48%), and 86 (28.48%) of participants reported complications, with severe chest pain being the most common (59, 68.60%). Hydroxyurea therapy was used by 192 (63.58%) participants, with 155 (81.58%) citing high cost of Hydroxyurea as a major challenge. Almost two-thirds of the participants on HU 119 (61.98%) were adherent. Education level, marital status, complications, and perceived benefits of Hydroxyurea were significantly associated with adherence. Phase 2 revealed that 143 (55.86%) of patients were male, with a mean age of 8.84 ± 4.19 years. Pain episodes were the most frequent complication experienced by 113 (44.14%) patients. The Wilcoxon test indicated significant reductions in acute chest syndromes, painful crises, hospitalizations, and blood transfusions post-Hydroxyurea initiation. Phase 3 identified financial burden and access issues as key barriers to Hydroxyurea use, with healthcare providers suggesting patient education, streamlined medication access, and government intervention to address these challenges. In Phase 4, 362 pharmacists participated, with 351(96.96%) aware of Hydroxyurea's role in managing Sickle Cell Disease. While 332(91.71%) pharmacists recognized Hydroxyurea's efficacy in reducing crises, challenges such as high cost, access difficulties, and fluctuating prices were noted.

Conclusion: Hydroxyurea significantly reduces acute chest syndromes, painful crises, hospitalizations, and transfusions. However, high costs and procurement challenges hinder access and adherence. Education, marital status, complications, and perceived benefits influence adherence. Addressing barriers and improving pharmacists' education are critical for optimizing Sickle Cell Disease care in Ghana.

Enhancing adolescent guidance: Communication practices for over-the-counter analgesics in Norwegian pharmacies

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Background: Recent reports indicate a high use of over-the-counter (OTC) analgesics among Norwegian adolescents. Pharmacy employees may play a crucial role in guiding adolescents on the correct use of these medicines, which requires effective communication skills.

Purpose: This study aimed to explore the communication about OTC analgesics in Norwegian pharmacies from the perspective of both pharmacy employees and adolescents.

Method: The data were collected anonymously from 432 adolescents (aged 13–18) and 1630 pharmacy employees using digital questionnaires. The adolescents' questionnaire was distributed through school principals across Norway (strategic selection), while the pharmacy employees' questionnaire was distributed via the website of the Norwegian Pharmacy Association. The data was analysed using descriptive statistics in SPSS.

Results: Among the adolescents, 51 % expressed a desire for unsolicited counselling about OTC analgesics at the pharmacy, while 43 % preferred to receive counselling only if they requested it. Still, 20 % of adolescents found it challenging to ask for help. A majority of 56 % indicated they would be more open to counselling if pharmacy employees initiated the dialogue with unsolicited information. In contrast, only 21 % of the pharmacy employees reported that they generally (> 90 % of cases) initiated a dialogue with adolescents who did not request information. The perception that the adolescents were in a hurry or busy with other activities was the most frequently cited reason for not offering information, with 78 % of employees rating this as the most or second most important reason. However, only 7 % of adolescents reported being in a hurry when visiting the pharmacy.

Conclusion: The findings highlight a significant gap in communication between pharmacy employees and adolescents regarding OTC analgesics, with many adolescents being positive towards more proactive engagement from pharmacy staff. Enhancing pharmacy employees' confidence in initiating dialogues about the use of OTC analgesics could improve the guidance provided to this age group.

Enhancing asthma and COPD management: Aligning pharmacy services with patient needs and expectations

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Background: Asthma and chronic obstructive pulmonary disease (COPD) are common diseases that increase morbidity, reduce quality of life and result in high healthcare costs. Treatment is often compromised by poor adherence to inhaled medications and incorrect inhalation techniques. Pharmacist-led services can improve these aspects, but their success depends on meeting patients' expectations and needs.

Purpose: This study aimed to identify asthma and COPD patients' experiences, needs and expectations for pharmacy follow-up services.

Method: Semi-structured interviews were conducted with 10 user representatives for patients with asthma and COPD in Norway. The interviews were audio-recorded, transcribed, and analysed using deductive thematic analysis.

Results: The key treatment challenges reported by the user representatives were non-adherence, inhalation technique issues, unmet information needs, and insufficient therapy response. Follow-up in Norwegian pharmacies was described as inconsistent, with varying employee knowledge and a lack of openness to patient perspectives. Insufficient resources for follow-up and inadequate privacy at the pharmacy counter were also noted. The representatives called for greater discretion, more information on new drugs and treatment guidelines, and regular checks of inhalation techniques.

Conclusion: Addressing the identified challenges and aligning pharmacy follow-up with patients' expectations and needs can probably improve asthma and COPD management. Enhanced pharmacist-led interventions focusing on adherence, inhalation techniques, and comprehensive patient education, are essential for better health outcomes.

Patients' experiences with Medisinstart: Benefits and areas for improvement in a Norwegian pharmacist-led service

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Background: Medisinstart is a Norwegian pharmacist-led service in pharmacies for patients starting on new cardiovascular medications. The service includes two consultations and is aimed at improving adherence and reducing medication-related problems.

Questionnaire surveys have shown high patient satisfaction with Medisinstart, but they offer limited insight into the patients' experiences and why they were satisfied or dissatisfied.

Purpose: This study aimed to identify patients' perceptions of Medisinstart's benefits and areas for improvement.

Method: Semi-structured interviews were conducted with 10 patients (18+ years) who recently used Medisinstart. The interviews were audio-recorded, transcribed, and analyzed using deductive thematic analysis.

Results: Patients appreciated the availability of pharmacies, the accessible medicine information, and the free service. They felt more confident and received useful advice for remembering their medication. Suggestions for improvement included more individualised information, written summaries of consultations, and the option for more than two consultations. Some patients also desired the service to be available in other languages.

Conclusion: Medisinstart is well-received by patients for its accessibility, free service, and helpful advice, which increases their confidence in managing medications. However, there is room for improvement in providing more personalized information, written summaries, additional consultations, and multilingual options to better meet patient needs.

Effectiveness of Chinese herbal medicine on haematological outcomes in colorectal cancer patients receiving irinotecan-based chemotherapy: A retrospective propensity score matching-adjusted analysis

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Introduction: Haematological toxicity, including leukopenia and anaemia, is a major concern in colorectal cancer (CRC) patients receiving irinotecan-based chemotherapy. Chinese herbal medicine (CHM) is widely used as a complementary therapy; however, its impact on chemotherapy-induced haematological toxicity remains unclear. This study investigates the association between CHM use and changes in white blood cell (WBC) and haemoglobin (Hb) levels in CRC patients receiving irinotecan-based chemotherapy.

Method: A retrospective cohort study was conducted using electronic medical records from a medical center in southern Taiwan. Eligible patients were diagnosed with CRC and received irinotecan-based chemotherapy between January 2021 and August 2024. CHM users were defined as those who received CHM prescriptions from hospital-based traditional Chinese medicine physicians for at least three days within 30 days of their first irinotecan-based chemotherapy session. This threshold was selected to define CHM exposure while maintaining an adequate sample size. To address baseline imbalances, propensity score matching (PSM) was performed using a 1:4 nearest-neighbor approach with a caliper of 0.1. Matching variables included age, gender, cancer diagnosis, irinotecan regimen, granulocyte colony-stimulating factor (G-CSF) use, and baseline WBC and Hb levels. Standardized mean differences (SMD) < 0.1 indicated adequate balance. Primary outcomes included WBC and Hb changes before and after chemotherapy, as well as the incidence of severe leukopenia (WBC < 3.0 × 10^3/uL) and anaemia (Hb < 8.0 g/dL). PSM-adjusted linear regression was used for continuous outcomes, and logistic regression was applied to assess haematological toxicity risk. Multiple comparisons were adjusted using Bonferroni and False Discovery Rate (FDR) corrections. A post hoc power analysis assessed the study's ability to detect clinically significant effects.

Results: After PSM, 67 patients were included, with 18 (26.9%) classified as CHM users. Baseline characteristics were balanced (all SMD < 0.1). PSM-adjusted regression showed no significant differences in WBC changes (β = 0.727, 95% CI: -0.294 to 1.748, p = 0.160) or Hb changes (β = -0.110, 95% CI: -0.645 to 0.424, p = 0.682) between CHM users and non-users. Logistic regression indicated no significant association between CHM use and severe leukopenia (OR = 0.53, 95% CI: 0.07 to 2.35, p = 0.467) or severe anaemia (OR = 2.09, 95% CI: 0.13 to 33.45, p = 0.633). After multiple comparison adjustments, no statistically significant associations were identified. Post hoc power analysis showed a power of 0.431 to detect a moderate effect size (Cohen's d = 0.5), indicating potential underpowering to detect clinically meaningful effects.

Conclusion: This study did not provide sufficient evidence to support a significant association between CHM use and reduced chemotherapy-induced leukopenia or anaemia in CRC patients receiving irinotecan-based chemotherapy. These findings are limited by the small sample size, potential unmeasured confounders, and variability in CHM prescriptions. The statistical power was below the conventional threshold (0.8), suggesting that non-significant results may be due to Type II error. Despite this, the role of CHM in chemotherapy-induced haematological toxicity warrants further investigation in larger trials.

Holistic pain management: Leveraging real-world data in the context of the analgesic ladder

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Introduction: The World Health Organization analgesic ladder offers a three-step framework for pain management that recommends escalating from non-opioids to opioids for acute to moderate-to-severe cancer pain. Clinical guidelines for musculoskeletal (MSK) pain vary globally but typically advocate a multimodal approach with non-pharmacological treatments as a first-line option and an emphasis on patient education. Despite moderate-to-strong evidence supporting the effectiveness of non-pharmacological treatment options, little research has been done to support an understanding of how they might be better incorporated into the analgesic ladder for MSK and conditions other than cancer. Purpose: We used data from two real-world studies

concerning different types of pain (headache and MSK) – Global Self-Healing Survey and The Impact of Headache and Over-the-Counter Medication Treatment (IMPACT-TED) to highlight the importance of an appropriate approach for different types of pain management.

Methods: We utilised a case study methodology to analyse data from: 1) A cross-sectional online survey conducted among healthcare professionals (HCPs) treating MSK pain (n=398) and consumers experiencing MSK pain (n=1805) in six countries, and 2) IMPACT-TED, a prospective, observational, eDiary-based study that investigated the effect of over-the-counter (OTC) pain medications – ibuprofen 400 mg+caffeine 100 mg; dipyrone 1 g; or ibuprofen 100 mg+caffeine 40 mg on headache intensity and their benefits on cognitive and functional parameters in headache sufferers (n=32,623) in Germany, Brazil, and Japan, respectively.

Results: The Global Self-Healing Survey revealed that the consumers often turn to OTC medications (52%), followed by rest (42%) and other non-pharmacological therapies (25%) for managing acute pain. Those in France (34%) and Australia (33%) tend to seek information on MSK pain management from pharmacists, frequently on physical therapy (43%) and chiropractic (47%). About 44% consumers agreed that using non-pharmacological approaches before pain medications result in lower overall pain levels. Among HCPs, 61% expressed confidence in integrating non-pharmacological treatment approaches into global pain management guidelines; 87% of pharmacists were confident that these approaches promote body's self-healing. Early intervention with non-pharmacological therapies was seen as crucial, with 50% of consumers and 71% of HCPs believing it can prevent acute pain from becoming chronic.

The key findings of IMPACT-TED study indicated that OTC analgesics significantly reduced the mean numeric rating scale score from headache onset to 2 hours post-treatment, ranging from 5.8 to 2.4, 6.5 to 2.3, and 4.9 to 1.9 ($P<0.0001$); 17.3%, 29.7%, and 26.0% of participants reported no pain at 2 hours post-treatment in Germany, Brazil, and Japanese, respectively. In the 3 countries, 91% achieved also meaningful (≥20%) improvement in all functional and cognitive parameters from baseline.

Conclusion: Owing to the growing interest and confidence of consumers and HCPs in non-pharmacological therapies for managing some specific acute pain, integrating these therapies at initial steps of the ladder should be considered to optimise pain management. Also, the effectiveness and safety profile of non-opioid OTC analgesics are often associated with significant improvement of associated cognitive and functional parameters. Our findings highlight the role of pharmacists in bridging non-pharmacological and pharmacological therapies through credible integration guidance to promote consumer's holistic well-being.

Integrating self-healing into musculoskeletal pain management: Role of pharmacists

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Introduction: Musculoskeletal (MSK) disorders are a leading cause of global disability, encompassing conditions such as muscle pain, as well as joint pain and osteoarthritis. The most affected locations are the back, shoulder, neck, and legs. Current pharmacological treatments for managing MSK pain primarily target symptom relief rather than underlying causes. Given the potential side effects and temporary relief provided by pharmacological treatments, alternative therapies (non-pharmacological treatments) are being integrated into global guidelines for MSK pain management. These approaches complement pharmacological treatments by promoting the body's self-healing mechanisms. Purpose: This study aims to highlight the evolving role of pharmacists, as healthcare professionals (HCPs), in providing evidence-based information on integrating alternative treatment options for MSK pain management.

Method: A cross-sectional global survey was administered online to people (n = 1805; aged 18–65 years) who experienced MSK pain within past 12 months and HCPs (n = 398; aged 18–65 years) who managed MSK pain, including general practitioners/primary care physicians, functional movement/physical therapists, and pharmacists from the United States (US), France, Australia, Germany, China, and Brazil. The study population was pre-recruited from two sources: people with pain from the Ipsos iSay platform and HCPs from the M3 USA Corporation's database. The survey explored sociodemographic characteristics, experiences with pain, and perspectives regarding specific treatment modalities.

Results: Across countries, people with MSK pain expressed confidence in complementary treatment approaches for pain management; 74% believed that alternative therapies are becoming more important globally, with minimal side effects, and 82% believed that reduced reliance on pain medications can minimize side effects. Further, 74% believed that early intervention using multiple alternative therapies can prevent pain from becoming chronic. More than half (53%) agreed that their HCPs have given them helpful information on using

the alternative approaches to relieve pain. Those in France (34%) and Australia (33%) tend to seek information on pain management from pharmacists, frequently for information on physical therapy (43%) and chiropractic (47%).

Pharmacists (83%) were more likely than other HCPs (general practitioners, 77%; physical therapists, 80%) to believe that conventional pharmacological therapies address symptoms more than the underlying causes. Although most pharmacists (78%) endorse alternative therapies, believing that they can promote the body's self-healing ability, the efficacy of these therapies remains a major concern, especially to those in the US.

Conclusion: People with MSK pain expressed their interest in integrating non-pharmacological treatment approaches for MSK pain management. Complementing these findings, pharmacists expressed their belief in the benefits of alternative therapies and that conventional therapies have limitations. They play a crucial role in bridging the gap between conventional and complementary therapies by providing credible guidance on their appropriate integration. Strengthening pharmacists' knowledge and confidence in integrative non-pharmacological approaches may enhance education in people with pain, support self-healing, and promote a more holistic approach to MSK pain management.

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Antifungal Agents trends of utilization, spending, and prices in the US Medicaid Programs: 2009 – 2023

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Introduction: Fungal infections, particularly among immunocompromised individuals, present significant challenges due to rising incidence rates, treatment costs, and increasing resistance to antifungal agents. This study evaluates trends in antifungal use among Medicaid beneficiaries, focusing on prescribing patterns, costs, and pricing to optimize therapy.

Methods: Using the national Medicaid outpatient pharmacy claims data collected by the US Center of Medicare and Medicaid Service, a retrospective drug utilization analysis was conducted for antifungal medications from 2009 to 2023. Two therapeutic classes superficial fungal infections (SFIs, like tioconazole, miconazole, clotrimazole, ketoconazole) and invasive fungal infections (IFIs, like amphotericin B, fluconazole, itraconazole, caspofungin) prescription data were extracted based on study drug NDC codes and categorized based on therapeutic use. The study examined time-series secular trends of annual utilization (number of prescriptions), reimbursement, and reimbursement per prescription (proxy of drug price) trends, along with the market share. Joinpoint regression analysis was employed to detect changes in the direction of these trends.

Results: Overall Medicaid utilization of superficial fungal infection (SFI) medications increased from 3.95 million prescriptions in 2009 to 6.16 million in 2023. Nystatin was the most frequently utilized SFI agent, while Fluconazole emerged as the most commonly prescribed agent for invasive fungal infections (IFIs). In 2022, a notable spike occurred in the number of prescriptions for both SFIs and IFIs. Medicaid's total expenditure on SFI medications rose from $121.9 million in 2009 to $155 million in 2023, while spending on IFI medications fluctuated substantially, peaking at $156.8 million in 2022 before declining to $80.7 million in 2023. Among SFI medications, Efinaconazole, Oxiconazole, and Naftifine were the most expensive agents throughout the study period. Following its market introduction, Isavuconazole exhibited a sustained price increase, significantly influencing the pricing of other IFI agents, and contributing to reduced costs.

Conclusion: The substantial rise in antifungal utilization and spending underscores the growing financial burden on Medicaid, emphasizing the need for policy interventions to manage costs and generic drug substitution while ensuring equitable access to these essential treatments.

An evaluation of pre-post antimicrobial stewardship intervention studies utilizing the Kirkpatrick model across healthcare education levels: A scoping review

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Introduction: Antimicrobial stewardship (AMS) education plays a crucial role in promoting the rational use of antibiotics among healthcare professionals (HCPs) and students. Despite its significance, the effectiveness of AMS educational interventions in driving behavioral change and improving clinical outcomes remains unclear. The Kirkpatrick Model, which assesses educational interventions across four levels (reaction, learning, behavior, and results) provides a structured approach to evaluating AMS education. This study systematically examines AMS educational interventions using the Kirkpatrick Model to determine their effectiveness, identify existing gaps, and propose future directions for optimizing AMS education.

Method: A scoping review was conducted following the Joanna Briggs Institute (JBI) framework. A comprehensive search was performed across nine electronic databases to identify studies published between January 2010 and December 2024. Eligible studies employed a pre-post-intervention design and targeted HCPs or students. Outcomes were classified into the four levels of the Kirkpatrick Model: reaction (Level 1), learning (Level 2), behavior (Level 3), and results (Level 4).

Results: A total of 63 studies were included, mapping 192 outcomes across the Kirkpatrick Model: reaction (23.96%), learning (26.56%), behavior (26.04%), and results (23.44%). The majority of studies (76%) targeted HCPs, with a strong focus on behavior modification (Level 3) and clinical outcomes (Level 4). In contrast, interventions aimed at undergraduate students (24%) primarily measured knowledge acquisition (Level 2). Didactic teaching methods (54%) were effective for knowledge transfer but had limited impact on long-term behavioral and clinical improvements. Online learning modules (30%) provided flexibility but required interactive components for sustained engagement and behavior change. Multi-faceted interventions (16%) demonstrated the highest potential for achieving comprehensive educational outcomes but were underutilized.

Conclusion: AMS education interventions effectively enhance knowledge and engagement; however, improvements in behavioral and clinical outcomes remain necessary. Multi-faceted approaches that integrate didactic, online, and interactive strategies are more effective in bridging educational gaps and fostering long-term behavioral change. Future research should focus on designing hybrid interventions, utilizing rigorous study designs, and assessing long-term impacts on patient outcomes. Strengthening AMS education with comprehensive, behavior-focused interventions will be essential in equipping future prescribers with the necessary skills to combat antimicrobial resistance.

Digitalization in curriculum of pharmaceutical science education

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Background: The rapid integration of digital technologies into healthcare requires pharmacy education to evolve, equipping future pharmacists with essential digital skills. Digitalization in pharmacy includes artificial intelligence (AI), digital health, and the broader digital transformation of pharmacy practice.

Objective: This study explores the rationale for integrating digitalization into pharmacy curricula, outlines its core components, and examines global and national (Türkiye) approaches to digital pharmacy education.

Materials and Methods: This descriptive qualitative study analyzed pharmacy curricula available on the official websites of universities in various countries. Course syllabi were reviewed to identify the inclusion and scope of digital health-related content, such as AI, health informatics, telepharmacy, and e-health. A detailed review of pharmacy faculties in Türkiye was also conducted to assess national strategies.

Results: Türkiye has made relatively proactive efforts to incorporate digital health into pharmacy education. However, challenges remain, including curriculum standardization gaps, limited qualified academic staff, the interdisciplinary nature of digital health, and digital inequities impacting access to education and tools.

Conclusion: Digital health literacy is vital for pharmacists in the 21st century. Addressing current barriers through curriculum alignment, faculty development, interdisciplinary cooperation, and investment in digital infrastructure is essential. These steps will ensure equitable access to digital resources and prepare future pharmacists to deliver patient-centered care, foster innovation, and advance the profession in a digital era.

Pharmacist-assessed adherence and quality of life in patients with epilepsy

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Introduction: Epilepsy is recognised as a prevalent chronic noncommunicable neurological disorder, affecting approximately 50 million individuals worldwide, across all age groups. Community pharmacists are uniquely positioned to improve medication adherence, a critical factor in preventing breakthrough seizures that can drastically affect patients' quality of life. The study aimed to enhance epilepsy management in Cyprus by identifying adherence gaps and providing a basis for targeted interventions by community pharmacists to improve patient health outcomes.

Method: The study was a thirteen-month quantitative research project, from September 2022 to October 2023, with ethical approval from the Cyprus National Ethics Committee.

Data were collected by a pharmacist-researcher through telephone interviews using tools translated into Greek. The primary instruments included the Morisky Medication Adherence Scale (MMAS-8), which assessed medication adherence with eight items, the Readiness for Change Ruler, which evaluated willingness to change habits, the Medication Adherence Report Scale (MARS-5) for further adherence assessment, and the QOLIE-31 for quality of life evaluation in epilepsy patients. Demographic data were also collected for analysis. Analysis was conducted using SPSSv28. The study involved 85 participants, with a 62.96% response rate. The group comprised 55.3% males and 44.7% females, aged 18-34 (21.2%), 35-64 (54.1%), and over 65 (24.7%). Education levels were primary (37.6%), secondary (42.4%), and tertiary (20.0%). Epilepsy onset was before 18 years for 45.9% and at 18 or older for 54.1%; Medication use showed 57.7% on monotherapy and 42.3% on polytherapy; 14.1% used benzodiazepines. Medication adherence (MMAS-8) was high (8) for 55.3%, medium (6 to <8) for 30.6%, and low (<6) for 14.1%; MARS-5 showed 70.6% adherent (≥4.8/5) and 29.4% non-adherent patients (<4.8/5). The Readiness for Change Ruler averaged 9.48, with 84.7% scoring 10. Quality of Life (QoL) averaged 75.3, with 80.0% scoring ≥60 (compared to mean QoL score in Europe and worldwide) and 71.8% scoring ≥70 (compared to mean QoL score in Greece and Cyprus). These results highlight participant characteristics and epilepsy's impact on life quality. Both adherence tools demonstrated a statistically significant association between adherence and QoL. Compared with mean average QoL scores in Greece and Cyprus, this association was supported by p=0.001, OR 7.125, 95% CI 1.899-26.729 (MMAS-8, high/medium Vs low adherence) and p=0.002, OR 4.826, 95% CI 1.738-13.401 (MARS-5, adherent Vs non-adherent). In comparison with the mean average QoL scores in Europe and worldwide, the association was indicated by p=0.043, OR 3.631, 95% CI 0.986-13.375 (MMAS-8), and p=0.017, OR 3.656, 95% CI 1.211-11.039 (MARS-5).

Conclusion: This study, the first of its kind in Cyprus, explored how pharmacists could implement more effective strategies and utilise techniques and tools for better-educating epilepsy patients. A limitation of the study was its reliance on self-reported data for assessing medication adherence and quality of life, which might have been subject to recall bias or inaccuracies. The findings indicated that improved medication adherence was achievable and underscored the pharmacist's active role in providing pharmaceutical care. The ultimate goals were to enhance the quality of life for epilepsy patients and to reduce deaths, accidents, injuries, and costs associated with non-compliance.

Exhaustive computational analysis of pyrimidine derivatives as GPR119 agonists for the treatment of Type 2 Diabetes Mellitus

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Background: Type-2 Diabetes (T2DM) is a long-term medical disorder characterized by Insulin deficiency and high blood glucose levels. Among other medication to cure T2DM, the review of the literature found that various Pyrimidine derivative act as an agonist for G-protein-coupled receptor 119 (GPR119) was proposed to control blood glucose levels by enhancing the function of pancreatic beta-cells and its mechanism of action with fewer adverse effects. In the present research work, in-silico investigations were carried out to investigate the potential of Pyrimidine analogue as an agonist to the protein target GPR119 receptor. We performed exhaustive molecular modelling and protein modelling methodologies such as homology modelling, molecular docking along with various drug designing tools such as 3D-QSAR and pharmacophore mapping to ascertain the design of better GPR119 agonists.

Results: On the basis of in-depth computational studies, we designed new pyrimidine moiety and analyzed them for GPR-119 receptor agonist and further explored the ADME properties. Designed compounds found to exhibit better predicted activities as compared to reference compound.

Conclusions: The current research on pyrimidine derivatives, using molecular docking, 3D-QSAR and Pharmacophore mapping demonstrated that the obtained computational model has significant properties and the designed molecules and Dataset from this model, produced antidiabetic compound against the target GPR119 i.e., compound 1S, 1Z and 1D with the docking score of −11.696, -9.314 and -8.721 respectively. The pharmacokinetics and drug-likeness studies revealed that these compounds may be the future candidate for the treatment of diabetes acting via GPR119 agonist mechanism.

Personalizing Enoxaparin therapy in pediatric patients: A Precision based approach using Anti - Factor Xa Monitoring and enhance therapeutic outcomes in low middle income countries

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Introduction: Enoxaparin, a low molecular weight heparin, is widely used in pediatric patients for thromboembolism prevention and treatment. However, optimizing dosing remains challenging due to significant variability in drug response. Unlike adults with well-defined guidelines, Pediatric patients exhibit unique pharmacokinetic and pharmacodynamics differences, including increased renal clearance and altered hepatic metabolism, resulting in a larger volume of distribution and faster LMWH clearance. However, routine monitoring of anti-factor Xa levels is often limited due to cost constraints which increases the risk of suboptimal therapy which may cause inadequate anticoagulation and thrombus progression, while supratherapeutic doses elevate the risk of bleeding complications.

Purpose: To evaluate the effectiveness of enoxaparin dosing as per different guidelines, in pediatrics patients, by assessing the proportion of patients achieving prophylactic or therapeutic anti-factor Xa levels and determining the optimal enoxaparin dosing strategy to improve the clinical outcomes and minimize adverse effects.

Methodology: A retrospective, cohort study was conducted on pediatric patients who have received enoxaparin in the last five years. Patients aged 0-16 years were included in the study receiving enoxaparin for both prophylactic and therapeutic purposes. A total of 372 patients receiving enoxaparin out of which 65 patients were evaluated for anti-factor Xa levels drawn 4-6 hours following subcutaneous administration of at least second dose of enoxaparin. Total patients were divided into five distinct groups i-e age < 2 months, 2 months to 1 year, age >1 year to 5 years, age > 5 years to 10 years and age group of age > 10 years to 16 years, to investigate the predictive relationship between the enoxaparin dose and anti-factor Xa levels to develop evidence-based dosing guidelines of enoxaparin in pediatric population. Patients above 18 years of age and those with no anti-factor Xa levels were excluded from the study.

Results: Most patients did not achieve therapeutic anti-Xa levels with the initial 1 mg/kg dose. Infants under 2 months (80%) and children aged 2 months to 1 year (73%) exhibited suboptimal responses due to higher metabolic rates, while children aged 5–10 years also required dose modifications. Older children (10–16 years) demonstrated better responses; however, 55% still required adjustments. A major limitation of this study was the lack of follow-up anti-Xa monitoring in many patients, primarily due to financial constraints, leading to empirical dosing and an increased risk of under- or over-anticoagulation. Notably, most patients underwent anti-Xa level testing only once due to cost-related limitations, emphasizing the need for an optimized initial dose that ensures a single measurement is sufficient to confirm prophylactic or therapeutic efficacy.

Conclusion: The findings underscore the importance of optimized initial dosing to minimize the need for repeated anti-Xa monitoring, ensuring both efficacy and cost-effectiveness in anticoagulation therapy.

Ensuring prescription accuracy in ambulatory care: A retrospective analysis of prescription elements appropriateness in a tertiary care hospital

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Background and introduction: Medications play a crucial role in disease prevention and treatment, but improper prescribing practices can lead to patient harm. International organizations, such as the World Health Organization (WHO), emphasize the need for standardized prescription drug use indicators to enhance medication safety. Pharmacists, as key members of the healthcare team, contribute significantly to prescription review and intervention. Despite their role, pharmacist interventions in outpatient settings remain underexplored.

Purpose: This study aims to analyze the completeness and accuracy of prescription elements in a tertiary care hospital, specifically in cardiology, neurology, and orthopedic specialties. The findings will highlight prescribing trends, identify gaps, and propose strategies to enhance prescription quality and patient safety.

Methods: A quantitative cross-sectional study was conducted, reviewing 300 prescriptions from the cardiology, neurology, and orthopedic departments. Prescription elements, including patient demographics, diagnosis, allergy documentation, directions for use, therapy duration, generic names, route, and rate of administration, were assessed. The data was analyzed to identify inconsistencies and deficiencies in prescription writing.

Results: Significant gaps were found in prescription completeness across all specialties. Key findings include: •Patient demographic details (weight and height) were missing in 95% of cardiology prescriptions and 97% in orthopedics.

•Diagnosis was absent in 91-95% of prescriptions.
•Allergy documentation was completely missing in all prescriptions.
•Directions for use were incomplete in 55-56% of cases.
•Therapy duration was not mentioned in 31-84% of prescriptions.
•Generic medication names were omitted in 66-80% of prescriptions.
•Route and rate of administration were missing in 30-100% of cases.
After the gap analysis PILOT CPOE was implemented in outpatient settings to reduce the hand written errors and incompleteness of prescription

Conclusion: The study reveals critical deficiencies in prescription writing that may compromise patient safety. Implementation of Computerized physician order entry system in outpatient settings will Enhance prescription completeness through standardized protocols Addressing these gaps is essential to optimizing healthcare outcomes and ensuring safer medication practices

Leveraging of artificial intelligence to enhance medication adherence: A pharmacy perspective

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Medication adherence is critical in promoting positive outcomes in care. However, studies point to a significant prevalence of nonadherence that could be intentional or unintentional. Therefore, the current study focused on the cases of medication nonadherence, establishing the associated factors and exploring the potential use of AI-based technologies to reverse the trends. The current study included both primary and secondary research, examining the existing literature to establish the potential use of AI to improve compliance. Based on the demographic analyses, the study showed that a significant proportion of the patients have limited understanding of AI technologies and their potential uses in healthcare, particularly in medication management. However, the results pointed to a willingness of the patients to embrace the use of AI, despite some patients expressing concerns over the potential privacy and safety implications. On this note, efforts to integrate AI in medication management should also focus on ethical use of these technologies. In particular, it is necessary to explore the safety issues expressed by the patients. Such interventions will make the AI tools safer and will equip the pharmacists with ideal mechanisms to track and strengthen medication compliance efforts.

Investigating structural features of curcumin-derived CK2 inhibitors for anticancer therapy: A 3D-QSAR, pharmacophore modelling, virtual screening, and molecular docking approach

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Introduction: Casein Kinase 2 (CK2), discovered as one of the earliest protein kinases, is a ubiquitous Ser/Thr protein kinase-specific to acidic environments. CK2 has been implicated in regulating diverse cellular processes and has been linked to the onset of various diseases, including cancer.

Method: Consequently, modulating CK2 function has emerged as a potential therapeutic strategy. However, currently, available CK2 inhibitors or modulators often lack sufficient specificity and potency.

Results: The results were validated through QSAR of curcumin derivatives, Pharmacophore modelling, virtual screening performed for filtered curcumin-like featured derivatives from the database, and Molecular Docking approaches. Since there is a solved crystal structure of high-resolution X ray crystal structures of Human protein kinase CK2 alpha in complex with ferulic aldehyde.

Conclusion: Also, structure-based virtual screening was performed against a total of 3253 compounds from different libraries, and only the top 4 best-hit compounds with exceptional docking scores exceeding > -7 kcal/mol (more than 7 kcal/mol) were screened and analysed. However, to validate their therapeutic potential, these compounds require in-vitro evaluation to assess their CK2 targeting ability.

Ethical dilemmas in dispensing nervous system medication: Justice, socio-availability, and adherence

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Therapeutic non-adherence in chronic diseases ranges between 36-49%, with even higher rates in elderly and polymedicated populations (1,2). In mental health, variability ranges from 23-70%, depending on the methodology. A study showed that the use of SPD significantly improved adherence,

reaching 98.9% compared to 73.5% in the control group (p = 0.001) (3)

Methodology: A PROM questionnaire was conducted with 59 patients who requested SPD at our pharmacy, aiming to assess their ability to manage medication and perceived difficulties in their treatment. The therapeutic groups analyzed included medications for the nervous system, hypertension, hyperlipidemia, and diabetes, as well as the total number of prescribed medications. A total of 39 responses were collected, and Pearson's correlation coefficient was applied to analyze the relationship between the difficulty in medication management, the number of drugs, and the different therapeutic groups.

Results: Nervous System Medications: These show the strongest correlation (r = 0.621) with medication management difficulty. This correlation is statistically significant ($p < 0.05$) and explains approximately 38.6% of the variability in management difficulty.

Total Chronic Medications: A moderate correlation (r = 0.385) was found, also statistically significant, but explaining only 14.8% of the variability.

Hypertension Medications: These show a weak positive correlation (r = 0.110), which is not statistically significant ($p > 0.05$).

Diabetes and Hyperlipidemia Medications: These present very weak and non-significant negative correlations, suggesting little to no relationship with medication management difficulty.

The most precise and strongest correlation is clearly observed between nervous system medications and medication management difficulty. It is more than 1.6 times stronger than the correlation with the total number of medications and significantly higher than with any other specific type of medication.

This evidence suggests that nervous system medications have a particularly significant impact on patients' ability to manage their medication, beyond the mere effect of polypharmacy.

Discussion: Possible Explanations for These Patterns Cognitive Side Effects: Nervous system medications frequently cause sedation, confusion, or cognitive impairment, directly hindering medication management (Culpepper et al., 2017).

Complex Regimen: Antipsychotics, antiepileptics, and other neurological drugs often require dose adjustments and frequent monitoring, increasing treatment complexity (Chapman et al., 2015).

Perceived Stigma: Taking medication for neurological or psychiatric conditions may be associated with social stigma, negatively impacting adherence (Corrigan et al., 2014).

Ethical Conflict for the Pharmacist

Principle of Beneficence vs. Non-Maleficence

Pharmacists have an obligation to provide treatments that benefit the patient, but dispensing medications that are unlikely to be taken correctly could indirectly facilitate potential harm.

Beauchamp and Childress (2019) define these principles as fundamental in bioethics, and in this case, they are in tension.

Justice as Equity in Outcomes

True equity may require additional efforts for populations facing greater difficulties, as Daniels (2007) suggests.

This issue can be described as socio-accessibility, meaning that true justice would require systems that identify high-risk patients (such as those on multiple nervous system medications) and provide additional support.

Ensuring not only access to medication but also the necessary tools to use it correctly according to individual patient conditions is essential.

Indispensable role of pharmacists in pre-end-stage renal disease (pre-ESRD) management: New prospects for health policy formulation

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Introduction: The increasing prevalence of dialysis patients has driven the need for pharmacists' involvement in the comprehensive care of individuals with chronic kidney disease. Additionally, polypharmacy—one of the fundamental causes of renal impairment—underscores the indispensable role of pharmacy practice in retarding the deterioration of renal function. High-quality pharmaceutical care and integrated medication reviews provide vital support for physicians and offer valuable insights for treatment plan optimization. With the implementation of a project developed by the Health Insurance Bureau, pharmacists are now able to actively participate in the care of patients with pre-end-stage renal disease (pre-ESRD) by providing prescription advice and health education. To investigate the benefits of this pharmacist-involved health policy, a retrospective study monitoring drug compliance and disease progression in pre-ESRD patients with polypharmacy has been conducted.

Method: In this study, patients enrolled in the pre-ESRD pharmaceutical care project who regularly used more than 10 medications were selected. Data were collected on Adherence to Refills and Medications Scale (ARMS) scores, the number of regularly used medications, and renal function indicators, such as serum creatinine levels (Scr), estimated glomerular filtration rate (eGFR), and urine protein-to-creatinine ratio (UPCR). The benefits of pharmaceutical care

were evaluated based on the differences in these data between patients' first-quarter and last-quarter visits in 2024.

Results: A total of 36 patients were included in this study. A remarkable decline in ARMS scores was observed (12.5, 48.6%). With pharmacists' assistance, patients gained a better understanding of the correlation between their medications and physical conditions and became more likely to collaborate with pharmacists to achieve better clinical outcomes. The number of regularly used medications also decreased (4.3, 25.6%), indicating successful disease control and more effective use of medical resources. In addition, reductions in Scr levels (0.2, 8.3%), eGFR (1.0, 2.6%), and UPCR (151.2, 16.7%) demonstrated that patients experienced minor loss or even slight recovery of renal function, thanks to the teamwork of pharmacists and other healthcare practitioners. Improvements in other parameters, such as HbA1c (0.2, 3.1%), LDL (11.0, 11.7%), and TG (16.0, 11.4%), indicate a significant advantage in the treatment of metabolic syndromes associated with renal insufficiency and highlight the potential for pharmacist intervention in other disease management.

Conclusion: Pharmaceutical care for pre-ESRD patients is critical. It not only delays the initiation of dialysis but also improves the quality of life for both patients and their caregivers. Moreover, meaningful pharmacist participation strengthens the sustainability of healthcare systems, enabling the Health Insurance Bureau to allocate resources more efficiently for urgent and complex treatments. These valuable achievements may also contribute to the advancement of other developing projects, further defining the crucial role and irreplaceable responsibilities of pharmacists in enhancing therapeutic efficacy, patients' well-being, and healthcare policies.

Occurrence of polypharmacy and its relationship with comorbidities: A descriptive cross-sectional study from a secondary care clinic setting in Sri Lanka

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Introduction: Polypharmacy is defined as the concurrent use of five or more medications by an individual patient. Polypharmacy is associated with increased adverse drug events, increased health expenditures, and issues in medication adherence. Sri Lanka is a Low Middle-Income Country (LMIC) providing free healthcare to all citizens and thus polypharmacy is a strain on Sri Lankan economy. Despite global attention on this issue, local data from Sri Lankan healthcare settings remain limited. Understanding the extent of polypharmacy and its relationship with comorbidities is important to improve patient health outcomes by optimally allocating available human resources.

Purpose: The objective of this study was to assess the extent of polypharmacy and the relationship between the number of comorbidities per patient and polypharmacy among patients attending a selected medical clinic in Sri Lanka.

Method: A descriptive cross-sectional study was conducted in a medical clinic of a selected secondary care hospital in North Central Province, Sri Lanka. The data was collected from August to September 2024 by a Bachelor of Pharmacy undergraduate. Informed written consent was obtained from the participants. Two hundred and eighty-three patients' prescription cards and clinic documents were examined for the study. Age, diagnoses, and current medication list were extracted using patients' documents. Verbal information was not obtained from the participants. Demographics, number of comorbidities, and number of medicines per patient were assessed. The occurrence of polypharmacy was determined in the sample. The correlation between polypharmacy and the number of comorbidities per patient was evaluated using Spearman's rank correlation. The study was approved by the ethics review committee, The Open University of Sri Lanka.

Results: A total of 265 participants' data was included in the final analysis (18 participants' information was excluded due to missing data). The mean age of the participants was 59.2 (±11.4) years, and 76.2 % of participants were females. The median number of diagnoses per participant was 2 (3-2) and the median number of medications per patient was 5 (6-4). Polypharmacy was observed in 60.4 % of patients. A statistically significant positive correlation was observed between the number of comorbidities per participant and the occurrence of polypharmacy ($r = 0.51$, $p < 0.01$).

Conclusion: The patients' disease conditions are complex, having multiple comorbidities. Their medication regimens are complex to manage multiple comorbidities. The findings highlight the occurrence of polypharmacy among the majority of patients in the selected patient group. A positive correlation between the number of comorbidities per patient and the occurrence of polypharmacy indicates that patients with more comorbidities were more likely to experience polypharmacy. Patients with multiple comorbidities need careful medication management to reduce inappropriate polypharmacy. Pharmacists can be well-placed in minimizing the risks associated with polypharmacy by optimizing drug regimens, and ensuring treatments align with rational prescribing practices. It will be a worthwhile exercise to resource limited setting like Sri Lanka.

Do demographic factors affect medication knowledge and adherence among bipolar disorder patients? Insights from outreach clinics conducted by National Institute of Mental Health, Sri Lanka.

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Background: Bipolar disorder (BD) is a chronic psychiatric disorder characterized by episodes of mania and depression. Medication adherence is a significant challenge in BD management which can contribute to frequent relapses, suicides, and prolonged hospitalizations. Medication knowledge plays a crucial role in adhering patients to the medication regimen. Medication adherence and medication knowledge can be affected by patients' demographic factors too. Pharmacists play a key role in improving medication knowledge and medication adherence to ensure treatment effectiveness among BD patients.

Purpose: This study aimed to evaluate the level of medication knowledge and medication adherence among patients with bipolar disorder attending outreach clinics conducted by National Institute of Mental Health (NIMH), Sri Lanka, and to assess the association of demographic factors with medication knowledge and medication adherence.

Method: A hospital-based descriptive cross-sectional study was conducted in five outreach clinics conducted by NIMH, Sri Lanka located in Pannipitiya, Modara, Kotahena, Rajagiriya, and NIMH itself, from January to September 2023. A total of 224 patients were registered as the study population. A sample of 142 patients were recruited to the study. The data was collected using an interviewer-administered questionnaire. A translated, validated questionnaire was used to assess the medication knowledge. Medication adherence was assessed using translated and validated Morisky Green Levin Medication Adherence Scale (MGLS-4). The medication adherence score ranges between 0-4. (Higher scores denote better adherence). Medication adherence was classified into three levels. They were low, (0-1 score), medium (2-3 score), and high adherence (score of 4). Collected data were analyzed using Statistical Packages for Social Sciences (SPSS) Version 21. Spearman rank correlation was used to assess relationships. The study was approved by the Ethics Review Committee, National Institute of Mental Health, Sri Lanka.

Results: Out of 142 patients, the majority were females (56.3%), Sinhalese (57.7%), married (71.1%), and unemployed (76.1%). Patient's mean age was 45.2 ± 9.6 years. Of the sample, 62.7% had high medication knowledge. A significant proportion of patients demonstrated medium to high medication adherence (74.6%). The patients' education level was positively correlated with medication knowledge (r=0.855, p<0.01) and medication adherence (r=0.843, p<0.01) while patients age was negatively correlated with medication knowledge and medication adherence (r=-0.783, p<0.01; r=-0.761, p<0.01). Any other demographic factors were not correlated with medication knowledge or medication adherence.

Conclusion: The findings highlight the impact of education and age on medication knowledge and medication adherence in BD patients. A majority of patients exhibited moderate to high medication adherence. A strong positive correlations were observed between patients' education level and both medication knowledge and medication adherence. Conversely, age was negatively correlated with medication knowledge and medication adherence. Enhancement in patients' education level may contribute to improved medication knowledge and medication adherence. Further, older patients with BD may require additional support to enhance their medication management.

The relationship between medication adherence and Fasting Blood Sugar level among diabetes patients on oral antidiabetics. An analytical cross-sectional study from Southern province, Sri Lanka.PPR-112

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Background: Diabetes is a chronic metabolic disorder characterized by elevated levels of blood sugar. There is a rise in prevalence of diabetes in Sri Lanka. Despite most patients using oral medicines for diabetes management, the majority complaint about suboptimal blood sugar levels.

Purpose: The aim of this study was to assess the relationship between medication adherence and Fasting Blood Sugar (FBS) level among diabetes patients on oral antidiabetics in a selected out-patient setting in Sri Lanka.

Method: A descriptive cross-sectional study was conducted in a medical clinic of a selected secondary care hospital in Southern province, Sri Lanka recruiting 317 diabetes patients on oral antidiabetics. Participants demographic data, antidiabetic medication adherence and FBS levels were collected using an interviewer administered questionnaire. Medication adherence was assessed using validated Sinhala translation of Brief Medication Questionnaire (BMQ). Eleven questions were assessed in scoring BMQ. A score of 0 offered for adherence and score of 1 offered for nonadherence. The total BMQ score ranged from 0-11 (Lower scores denote better adherence). The total BMQ score was classified into three levels. They were adherence (score of 0 – 2), probable adherence (score of 3 – 5) and nonadherence (score more

than 5). FBS levels were extracted from patients' available records (within one month period). FBS values between 70 - 130mg/dl were considered as optimum diabetes management. The relationship between medication adherence and FBS level was assessed using Pearson correlation. The study was approved by the ethics review committee, Teaching Hospital, Karapitiya.

Results: The majority in the participants were females (73.2%), aged ≥65 years old (47.6%) and married (97.5%). Most of them treated diabetes for 1-5 years (35.6%). Total BMQ score ranged from 0 to 6. Most individuals had probable adherence (61.2%) followed by adherence (37.9 %) and nonadherence (0.9%). FBS level was optimum in 48 % of the sample. A positive correlation was observed between total BMQ score and FBS level ($r=0.397$, $p<0.01$).

Conclusion: The BMQ score and FBS levels were moderately associated, highlighting the importance of medication adherence in achieving optimum FBS levels. Further studies should be planned to explore how pharmacists can be effectively utilized in improving medication adherence and ultimately achieve optimum diabetes control among oral antidiabetic users in Sri Lankan out-patient clinic setting.

Development and evaluation of a fall prevention flipchart as a pharmacist-provided counselling material

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Introduction: Medications are one of the modifiable risk factors contributing to fall. Those are commonly known as "Fall-Risk Increasing Drugs" (FRIDs) and are common among older people (OP). However, OP and their family caregivers (FCGs) are largely unaware of FRIDs and their risks in increasing the risk of fall (ROF).

Aim: The Fall Prevention Flip Chart was created and assessed to educate OPs and FCGs about FRIDs. Current existing literatures have shown lack of published and validated pharmacist-provided counselling materials worldwide that specifically included FRIDs.

Methods: The fall prevention flip chart adapted the Centres for Disease Control and Prevention (CDC) Development of STEADI-Rx framework incorporating suitable design for OP. The flip chart was content validated by a panel of 6 reviewers through the Patient Education Materials Assessment Tool (PEMAT). Evaluation of the flip chart, was done among 50 OPs and 50 FCGs in Felda Purun, a rural area located in Bera District, Pahang. Perceived knowledge of the participants were assessed prior to and after completing the flip chart counselling session through set of questionnaires.

Result: The fall prevention flip chart intervention led to significant improvements in knowledge ($p<0.001$) among both OP and FCG groups with both groups achieving high post-test scores across all measured domains.

Conclusion: The fall prevention flip chart is a vital, user-friendly tool that effectively educates OP and FCGs in Felda Purun. This eventually reducing falls and improving health outcomes, while also serving as a key resource for public health policy and community safety efforts. This flip chart also serves an important commitment towards OP and people living in the rural area equivalent to the Sustainable Development Goal of the United Nation, which to ensure that no one is left behind.

What services do people seek when they visit a community pharmacy primary care clinic?

Yazid Al Hamarneh[1], Darius Ramrattan[1], Ross Tsuyuki[1], Karen Sullivan[2], Bo Pan[1], Scot Simpson[1]

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Background: Community pharmacy primary care clinics were established to improve access to pharmacy services for assessment and management of common ailments and chronic diseases, point-of-care testing, and administration of medications by injection. As part of an ongoing assessment program, we report the characteristics of people who accessed the first clinic to open in Alberta and services they sought during the first seven months of operation.

Methods: This cross-sectional study examined information collected from self-reported intake forms submitted when individuals visited the clinic in Lethbridge, AB. Individuals seeking services between June 24, 2022 and January 31, 2023 were eligible for inclusion.

Results: There were 3305 people who visited the clinic 4962 times. They submitted 3831 intake forms with 4611 reasons for seeking care. Mean age was 32 years (range 0 to 96) and 62% were female. Almost one in three (32%) reported not having a family physician and 5% reported usually seeking medical care in an emergency room (ER) or urgent care clinic. Reasons for seeking care were: 79% Common Ailments (e.g., upper respiratory symptoms, urinary tract infections, ophthalmic symptoms, musculoskeletal pain); 16% Chronic Disease Management (CDM, e.g., diabetes, hypertension, hypothyroidism); 4% Point-of-Care Testing or Immunization; or <2% Other. Reasons for seeking care differed whether an individual had a family physician or not ($p<0.01$). CDM was

more frequently reported as a reason for the visit for people without a family physician (29%) compared to those with one (9%). In contrast, people with a family physician sought care for common ailments more frequently (86%) compared to those without one (63%). Of those who usually seek care in an ER or urgent care clinic, 25% of pharmacy clinic visits were for CDM while 69% were for common ailments.

Conclusions: The community pharmacy primary care clinic has improved access for people who do not have a family physician and supported those with a family physician. It is also likely that these clinics reduced some ER visits for primary care issues.

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Pharmacy professionals' contribution to the prevention, preparedness, response, and recovery of non-COVID outbreaks: Initial findings from a rapid systematic review

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Introduction: The World Health Organization (WHO) defines disease outbreaks as the occurrence of cases in excess of normal expectancy. They are usually due to infectious diseases, however, may occur following exposure to chemicals or radioactive materials. Examples of non-COVID outbreaks include widespread outbreaks such as H1N1 influenza, ebola, and local outbreaks such as measles in a school. Pharmacy professionals are well placed to undertake pharmaceutical public health roles in the management of outbreaks as part of the WHO emergency cycle of prevention, preparedness, response, and recovery. These activities can be at micro- (individual or patient-facing), meso- (regional or organisational) or macro- (national) levels.

Purpose: This review aimed to identify pharmacy professionals' contribution to the management of non-COVID outbreaks, classifying their roles according to the WHO emergency cycle and level of intervention.

Method: In February 2025 we searched Embase, Medline, and SCOPUS. Articles discussing pharmacy professionals' contributions or roles in the management of non-COVID outbreaks from 2014 onwards were included. The papers were screened, extracted, and assessed for risk of bias by one reviewer, with a minimum of 10% of decisions checked by a second reviewer. The protocol for the review was published on PROSPERO – CRD42024617152.

Results: Of the 1489 articles identified, 248 were screened for their title and abstract. Full text assessment was conducted on 168; most of the papers were narrative commentaries or descriptive case studies.

Outbreaks were identified across 53 countries, with the highest number of papers from the United States (55/168) followed by multi-nation papers (23) and China (9).

Specific disease outbreaks were reported in 97 papers, covering over 30 different diseases including influenza (23), mpox (16), ebola (13), zika (6), poisonings (4) and AMR, biohazards, measles and tuberculosis (3 each). A third of the papers (54/168) reported roles in non-disease specific general outbreaks, pandemics, and epidemics. Outbreaks due to contamination of pharmaceutical products were reported in 17 papers.

Most of the reported roles for pharmacy professionals were themed within the response phase of the WHO emergency cycle. Examples included supply of patient advice at micro-level, collaborating with regional partners for vaccinations at meso-level and development of national treatment guidance at macro-level.

Examples of roles themed as prevention included vaccinating, contributing to organisational infection prevention guidance, and employment within national health protection organisations. Preparedness examples included undertaking learning, organisational stock management of vaccine, and pandemic preparedness research.

Fewer roles reported could be themed as part of recovery. Examples included long-term management of poisonings, organisational level root cause analyses, and research to learn from previous outbreaks.

Conclusion: Pharmacy professionals have contributed to the management of outbreaks across the world. When themed within the phases of the WHO emergency cycle, most of the roles were related to response, followed by prevention and preparedness. Fewer roles were themed within the recovery phase. Most of the reported interventions were at micro-level. However, the pharmaceutical public health expertise of pharmacy professionals at meso-and macro-levels as well as within the recovery phase of the WHO emergency cycle appear to be under-utilised.

Pharmacists versus chatbot: Is there agreement in clinical decision-making for NSAID deprescribing?

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Introduction: Non-steroidal anti-inflammatory medications (NSAIDs) are frequently prescribed and used for managing mild-to-moderate pain. Inappropriate use of NSAIDs in older adults can result in negative effects, and deprescribing should be considered and suggested to all those with increased harms or decreased benefits. Decision-making process to deprescribe NSAIDs can be challenging for healthcare providers. Use of various artificial intelligence (AI) systems is becoming increasingly interesting as an aid in clinical decision-making. This study aimed to compare the clinical decision-making process regarding NSAID deprescribing between pharmacists and a dialogue-based AI chatbot GPT4 (ChatGPT-4), and assess AI's clinical judgement outputs.

Method: Two research team pharmacists evaluated NSAID deprescribing potential using data of community-dwelling patients using NSAIDs (n=111) from the Croatian cohort within the EuroAgeism H2020 ESR 7 project, and pre-established deprescribing criteria (lack of indication, safety concerns, inappropriate dose, inappropriately long use). Two other members of the research team created and tested AI-prompts to ensure AI-outputs were consistent and comparable to pharmacists' judgement. AI-prompts contained the same information pharmacists used for clinical judgement, and ChatGPT-4 was instructed to assess each presented patient in the same manner, assessing the overall need for deprescribing and each deprescribing criteria. Decisions made by pharmacists and ChatGPT-4 were compared for agreement rates and Cohen's kappa. Qualitative content analysis of ChatGPT-4's outputs was performed to assess the usefulness and clarity of AI-generated deprescribing judgments.

Results: Pharmacists would consider deprescribing NSAIDs to 74.80% of patients, while AI would suggest deprescribing to 79.30% of patients (agreement in 63.06% of cases). ChatGPT-4's level of certainty in deprescribing suggestions ranged from 60% to a 100%, with median of 90%. When it comes to specific criteria the results were as follows: for "lack of

indication" there were 74 agreed cases (66.67% agreement rate), for "safety concerns" 71 (63.97% agreement rate), for "inappropriate dose" 75 (67.56% agreement rate), and for "inappropriately long use" 62 agreed cases (55.85% agreement rate). There were 15 cases (13.51%) with complete agreement on all criteria between pharmacists and AI, 12 cases (10.81%) with discrepancies in judgement on all criteria, and three cases (2.70%) with difference in final deprescribing judgment but agreement on all specific criteria. Inter-rater reliability analysis showed fair agreement (κ= 0.297; p>0.001) between pharmacists and ChatGPT for the criterion of "inappropriate dose". There was no agreement for other criteria or overall deprescribing judgement. Qualitative analysis revealed 20.72% ambiguous outputs requiring additional prompts for the same patient case to get a conclusive AI-response. ChatGPT-4 suggested alternative pain management strategies for 90.09% cases, patient monitoring for 68.46%, medication review for 29.73%, and gastroprotection for 22.52% cases. Gradual tapering of NSAIDs was suggested in 22 instances, while immediate discontinuation was suggested for 18 cases, irrespective of NSAID type.

Conclusion: Moderate agreement was found between pharmacist and ChatGPT-4 in NSAID deprescribing. Findings suggest that while AI-tools could serve as a supportive aid in deprescribing decision-making, they should not replace clinicians' patient-tailored judgements. Further research is needed to refine AI's clinical reasoning process and explore potential benefits of integration into pharmacist-led deprescribing initiatives.

From knowledge to attitude: Designing and validating scales for understanding psychoactive substance consumption among university students

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Introduction: The misuse of psychoactive substances among university students has emerged as a pressing public health issue, particularly in Lebanon, where research on this phenomenon is limited. This study addresses the need for reliable instruments to assess the perceived knowledge and attitudes of university students towards various psychoactive substances. The primary aim was to develop and validate scales measuring these constructs, subsequently evaluating their psychometric properties within a sample of Lebanese university students.

Methods: A cross-sectional study design was employed, involving 414 university students recruited from diverse institutions across Lebanon during the academic year 2023-2024. Participants completed a self-administered questionnaire to anonymously collect data. The questionnaire was composed of questions relating to sociodemographics and financial status as well as questions designed to measure perceived knowledge and attitudes toward psychoactive substances. The scales were developed based on a thorough review of the literature and expert consultation to ensure content validity. To assess the validity and reliability of the newly developed knowledge and attitude scales, appropriate statistical methods were used, including exploratory factor analysis (EFA) and Cronbach's alpha. EFA was conducted to determine the underlying factor structure of the scales, while Cronbach's alpha was used to assess internal consistency reliability. Multivariate analysis was conducted to identify predictors influencing knowledge and attitudes towards psychoactive substances.

Results: Exploratory factor analysis identified two factors for the perceived knowledge scale that had an eigenvalue over 1, explaining a total of 51.4% of the variance. The model demonstrated adequacy, with a Kaiser-Meyer-Olkin measure of 0.864 and a significant Bartlett's test of sphericity (p<0.001). Additionally, the reliability of the scale items was high indicated by a Cronbach's alpha of 0.829. Similarly, the perceived attitude scale items converged over two factors, explaining a total of 58.78% of the variance. This model was deemed adequate as well, with a KMO value of 0.850 and a significant Bartlett's test of sphericity; and it exhibited good reliability with a Cronbach's alpha of 0.826. The study found that greater perceived knowledge was associated with students who had higher grades and those who were aware of the availability of psychoactive substances in inhalation form. However, there was no significant correlation between perceived knowledge and the attitudes of participants, as indicated by a correlation coefficient of r = -0.027 (p-value = 0.583). The multivariate analysis identified several predictors influencing knowledge and attitudes towards psychoactive substances, including academic year, financial status changes, presence of mental illness, and family history of substance-related issues.

Conclusion: The knowledge and attitude scales developed in this study demonstrated strong reliability and validity, positioning them as effective tools for assessing knowledge and attitudes associated with psychoactive substance consumption among university students. These scales can be valuable assets in the design and evaluation of drug education programs and behavioral interventions targeting this population.

The relationship between knowledge of multiple sclerosis, medication beliefs, access to care, and depression among MS patients: A cross-sectional study

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Introduction: Multiple sclerosis (MS) is an autoimmune disease that causes inflammation and nerve damage, which affects more than 2.8 million people worldwide. The disease typically appears between the ages of 20 and 40. Symptom relief and immunotherapy are the main treatment options; however, several barriers significantly impact health outcomes and quality of life. This study aimed to assess knowledge of the MS disease, access to care, medication beliefs, and depression among MS patients to determine the prevalence of depression among MS patients and its contributing factors.

Methodology: A cross-sectional study was conducted in Jordan from May to October 2024 at MS outpatient clinics (e.g., Al-Bashir Hospital, King Abdullah University Hospital, Princess Basma Teaching Hospital). Participants were invited to this study and voluntarily recruited after reviewing and comprehending the informed consent form. Data were collected through face-to-face interviews using a structured paper-based survey, including sociodemographic data, medication-related beliefs, knowledge of MS, access to care, and depression levels.

Results: This study included 200 MS patients with a median age of 36 years. The majority were female (70.5%), non-smokers (65%), and had health insurance (77.5%). More than half had higher education (58%) but low income (67%), and the average duration of diagnosis was 7.8 years. Nearly 80% were unaware of their MS diagnosed type. Beliefs about medications varied, with 22% accepting, 48.5% hesitant, 14.5% skeptical, and 15% apathetic about their meds. Knowledge about the nature of MS was high among participants; the vast majority agreed that MS is a non-contagious, incurable autoimmune disease that affects women more than men. Many expressed dissatisfaction about traveling long distances to obtain care. According to the screening tool, depression affected 58% of participants and was influenced by anxiety beliefs, lack of health insurance, and difficulty accessing care. Other factors, such as age, gender, body mass index, and disease duration, showed no significant relationships.

Conclusion: In conclusion, MS patients face various challenges, such as difficulties accessing care, which were associated with psychological factors such as depression. Improving patients' beliefs and knowledge about MS medications and enhancing access to care are critical to ensuring better and optimal treatment outcomes and reducing the risk of depression.

What matters most to pharmacists when implementing professional services in community pharmacy? A Q method implementation study

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Introduction: Professional services have been a part of community pharmacy's 'DNA' for decades in Australia. However, considerations of achieving implementation success and sustainment have often lacked consideration. Pharmacists primarily focus on "internal" aspects of service delivery, and a consideration of, external "outer setting" aspects and the service itself could be of benefit. The Consolidated Framework for Implementation research (CFIR) outlines five key domains for successful implementation: (inner setting, outer setting, the process of implementation, individual roles, and service characteristics). The aim of this study was to answer the research question: "To what extent do implementation factors align with the best possible implementation of professional services in community pharmacy?"

Methods: The Q method, characterised by evaluating people's subjectivity and clustering them into phenotypes was employed. On ethics approval, the CFIR informed the development of a set of statements (Q set), data collection and analysis. The Q set was derived from a literature scan and semi-structured interviews with selected pharmacists championing community pharmacy professional services from all Australian jurisdictions. The set of statements were rated on a 13-point forced grid scale (-6 to +6) and mixed-methods survey were employed to complete the understanding the pharmacists' perceptions and reasons for placing statements on the grid. An interim analysis was undertaken to identify common implementation factors prioritised.

Results: The refinement of the literature scan and interview statements (n = 326) resulted in the final Q set with 63 statements. Ten award-winning pharmacists' subjective views were analysed. The responding pharmacists rated statements' importance of aligning with the best possible implementation of professional services as the most important for those in the inner setting (M = 0.72, SD 1.88) and individuals' roles and characteristics (M = 0.37, SD 1.97). Outer setting was rated as neutral (M = 0.18, SD 1.5) and innovation (M = - 0.77, SD 1.58) and implementation process (M = -0.81, SD 0.96) rated as least important. Analyses is

ongoing for phenotyping. The three most important statements award winning pharmacists saw contributing to the best possible implementation of professional services were related to pharmacy's sufficient capacity in relation to resources (inner setting), professional self-satisfaction (individuals' roles and characteristics), and good communication within the pharmacy team (inner setting).

Conclusions: The interim results show award-winning pharmacists value factors associated with CFIR's inner setting and individual roles and characteristics, while the implementation process and professional service itself are considered lower priorities. The apparent gap in considering the outer setting, which includes communication and intra-professional partnerships with external stakeholders and considerations around the professional service itself, was ranked lowest in priority.

A critical examination of pharmacies, pharmacists, health professional shortage and medically underserved area designations in the state of New York

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Introduction: In the United States, federal public health agencies such as the Health Resources and Services Administration (HRSA) use the designations of Health Professional Shortage Areas (HPSAs) and Medically Underserved Areas (MUAs) to identify geographic areas and population groups that are experiencing shortage of health professionals, services, and poor outcomes. These tools are important for public policymaking and identifying funding priorities. Currently, these designations do not consider the number of pharmacies and pharmacists who provide care in the area. Given pharmacists' expanded roles and primary care services now increasingly available at pharmacies, it is important to examine the relationship between the number of licensed pharmacists, pharmacies and the federal designations of HPSAs and MUAs. This study aimed to examine how the number of licensed pharmacist and pharmacies in New York State (NYS) correspond with HRSA designations (HPSAs and MUAs). The intent of this examination would be to consider possibilities of seeking inclusion of pharmacists as providers in the calculation of HRSA designations.

Methods:

1. Design: Secondary data analysis of publicly available information on pharmacies, pharmacists, population and HRSA designations.
2. Databases: United States Census Bureau (Census), New York State (NYS) Office of Professions (OP) and HRSA websites
3. Data: Number of licensed pharmacists and, pharmacies (from OP website), Counties, Population density (from Census website), HRSA designation of NYS counties (MUA, Index of Medical Underservice [IMU], HPSA, and rurality from HRSA website)
4. Analysis: Collected data identified above was entered into excel, aggregated and used for county level descriptive and bivariate analysis.

Results: Descriptive analysis revealed differences in pharmacist and pharmacy availability between higher and lower need MUAs. Higher need areas had an average of 689.8 pharmacists and 169.5 pharmacies, compared to 97.0 pharmacists and 21.2 pharmacies in lower need areas. In HPSAs, positive correlations were observed between HPSA scores and both pharmacist ($r=0.377$, $p=0.005$) and pharmacy ($r=0.334$, $p=0.015$) availability, indicating increased availability of pharmacy services in higher need HPSA regions.

Conclusions: With the expansion of pharmacist roles and more primary care services available at pharmacies, federal public health agencies should strongly consider integrating availability of pharmacies and pharmacists in their designations that affect policymaking and funding for addressing health disparities. In light of our analysis of circumstances in New York State (the fourth largest state and one of the most diverse demographically), we believe this data sampling provides a solid justification for a national examination by public health researchers and a dialogue about including pharmacists in its designations nationally by HRSA.

A theoretically informed interview study on key healthcare stakeholders' readiness to implement a clinical pharmacy competency framework for hospital practice in Austria

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Background: The implementation of competency frameworks for hospital pharmacists improves patient safety, quality of care and their education and further training. Nevertheless, their implementation poses several challenges. Well-designed theoretically informed studies are needed to support their safe and sustainable implementation.

Purpose: To investigate the readiness of key healthcare (policy) related stakeholders on the possible implementation of a clinical pharmacy competency framework for hospital pharmacists in order to identify implementation related facilitators and barriers.

Methods: A qualitative interview study with 20 key healthcare (policy) related stakeholders was conducted across Austria. Based on the Consolidated Framework for Implementation Research (CFIR) the semi-structured interview questions, and all additional study materials (e.g. study information sheet for potential participants) were developed. According to the ethics committee of the medical university of Innsbruck, an ethical approval was not needed. Interview questions were validated by two experienced researchers and piloted with two participants. The interviews were carried out in person, were audio-recorded and transcribed verbatim. Framework analysis was underpinned by the CFIR domains and was conducted by two researchers independently. Data saturation was not achieved due to the diverse nature of healthcare stakeholders.

Results: Themes from all five CFIR domains were identified, revealing key implementation facilitators and barriers. Identified key facilitators ranged from communication and motivation for change (IV. Individuals) to teamwork for implementation (V. Implementation Process). Precisely defined skills of hospital pharmacists were identified as a facilitator as well (II. Outer Setting). Concerning legal aspects, it would be helpful for the implementation if the competency framework was anchored in the Austrian law (II. Outer Setting). Lack of financial and structural resources (II. Outer Setting and III. Inner Setting), as well as long, unrealistic implementation process timelines (V. Implementation process) were determined as key barriers. Sceptical attitudes of some physicians towards hospital pharmacists (II. Outer Setting) might be another hindering factor for implementation, although most participants stated that these boundaries usually vanish when hospital pharmacists are able to successfully implement themselves in the interdisciplinary team. Even though participants were in favour of the implementation, they found it difficult to find a starting point for the implementation process, as they were not sure where and with whom to start this process (V. Implementation process). Moreover, participants were decidedly positive about the framework implementation, as the competency framework will help to define and develop the hospital pharmacist's role profile within the interdisciplinary healthcare team. Furthermore, the competency framework will allow hospital pharmacists to support other healthcare practitioners using their expertise in medication therapy in daily practice and to therefore relieve them of stress in an already overwhelmed healthcare system.

Conclusion: The use of a theoretically informed interview study design successfully identified healthcare stakeholders' readiness to implement a clinical pharmacy competency framework within Austrian healthcare practice. Thoughtful and sensitive implementation steps are believed to be necessary to not overwhelm already well-established working processes and hierarchical structures within the Austrian healthcare system. The competency framework was considered helpful in driving the interdisciplinary role profile development of hospital pharmacists forward in Austria.

Are attitudes changing to antibiotics for upper respiratory tract infections? Findings from STAR 2 shed light on what more pharmacy teams can do

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Background: Overuse and misuse of antibiotics in upper respiratory tract infections (URTIs) contribute significantly to antimicrobial resistance. Public misconceptions on how antibiotics work for URTIs, which can lead to inappropriate use, have been identified previously. Regular evaluation of these misconceptions is essential so that communication strategies can be adapted as necessary to promote responsible antibiotic use.

Purpose: To examine the changes in reported antibiotic use for URTIs and individual attitudes on antibiotic use from a range of countries across the world.

Method: In June 2024, an observational, questionnaire-based study (Sore Throat and Antibiotic Resistance 2 [STAR 2]) was conducted in adults who had experienced and received treatment for respiratory symptoms in the previous 6 months. The study was conducted in 16 countries (Australia, Brazil, Germany, Italy, Malaysia, Mexico, Netherlands, Philippines, Poland, Romania, Saudi Arabia, South Africa, Spain, Thailand, United Kingdom [UK], United States) and built on observations from the first STAR study conducted in May 2022. The survey explored consumer experience of respiratory illnesses and symptoms, antibiotic use and attitudes and perceptions of antibiotics.

Results: Of 16,781 eligible adults who completed the questionnaire, 7350 were from Europe and 9431 were from outside Europe. Overall, over one-third (37%) of participants consulted a pharmacist for advice for their last URTI (27% [Mexico]–58% [South Africa]). Since 2022, the proportion of participants taking antibiotics for an URTI increased by 3%. Participants from Germany, Spain, Poland, Saudi Arabia, Mexico and South Africa were significantly more likely to have taken antibiotics in 2024 compared with 2022. Overall, the misconception that antibiotics quickly relieve symptoms remained stable from 2022 to 2024, although eight countries experienced an increase (1% [South Africa]–17% [Germany]). The misconception that antibiotics relieve pain increased by 4%. Finally, although some misconceptions decreased overall, it is important to note that misconceptions persisted in some countries, such as the belief that antibiotics kill viruses (overall decrease of 1%; increase of 2% in UK and Brazil), that antibiotics are effective for sore throat (overall decrease of 2%; increase of 3% [Saudi Arabia]–20% [Spain]), and that antibiotics are effective for colds and the flu (overall decrease of 4%; increase of 1% [South Africa]–13% [Germany]).

Conclusion: Since 2022, while some misconceptions about antibiotic use have shown some improvement, the slight increase in reported antibiotic use for URTIs and the persistence of common misconceptions in several countries highlight the ongoing need for targeted education. Over one-third of participants sought advice from pharmacists for their last URTI, which may present an opportunity for pharmacists to provide education, address gaps in understanding and promote responsible antibiotic use.

Analysis of a systematic program to transition patients on warfarin to direct oral anticoagulants across a health care system

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Introduction: Direct Oral Anticoagulants (DOACs) are the standard of care for stroke prevention in AF and treatment of VTE. Despite being first line, many patients are still managed with warfarin. These patients represent a group that require elevated healthcare resources, and transition to a DOAC may streamline healthcare resource utilization and improve outcomes. Prior published studies have established the value of transitioning patients, but excluded many special populations such as renal dysfunction. The purpose of this study was to assess a systematic program at a which will evaluate patients on warfarin for a variety of thromboembolic conditions within UC Health Anticoagulation Management Services for transition to a DOAC.

Methods: Two thousand four hundred and forty-four patients were identified from the UC Health North and South Anticoagulation registries as taking warfarin for anticoagulation during a 12-month period (October 1, 2023 to October 1, 2024). Patients were evaluated by clinical pharmacists regarding whether they were good candidates for switching to a DOAC according to the following criteria. Inclusion criteria: patients currently treated with warfarin for anticoagulation for AF or VTE prophylaxis. Exclusion: dialysis, moderate-severe mitral stenosis, ablation, antithrombin III deficiency, DOAC failure, antiphospholipid antibody syndrome, within 3 months of a bioprosthetic heart valve and mechanical valves. Patients meeting eligibility criteria were approached with physician approval regarding a potential switch. For analysis, a retrospective review of patient charts was performed to identify qualities to describe this population including age, sex, BMI, indication, clinical and outreach candidacy, CHA2DS2VASc and HAS-BLED scores. A comprehensive analysis was conducted to determine patient eligibility for transition from warfarin to Direct Oral Anticoagulants (DOACs) and with physician approval, each patient was notified and offered the opportunity for transition. Endpoints to be analyzed include the number of successful transitions, common barriers, and whether patients remained on therapy.

Results: One thousand one hundred and thirty-seven patients out of 2,444 were excluded initially due to poor clinical candidacy for the transition. Out of the remaining 1,186 patients who were candidates for transition from warfarin to a DOAC, 184 successfully were transitioned. Cost and patient preference were the most common reasons for patients not transitioning. Forty-eight of the 184 had active cancer, 15 had a BMI > 40, and 26 had stage 3 or 4 chronic kidney disease (CKD). Most patients were transitioned to apixaban (164), with a handful transitioned to rivaroxaban. Over an average of 10 months, 3 patients experienced a bleeding event (1.6%) and 2 (1.1%) a recurrent thromboembolic event. Patients transitioned to a DOAC had a lower rate of healthcare resource utilization as compared to the 12 months prior to the transition.

Conclusions: A pharmacy driven systematic program to transition patients on warfarin to direct oral anticoagulants was successfully implemented. Although a low percentage of patients were ultimately transitioned, patients who were experienced good clinical outcomes and reduced healthcare resource utilization. This study expands prior published work through inclusion of patients with cancer, CKD and obesity.

Community pharmacist networks for collaborative patient care

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Introduction: Community pharmacists serve essential roles in health and social systems of patient care. Community pharmacists are fundamentally the most accessible primary care provider, especially given global workforce shortages of family physicians and nurse practitioners. They will answer medication- and health-related questions, conduct disease screening, ensure the safety and suitability of dispensed prescriptions, and in some jurisdictions, pharmacists possess select prescribing authorities. Yet, to provide optimal patient care, they do not work alone. Community pharmacists build relationships with other health professionals, patients, and families. Pharmacist positions in interprofessional care is well described for inpatient and clinic settings where pre-configured teams collaborate. However, data about collaborative practice for pharmacists who are not physically co-located with others is lacking.

Methods: A qualitative social network analysis approach was employed to explore the collaborative networks of community pharmacists. Eligible participants were working at least one year in community pharmacy practice in British Columbia, Canada. Ego network data was collected using a two-stage participant-aided concentric circle technique for network visualization. In the first stage of data collection, participants were asked to name individuals who they consider are members of their collaborative network in providing care and support for patients. In the second stage, the participant placed the labels within the concentric circle diagram. Participants were advised that they were at the center of the concentric circle diagram ("ego") and to position their network members ("alters") in the circle rings according to the relative strength of their relationship, with one being the closest relationship and four being the most distant relationship. Participant rationale for alter placement was elicited with subsequent semi-structured interview questions whereby participants were asked to describe the collaboration with network members. Interview transcripts were systematically coded and analyzed in an iterative process throughout the data collection period.

Results: Thirty community pharmacist participants described collaborative networks of varying sizes and configurations. Reported network membership was as low as 4 alters and as high as 12 alters (mean of 9). Prescribing professionals were the most prevalent network members; family physicians (25, 83%) appeared most frequently, followed by other specialty physicians (18, 60%); nurse practitioners (15, 50%); dentists (12, 40%) and physicians working in hospital (8, 27%). Other health professionals (e.g. dietitians, physiotherapists, occupational therapists) were identified less frequently. Collaborators situated most often in the first concentric ring circle, representing the closest network relationship, were physicians (18%); patients and family (12%); and other pharmacists (10%). Network relationships were established by various means, such as sharing the care of specific patients or frequent interactions with network members working near the community pharmacy itself. In rural communities, pharmacists also met network members in social settings. Network relationships were facilitated when members could efficiently communicate and exchange patient information and develop care plans.

Conclusions: This study characterizes community pharmacist networks and how these relationships are established and maintained for collaborative patient care. The findings provide valuable insights to inform training for interprofessional care, especially developing the skillsets necessary to effectively share care across different physical spaces.