L-Università ta' Malta
Faculty of
Medicine & Surgery

Department
of Pharmacy

Dissertation Abstracts and Project Descriptions

2026

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L-Università ta' Malta
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Medicine & Surgery

Department
of Pharmacy

HEAD OF DEPARTMENT

Professor Lilian M. Azzopardi

lilian.m.azzopardi@um.edu.mt

+356 2340 2896

um.edu.mt/ms/pharmacy

ACADEMIC STAFF

Dr Alison Anastasi
Dr Annalise Attard
Dr Maresca Attard Pizzuto
Prof. Lilian M Azzopardi
Doris Baldacchino
Dr Dustin Balzan
Dr Edwina V. Brejza
Marie Clare Camilleri Podestà
Dr Bernard Coleiro
Ing. Stephen Ferrito
Dr Marise Gauci
Dr Louise Grech
Dr Nicolette Sammut Bartolo
Prof. Anthony Serracino-Inglott
Dr Claire Shoemake
Prof Janis Vella Szijj
Prof Francesca Wirth
Dr Lilian Wismayer

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Enrica Puddu

ADMINISTRATIVE STAFF

Joanne Bugeja
Amanda Calleja
Maria Mosella
Elton Zammit

PHARMACY SYMPOSIUM 2025

Booklet | Editorial Team

Project Tutors

Alison Anastasi
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Lilian M. Azzopardi
Edwina V. Brejza
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Anthony Serracino-Inglott
Claire Shoemake
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Francesca Wirth

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Amanda Calleja

Editor

Anthony Serracino-Inglott

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FOREWORD

Navigating the Complexities of Introducing AI into Pharmaceutical Sciences and Pharmacy Practice

Professor Anthony Serracino-Inglott

Pharmacy Practice Projects Co-ordinator

The integration of AI into pharmaceutical sciences and pharmacy practice presents challenges and opportunities which result in a situation that makes stakeholders feeling enthusiastic, yet somewhat unease. It is the quest of the professionals in these particular scientifically-based professions, that draws deep responsibilities. Applications of regulatory sciences and more significantly human-centric decisions must reflect on the contemporary need and future trajectories in integrating AI into pharmaceutical sciences and practice. Whilst overcoming a number of hesitancies in the use of AI, students and academics may be equally apprehensive of the risk of over-reliance on algorithms. The fear that professional judgement may one day no longer be indispensable leads to hesitancy and a "let us wait" attitude. Dangers envisioned include lack of application of "living" experience to the different kinds of illnesses ranging from mental to physical. The lack of a "living" experience may lead one to perceive that one is dealing with a structure rather than with humanity.

The convincing factor in the application of AI to pharmaceutical sciences and practice is the envisioning of AI as a tool rather than a shortcut- a tool which is similar to all other tools in the evolvement of the human being. In the same way that pharmaceutical professionals are used to obtain information and examine the evidence to reach the best recommendation, a pharmaceutical professional needs to acquire the skill to interrogate the machine and investigate its output. The AI generated output needs to be taken as a suggestion rather than a dogma.

In small countries such as Malta, the application of AI may miss features characteristic to the Maltese population, including cultural aspects. This real risk is just one example where AI has to be used with wit and human intelligence. There are other challenges that could be identified at this stage of introduction of AI. To mention a challenge close to education, one could hint at the integration of AI into academic curricula realizing that this is not a simple addition of another module. The impact of AI implicating a mental shift requires equipping the workforce and society at large to accept a pedagogical tool that may be felt by some as a threat rather than as a benefit. There are other aspects that are not evident at first sight and these are the impacts on the mental frameworks for a human being to accept that a machine is able to reach intellectual higher standards than what could be achieved by the best performers in the field. The uniqueness of "life" over any technology is the comfort that humanity should overcome any perceived or real challenges which come with the use of AI. Pharmaceutical professionals are well-equipped in our educational system to excel in the humanistic aspects of pharmacy.

One is confident that our students are prepared to meet these challenges and that AI will enhance pharmaceutical sciences and pharmacy practice today and more so in the future. The task is to embrace technological change, not in a submissive way but rather through critical thinking and most importantly, whilst ensuring ethical applications.

The Abstracts presented in this Symposium are evidence of how well-prepared students are to navigate change, engage through research, innovation, and patient love, and embrace technological advancements such as AI with courage and significance as advocates of pharmacy and pharmaceutical technology contributing to society at large.

INTRODUCTION

Cultivating Pharmaceutical Transformation through Research

Professor Lilian M. Azzopardi

Head, Department of Pharmacy

In the context of transformations occurring in the healthcare scenario, we are experiencing catalysis through the opportunities evolving with the application of digital technologies and more recently artificial intelligence through generative AI. The landscape of pharmacy practice and pharmaceutical technology is also a breeding ground for opportunities to move beyond traditional practices and processes and embrace progress such as advanced pharmacists' clinical interventions, and use and access to biotechnology drugs and digital medical devices.

To support professional transformation and preparedness for the pharmaceutical workforce towards managing reflections on threats from digital technologies and leveraging opportunities, pharmacy education needs to be driven by ensuring *Relevance*. Earlier this year the International Pharmaceutical Federation Academic Institutional Membership, representing the deans of schools of pharmacy globally, launched the handbook 'Promoting relevant education for practice and science'. The publication constructively presents how to strengthen pharmacy education by connecting knowledge mastery with real-world agility and developing a mindset of scientific curiosity, innovation, and development.[1]

At the Department of Pharmacy, curricula for the diverse courses at undergraduate and postgraduate studies in pharmacy and pharmaceutical technology, are continuously updated to ensure that graduates are equipped with the skills and competences that support innovation across the diverse pharmaceutical landscape. An essential component is how research skills are embedded within the programmes and that such learning experience is modelled to highlight real-life settings. Through the research experiences in the programmes, students develop skills in critical analysis, real-world data capturing, collaborative innovation and applying research outcomes to support transformations and advancements.

As the debate on how generative AI is changing the landscapes in education and pharmacy, I took the liberty of developing an AI-generated infographic of the research which is presented in this abstract book (Figure 1). The figurative synopsis focuses on research areas that explore expanding access to medicines and medical devices, reflect on innovations in pharmacist recommendations in the use of medicines, provide data-driven forecasting examples that can mitigate medicine shortages, elaborate pharmacists' clinical interventions to reduce drug burden and review actionable contributions to close the digital gaps and improve digital health literacy.

This research relies on a robust partnership that the Department enjoys with healthcare providers, pharmaceutical regulators and the pharmaceutical industry. By fostering this dialogue, students are exposed to practical realities and participate in research which is generating outcomes that are translated to local and international implementation. In this way, research in pharmacy and pharmaceutical technology programmes is serving as a vital component towards supporting transformation and empowering students to become champions of change and innovation.

1. Azzopardi LM, Desireh G. (eds). Promoting relevant education for practice and science. The Netherlands: International Pharmaceutical Federation, 2026.

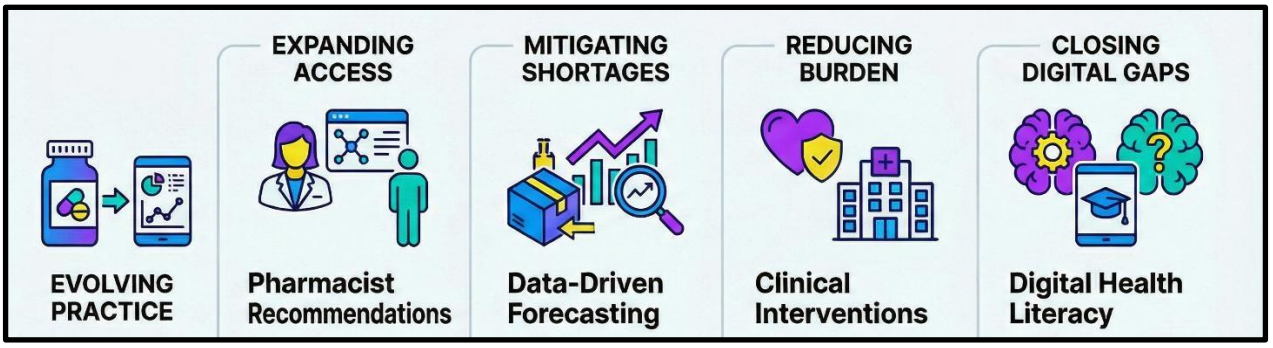

Figure 1: Infographic of research presented in this abstract book (created by NotebookLM)

Doctorate in Pharmacy

DISSERTATION ABSTRACTS

Doctorate in Pharmacy

DISSERTATION ABSTRACTS

Access to Pharmacist Recommended Medicines *10*
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Access to Pharmacist Recommended Medicines

Jean Claude Calleja

Background: Enhanced access to medicines is well-established as a major factor of improved patient outcomes, particularly in primary care settings. The criteria used to identify medicines suitable for pharmacist recommendation remain variable and inconsistently defined.

Purpose: To design, develop and validate a structured, evidence-based framework for determining which medicines may be classified as pharmacist-recommended medicines (PRMs).

Method: A scoping literature review was conducted using studies published between 2012 and 2025. A thematic analysis was performed, followed by the development of a literature-informed gap analysis. A focus group of healthcare professionals, and pharmacists reviewed and validated the gap analysis, defined the framework domains, assigned relative weightings to each section of the framework based on perceived importance to patient health, and contributed to the development of a scoring algorithm for PRM classification. Domain-specific questions were identified through the literature. The final framework was validated in four other focus groups to determine scoring for each question. Four medicinal products were randomly selected for case-study evaluation, through which the PRM category for each was identified.

Results: Six key gaps were identified: two related to access to general practitioners, two concerning the influence of chronic conditions on medicine selection, one related to cost, and one arising from the rapid evolution of scientific evidence. The final framework comprised 34 items distributed across four domains: (A) Patient Safety, (B) Access to Medicines, (C) Cost to Patients and the Healthcare System, and (D) Overall Threats. Weighted domain scores were aggregated and standardized against the score of a theoretical ideal medicine. The resulting percentage enabled classification of medicines into three categories: (1) Suitable for consideration as a PRM, (2) Suitable for consideration as a PRM with accompanying guidelines, or (3) Restricted to physician recommendation. Of the four drug case studies, three were classified as Category 1 and one was classified as Category 2.

Discussion: This framework provides a structured approach for assessing medicines appropriate for pharmacist recommendation in minor acute conditions. Its implementation may facilitate timely access to treatment and reduce the burden on physician and the healthcare system.

Streamlining Pharmaceutical Needs at Patient Discharge

Gerald Muhoro Chege

Background: Transitions from hospital to primary care are high-risk periods for patients. These transitions often result in medication errors, poor adherence, and fragmented care. Community pharmacists are uniquely positioned to ensure continuity of care in pharmaceutical services. Their potential contribution could be supported through elaborated pathways.

Purpose: Assess current experiences of community pharmacists with regard to supporting patients post-discharge and to develop a framework for supporting transition of care for patients discharged from hospital.

Method: Part 1: Review and thematic analysis of literature, identifying and adapting established post-discharge pharmaceutical care models for local application. Part 2: Development of a self-administered questionnaire to assess current experiences of community pharmacists with discharge services. It was disseminated to all community pharmacists through the Pharmacy Council of Malta. Part 3: A framework is developed and validated for content and practicality through a focus group.

Results: Key components of the community pharmacy post-discharge pharmaceutical service models identified in the literature review include training, communication, referrals, access to patient data, consultation, documentation, action planning, and continuous professional development. A total of 41 responses have been received. Twenty respondents (48.8%) strongly agreed, and seventeen (39%) agreed that an enhanced post-discharge care model is necessary for community pharmacies to deliver proactive follow-up care for patients after hospital discharge. Eighteen (43.9%) strongly agreed, and fifteen (36.6%) agreed that they would be interested in increasing the connection and collaboration with hospital providers; 20 (48.8%) strongly agreed and 14 (34.1%) agreed that there is no designated two-way communication system linking community pharmacists with hospital providers; 20 (48.8%) strongly agreed and 8 (19.5%) agreed that the current discharge summary does not provide sufficient inpatient information to facilitate comprehensive post-discharge pharmacy services.

Discussion: This research project makes a significant contribution to optimizing the role of community pharmacists in Malta's healthcare system, particularly in the context of post discharge care, and aligns with the priorities of the Maltese National Health Strategy 2023- 2030, which emphasizes enhanced provider collaboration and a shift towards community-based services.

Remote Good Manufacturing Practice Inspections

Stefanie Farrugia

Background: The Covid-19 pandemic made it impossible for good manufacturing practice (GMP) inspectors to inspect manufacturing sites outside of their territory due to travel restrictions. One of the mitigation measures to maintain regulatory oversight was to conduct inspections remotely.

Purpose: To assesses current practices, benefits and challenges related to remote GMP inspections, with the aim of harmonising the decision process for the feasibility of a remote inspection through the development of a risk assessment tool.

Method: A literature review was conducted using databases Google Scholar, Pubmed, Scopus and Web of Science. A validated questionnaire was disseminated to GMP inspectors in various global medicines agencies to gather feedback on experiences related to remote inspections. A risk assessment tool was developed and discussed with two focus groups, one consisting of experienced inspectors and one representing the industry, to be used as a harmonised tool assessing feasibility of sites for remote inspections.

Results: Twenty inspectors responded to the questionnaire. Sixteen inspectors had previously performed a remote GMP inspection, with five having had experience to participate in over five remote inspections. Fourteen indicated the Covid-19 pandemic as the main reason for having performed a remote inspection. Fifteen inspectors indicated that communication is more challenging during a remote inspection, while fourteen inspectors highlighted that a stable internet connection, especially in production areas was found to pose the greatest difficulty. Eight inspectors agreed that the scope of remote inspections may be broadened, particularly for non-sterile manufacturing sites with a good track record of onsite inspections. The risk assessment tool developed is split into eight sections, considering areas from product and patient risk, to manufacturing and process complexity.

Discussion: The inspectors' feedback indicates that while remote inspections may be a very useful tool where travel is not possible, they can't fully replace onsite inspections. Body language and human interaction play a crucial role in the trajectory of the inspection and during a remote inspection these aspects are much harder to assess. The risk assessment tool developed is intended to create harmonisation when considering remote inspections.

Pharmacist-Led Point-of-Care Testing of Iron Levels

Raquel Formosa

Background: Ferritin is a key biomarker of iron storage. Pharmacist-led point-of-care testing (POCT) offers a rapid, cost-effective and accessible patient monitoring of iron therapy.

Purpose: To investigate the contribution of pharmacist-led ferritin POCT on patient needs, outcomes and optimisation of care pathways. Objectives include: appraising available ferritin POCT, validating a selected device, developing a framework for pharmacist-led ferritin POCT and assessing feasibility in community pharmacy setting.

Method: This prospective cohort study was conducted in a community pharmacy. A suitable ferritin POCT kit was selected based on device specifications and validated against laboratory-based results in 20 patients. Eligible patients meeting any of the inclusion criteria (older patients, underweight, vegetarians/vegans, anaemia symptoms, requesting iron supplementation, relevant medication use) were recruited by convenience sampling. Following the POCT and pharmacist consultation, patients were categorised as having 'normal' or 'abnormal' ferritin levels, receiving tailored pharmacist advice. Follow-up was conducted four-weeks post-intervention to monitor progress.

Results: A rapid semi-quantitative ferritin test device was adopted for use in this study. With an overall accuracy of 95.1%, results are completed after approximately five minutes and are reported semi-quantitatively as three groups of ferritin levels; <13ng/ml, ≥13ng/mL ≤30ng/mL or >30ng/ml. Validation of the selected CE marked device against laboratory assays revealed no statistically significant difference (χ^2=0.00, p=1.000), indicating strong agreement. Thirty patients were recruited, predominantly female (n=25) aged 35–54 years (n=12), with a mean body mass index of 27kg/m². Common comorbidities included gastro-oesophageal reflux disease (n=12), menorrhagia (n=7), and previous anaemia (n=7), with 12 taking drugs predisposing low iron (most frequently proton pump inhibitors). Fatigue (n=22) and dizziness (n=20) were the most repeatedly reported symptoms. Abnormal ferritin results were identified in 24 participants, of whom 14 were on prior iron supplementation. All patients received individualised advice including iron supplementation (n=10) and referral (n=9). At follow-up, 15 reported symptomatic improvement, 19 were adherent to iron supplementation, and 23 were satisfied with the service.

Discussion: Incorporating ferritin POCT into community pharmacy practice locally enhances healthcare accessibility, supports early intervention, improves health literacy and reinforces the pharmacist's role in proactive health management.

Medical Devices in the Community Pharmacy

Kairylle Joy Mina

Background: Home-use medical devices, such as blood glucose monitors (BGM) and blood pressure monitors (BPM), serve as essential tools for self-management in patients with chronic diseases. Proficiency gaps persist, compromising patient safety and therapeutic outcomes due to factors like limited health literacy, cognitive decline, and socioeconomic barriers. Community pharmacists, with their accessibility and expertise in medication reviews, represent an ideal intervention point, yet no standardized toolkit exists for medical device use reviews (MDUR).

Purpose: To establish a toolkit for a pharmacist-led use review of home-use medical devices.

Method: A mixed-method design is adopted. Phase 1: Systematic literature review was conducted using PubMed, ProQuest, and Google Scholar, using the search terms “pharmacist AND blood glucose monitor*”, “pharmacist AND blood pressure monitor*”. Filters applied included last 10 years, full-text, English. Phase 2: Development and validation of Toolkit by five-member multidisciplinary expert panel, Phase 3: Piloting the Toolkit in a community pharmacy with 60 participants.

Results: PRISMA-guided systematic literature review generated a total of 13,726 records after removal of duplicates. The 148 studies considered eligible for review identified four thematic domains: (1) effectiveness of pharmacist-led interventions in improving device proficiency and adherence; (2) predictors of proficiency, including patients’ age, education, and health literacy; (3) multilevel barriers such as pharmacist knowledge gaps, workflow constraints, lack of standardization, access issues, and technical design flaws; and (4) facilitators for pharmacist contribution to patient use of medical device. The Toolkit is intended to be completed by the pharmacist during medical device use review, and consists of demographics, checklist assessing appropriateness of use of blood pressure and blood glucose devices, and information leaflet.

Discussion: The developed toolkit will be applied in a community pharmacy setting to assess its practicality, feasibility and utility in providing a standardized approach in medical device use review.

Reform of the European Union Pharmaceutical Legislation

Fidan Mirzayeva

Background: The European Union is reforming pharmaceutical legislation to improve medicine availability and access, strengthen shortage governance, modernise regulatory processes, and recalibrate innovation incentives. Implementation success will depend on enforceability, administrative capacity, and coherence with national access pathways such as health technology assessment, pricing, and procurement.

Purpose: To evaluate the design and implementation effects of the draft EU pharmaceutical package (proposed Regulation and Directive) on access and supply resilience, and to identify the EU approach through comparison with the United States and Türkiye, with a focus on feasibility in small-market Member States.

Method: A comparative documentary analysis was conducted using the draft EU texts, primary US and Turkish regulatory sources, and peer-reviewed literature. Findings were triangulated with a Malta case study based on two expert stakeholder sessions analysed as one dataset (N=10). Likert-type ratings (scale 1-5) were reported only when clearly stated, and qualitative findings were quantified as counts of expressed positions.

Results: The draft EU package aims to shorten centralised assessment from 210 to 180 days and simplify medicines governance from five scientific committees to two, while strengthening shortage-related duties and more conditional incentive structures. In the US, the Food and Drug Administration uses four expedited programmes, Priority Review targets 6 months versus 10 months under standard review, and shortage notifications are required at least 6 months in advance or within 5 business days. In Türkiye, the statutory licensing timeframe is 210 days, with a 90-day route for defined applications and scheduling rules that can affect when procedures start. In Malta, familiarity was moderate among numeric respondents (mean 3.30/5; n=5). Feasibility and enforceability concerns were raised by 7/10 stakeholders, and definitional or evidence issues by 6/10. Launch-and-supply conditionality attracted scepticism (2/10 negative and 2/10 mixed), including a 1/5 workability score. Article 56A-type leverage was mainly mixed (3/10), with one effectiveness rating of 3–4/5, reflecting proof and coordination barriers.

Discussion: Across systems, timelines and incentives matter less than operational deliverability. For small markets, measurable conditions, workable monitoring, and alignment with national access pathways are likely to determine whether the reform improves real-world availability, affordability, and supply resilience.

Addressing Challenges to Shortages of Pharmaceutical Products

Janica Mizzi

Background: Pharmaceutical product shortages are a significant challenge for healthcare systems resulting in treatment delays, medication errors, increased healthcare costs, and poor patient outcomes. Regulatory advancements, improved EU coordination and digital technologies have been proposed as solutions for shortages.

Purpose: To evaluate factors contributing to shortages, explore stakeholder perspectives on current shortage prevention and mitigation measures and use of digital tools to address shortages.

Method: Questionnaires targeting healthcare professionals (HCPQ) and another for pharmaceutical suppliers (PSQ) are developed. The HCPQ assessed the impact of medicine shortages on patient care, while the PSQ examined the challenges and opportunities brought by shortages. Questionnaires were distributed through professional channels. Guidelines on the prevention and mitigation of shortages were developed based on the outcomes of both questionnaires.

Results: Fifty-one HCPs and twenty-three suppliers responded. Twenty HCPs reported that they encounter shortages daily, with drugs of the neurological system being the most common, followed by anti-infective agents and vaccines. Forty-three HCPs associate shortages to treatment delays and manage shortages by substituting medications. Twenty-nine HCPs perceive digital solutions to mitigate and prevent shortages due to availability of high data quality and forecasting abilities. Suppliers cited manufacturing issues, Malta's limited market size and minimum order quantities as key challenges faced, with NHS stock being more liable to shortages. Alternative sources, parallel importation and early forecasting were the most common methodologies adopted by suppliers to manage shortages. Thirteen suppliers believe that data driven solutions play a role in mitigating shortages and are willing to invest but perceive cost as the biggest barrier to implementation. Digital solutions are applicable in forecasting and supply chain monitoring using Artificial Intelligence. Developed guidelines will provide recommendations on prevention of shortages and an action plan during shortages. These will be validated during focus group discussion.

Discussion: The insights gathered provide valuable evidence for policymakers, regulators and HCPs on the reduction and prevention of shortages leading to a robust supply chain.

Meeting Patient Needs Beyond Regulatory Compliance

Alessia Stivala

Introduction: Pharmacists rely on regulatory compliance as the basis of safe practice, and evolving patient needs increasingly call for extending this foundation through professional judgement.

Purpose: To identify patient needs and develop strategies to overcome challenges in meeting these needs.

Method: An anonymised online questionnaire to gather pharmacist insights was developed. A focus group was conducted to validate the questionnaire and clarify concepts such as 'going beyond the call of duty' in pharmacy practice. Thematic analysis was performed on qualitative data gathered. The Pharmacist Perspective on Patient Needs Questionnaire was disseminated online to pharmacists. The questionnaire gathered both quantitative and qualitative insights by including 17 questions across five sections: professional background, experience with patient needs, regulatory impact, collaboration, and reflections on patient-centred care. Ten cases were designed based on questionnaire and focus group insights.

Results: Thematic analysis led to the identification of four main themes with corresponding sub-themes. 'Going Beyond Duty' incorporates patient advocacy, extended professional service, individualised medicine support, follow-up care and emotional support. 'Barriers to Going Beyond Duty' incorporates understaffing, organisation and systemic pressures, patient related barriers, professional vulnerability, professional boundaries and compassion versus professionalism. 'Regulations' incorporates scope of practice and professional framework. 'Sustainability' incorporates time, and resource constrains, prioritising patient needs, burnout and systemic support. Ten case studies were designed to address patient needs. Each case was organised into four sections: Scenario outlining the patient need, Practice Challenges describing the pharmacist's difficulties, Thematic Links connecting the case to the study's themes, and Resolutions detailing both immediate pharmacist actions and broader systemic actions. The cases addressed continuity of care gaps, adherence support for patients with literacy barriers, non-formulary prescriptions, emotional distress, conflicting prescriber instructions, medication shortages, extended opening hours, support for non-English speakers, prescription support following bereavement and financial constraints.

Discussion: Pharmacists go beyond their duty through patient advocacy, individualised medicine support, after-hours professional service, follow-ups, and emotional care, reflecting a shift toward patient-centred practice. Sustaining these efforts remains challenging and the developed case studies demonstrate this by presenting realistic, practice-based challenges, where pharmacists navigate complex patient needs within routine constraints.

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Pharmaceutical Regulatory Sciences

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Stakeholder Input in Optimising Medication Access

Geordie Schembri

Background: Accessibility is introduced as an additional pillar to the three main pillars in the pharmaceutical scenario: quality, safety, and efficacy. Medicine accessibility improves the quality of life of the patient and reduces morbidity and mortality.

Objective: To collect data on the causes of lack of accessibility to medicines in Malta and understand how stakeholders can help.

Design: A questionnaire was formulated and validated. Following ethics notification, the questionnaire was distributed electronically to pharmacists through the Pharmacy Council. Particular attention was given to open-ended feedback. Interviews with pharmacists from all sectors were conducted, to allow deeper insights into challenges and strategies to enhance and facilitate patient access to medicines.

Setting: Online and in community pharmacies.

Main Outcome Measures: Number of pharmacists identifying specific barriers for medicine accessibility identified. Ways recommended by pharmacists to improve accessibility to medicines.

Results: A total of 59 pharmacists from all sectors in Malta completed the questionnaire. The main barrier identified was out-of-stock medication. Shortages were most evident relating to medication used to treat infection. The main barriers were financial constraints and out-of-stock medications. Strategy suggestions included improving prescriber awareness, better communication, brand substitution, and enhanced collaboration between healthcare professionals. Accessibility in Malta was found to be most problematic in community pharmacies, though similar issues occurred across all sectors.

Conclusions: Pharmacists play a key role in improving accessibility. Knowledge of advantages and risks of changing a medicine for a therapeutic equivalent will increase accessibility. As medication experts within the interdisciplinary team, pharmacists are empowered to guide and optimize medication use in order to bridge the gaps in accessibility.

Glossary of Abbreviations and Acronyms used in Regulatory Sciences

Libina Thomas

Background: Regulatory authorities such as the Food and Drug Administration (FDA), European Medicines Agency (EMA), Medicines and Healthcare products Regulatory Agency (MHRA) and Therapeutic Goods Administration (TGA) often use different or inconsistently interpreted abbreviations, creating challenges in submissions, product information and clinical or safety documents. Despite their widespread use, there is limited comparative analysis of regulatory abbreviations across these authorities.

Objective: To compile, compare and analyse abbreviations and acronyms used by major global regulatory agencies and propose recommendations to improve regulatory communication and consistency.

Design: A descriptive, comparative review of regulatory abbreviations and acronyms used by FDA, EMA, MHRA, and TGA, categorised and analysed in a structured Excel file.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: A comparative glossary of regulatory terms with standardisation recommendations for professional reference.

Results: The comparison showed clear variation in terminology across agencies. The United States and Australia used more unique terms, while EMA and MHRA were closely aligned. Key differences included the New Drug Application (NDA, FDA) versus the Marketing Authorisation Application (MAA, EMA/MHRA), and the Investigational New Drug (IND, FDA) versus the Clinical Trial Application (CTA, EMA/MHRA) and Clinical Trial Notification (CTN, TGA). Product information terminology also differed, such as United States Prescribing Information (USPI, FDA) compared with SmPC (EMA/MHRA) and Product Information (PI, TGA). In contrast, safety terms like Development Safety Update Report (DSUR) and Periodic Benefit-Risk Evaluation Report/Periodic Safety Update Report (PBRER/PSUR) were more consistent.

Conclusions: This study shows that regulatory abbreviations vary widely across agencies, particularly in regulatory affairs and clinical trial terminology, and identifies harmonisation gaps that influence clarity and consistency in regulatory communication.

Pricing of Medicines

Sannidhi Deepak Shetty

Background: Pricing of medicines plays an important role in the healthcare system. Every day rise in prices has inversely affected affordability, adherence to treatment, and quality of care. [1,2]

Objectives: To analyse the factors affecting the pricing of medicines and to evaluate their effectiveness on affordability and access to the healthcare system.[1]

Design: This study is a descriptive and analytical review based on primary and secondary resources including research articles, regulatory guidelines, and government policies.[1]

Setting: Department of Pharmacy, University of Malta

Main Outcome Measures: Effectiveness of pricing factors, reasonable pricing, and treatment persistence.[1]

Results: Factors such as research and development costs, manufacturing expenses, patent schemes, and regulatory policies significantly influence medicine pricing. Government price control mechanisms and reimbursement schemes improve affordability; however, medicines not covered under these schemes remain unaffordable for many patients. [1,2] Conclusion: Several factors influence medicine pricing and affordability. Government intervention through pricing and reimbursement policies improves access to medicines and supports a sustainable healthcare system. [1,2]

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1. World Health Organisation. Medicine price information sources and affordability pricing [Internet]. Geneva: World Health Organisation; [cited 2026 Jan 8]. Available from: https://www.who.int/teams/ health-product-and-policy-standards/medicines-selection-ip-and-affordability/affordability-pricing/m ed-price-info-source

2. World Health Organization. Human rights and access to medicines [Internet]. Geneva: World Health Organization; [cited 2026 Jan 8]. Available from: https://www.who.int/medicines/areas/human_rights/en/

Applications, Opportunities and Challenges of Digitalisation in Pharmaceutical Distribution

Kyra Jade Debono

Background: Introduction of digital tools within the pharmaceutical industry has enabled Pharma 4.0., an industrial revolution which offers continuously monitored, data-driven, and predictive approaches to different operations.[1] Despite its numerous advantages, the challenges presented must be addressed to reach its full potential.

Objective: To perform a SWOT analysis and propose strategies to enhance the pharmaceutical distribution (PD) process through implementation of digital tools.

Design: A questionnaire was developed, validated, and disseminated to registered pharmaceutical distributors in Malta. The questionnaire yielded both qualitative data and quantitative data which were analysed using thematic analysis and descriptive statistics respectively. A SWOT analysis will be prepared based on the results from the literature review and questionnaire, and discussed in a focus group setting comprising of 6 stakeholders.

Setting: Department of Pharmacy, University of Malta

Main Outcome Measures: SWOT-based strategy for enhancement of PD

Results: 25 responses were collected from the questionnaire, 17 of which from SMEs. Integration of advanced technology such as AI, ML and robotics remains limited. The most frequently cited barrier to further digitalisation was ‘lack of proper infrastructure leading to high initial investment costs’ whereas the strongest driving force was ‘operational efficiency’.

Conclusions: Wholesale distributors are implementing technology into their daily operations. The impact of digitalisation within PD extends to operational efficiency, workforce and environment. Nevertheless, digitalisation in this sector is still in its early stages and requires further adoption to reach its full potential.

Reference:

1. Ding B. Pharma Industry 4.0: Literature review and research opportunities in sustainable pharmaceutical supply chains. Process safety and environmental protection. 2018; 119:115-30. doi: 10.1016/j.psep.2018.06.031

M.Pharm. Students

DISSERTATION ABSTRACTS

Pharmacy Practice

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Reducing Prescribing Cascades in the Older Population

Nicole Sciberras

Background: A prescribing cascade is when an adverse drug event is misinterpreted as a new medical condition, leading to the addition of another, potentially avoidable medication and is especially relevant in older patients.

Objective: To identify prescribing cascades in older patients and enhance treatment optimization through clinical pharmacist intervention.

Design: Patients recruited were over 65 years of age who have at least one prescribing cascade on admission, excluding those deceased and transferred to acute care. In phase 1, ThinkCascades[1] was applied to patients discharged from July-December 2024 retrospectively. The findings were brought to the attention of the clinical pharmacist team by the researcher. In phase 2, the tool will be applied again to a similar cohort of patients discharged from June-November 2025.

Setting: Karin Grech Rehabilitation Hospital.

Main Outcome Measures: Frequency of prescribing cascades, extent of treatment optimization and care issue documentation by clinical pharmacists.

Results: 448 patients were included in phase 1 where the average age is 79, 65% are female and 93 had a prescribing cascade (21%). A total of 117 prescribing cascades were identified. The most common cascades were calcium channel blocker and diuretic (38%), selective serotonin reuptake inhibitor/serotonin-norepinephrine reuptake inhibitor and sleep agent (32%) and benzodiazepine and antipsychotic (12%). Treatment optimization for the 117 prescribing cascades occurred 62% (n=73) of the time and pharmaceutical care issue documentation was performed in 44% (n=52).

Conclusions: Specific prescribing cascades demonstrated a higher prevalence than others. Phase 2 is currently underway, reviewing a similar patient cohort and focusing on the most common cascades identified in phase 1, to assess whether treatment optimisation and documentation of clinical pharmacist intervention have improved.

Reference:

1. McCarthy LM, Savage R, Dalton K, Mason R, Li J, Lawson A, et al. ThinkCascades: A tool for identifying clinically important prescribing cascades affecting older people. Drugs & Aging. 2022;39(10):829-40. doi:10.1007/s40266-022-00964-9.

Integrating Clinical Pharmacy Services into Geriatric Care

Damien Spiteri

Background: Clinical pharmacy services have expanded in Malta, with increased focus on medication safety and patient-centred interdisciplinary care. At St Vincent de Paul (SVP), structured evaluation is needed to assess implementation in daily practice, staff perceptions, and areas for optimisation.

Objective: To assess healthcare professionals' views on clinical pharmacy service delivery at SVP, including perceived adherence, relevance to daily practice, collaboration, satisfaction, and priorities for improvement. A secondary aim is to explore perceptions of a proposed standardised online system to optimise medication-related workflow.

Design: A descriptive, cross-sectional questionnaire study administered to doctors, nurses, clinical pharmacists, and carers. A shared core assesses essential service priorities, Likert-scale ratings of service delivery and collaboration, and views on a proposed standardised online workflow system. Role-specific open-ended questions captures gaps and improvement suggestions, including additional services. No patients or identifiable data will be involved.

Setting: St Vincent de Paul, Luqa, Malta.

Main Outcome Measures: Staff-rated adherence to clinical pharmacy service delivery; perceived relevance and usefulness; satisfaction; interdisciplinary collaboration; prioritised essential services; perceived feasibility and required features of a standardised online system; and qualitative themes on gaps and improvement proposals.

Results: The study identifies strengths and system-level gaps in current service delivery, establishes multidisciplinary priorities for essential services, and generates actionable recommendations (including digital workflow optimisation) to support consistent, patient-centred medication management.

Conclusions: Findings should inform evidence-based recommendations to strengthen and standardise clinical pharmacy service delivery and interdisciplinary collaboration in geriatric long-term care at SVP.

Hospital Pharmacy in African Countries

Ibram Magdy Youssif Zekry

Background: In-patient dispensing forms a central part of hospital pharmacy work, covering the review of prescriptions, preparation, packaging, labelling, recording, and supply of medicines to the ward. Hospitals differ in how often medicines are supplied, ranging from daily dispensing to multi-day provision. Medicines may be labelled for individual patients or supplied as ward stock with limited identification. Variations in packaging, labelling, and documentation may increase the risk of dispensing or administration errors. There is limited comparative research on how in-patient dispensing is organised in Kenya and Zambia, including the roles of pharmacists and pharmacy technicians. Understanding these gaps is important for developing safer and more standardised dispensing systems.

Objective: To compare in-patient hospital pharmacy dispensing practices in Kenya and Zambia, focusing on medicine preparation, packaging, labelling, ward supply.

Design: A cross-sectional, questionnaire-based study will be conducted among hospital pharmacists and pharmacy technicians. The questionnaire will collect information on prescription handling, dose preparation, packaging, labelling, documentation, and medicine delivery to wards. Data will be analysed descriptively and compared between hospitals in both countries.

Setting: Hospital pharmacies in Kenya, and Zambia.

Main Outcomes Measures: Workflow of in-patient dispensing, frequency of supply, packaging and labelling methods, level of supervision, and challenges affecting safety.

Results: Differences are expected in how medicines are prepared, packaged, and labelled before reaching the ward. The findings identify specific gaps and areas that need standardisation.

Conclusions: This study highlights gaps in the in-patient dispensing process and proposes practical ways to improve accuracy, safety, and clarity in the preparation and supply of medicines to hospital wards, including the discharge process.

Risk Minimisation Strategies for Drug-Related Problems in Community Pharmacy Practice

Elena Gatt Bonanno

Background: Drug-related problems (DRPs) are a result of errors in prescribing, dispensing, storing, preparation and administration of medicine.

Objectives: To identify and quantify DRPs encountered in community pharmacies and to propose guidelines for reducing DRPs in community pharmacy practice.

Design: Two documentation sheets were developed and validated; one for patients (DSpt) in English and Maltese, and one for pharmacists (DSph). The DSpt collected data on patients' demographics and DRPs. The DSph assessed the probability of occurrence and severity of consequences of 15 literature-based prescribing errors and interventions selected by pharmacists. Probability and severity were rated on a 5-point Likert scale (1-5) and multiplied to calculate the Risk Priority Number (RPN). Average RPNs were calculated per prescribing error and classified into five categories, ranging from no risk (1) to extremely high risk (5).

Setting: Community pharmacies.

Main Outcome Measures: Development of guidelines for reducing DRPs.

Results: Fifteen pharmacists participated in the study, of whom 9 were aged 24-34 years and 13 were female. The prescribing errors with the highest risk of DRPs were illegible handwriting (RPN=3.80) and incorrect dosing (RPN=3.60). Prescribing by brand name rather than generic name carried the lowest risk (RPN=2.13). A total of 113 patients participated in the study, including 68 females, with the largest age group being 31-40 years (n=29). Patients (n=109) understood the purpose of their medications and their physician's instructions (n=106). Only 73 patients were aware of potential side effects, and 80 experienced side effects from at least one medication.

Conclusion: Pharmacists perceived illegible handwriting as the risk with the highest score, while patients viewed a lack of knowledge about side effects as a major concern. Prescribing clarity and patients' knowledge should be improved to maximise patient safety.

Strengthening Pharmacy Practice for Future Emergencies: Insights from COVID-19

Kathlene Saydon

Background: The COVID-19 pandemic exposed vulnerabilities in healthcare systems worldwide. In Malta, pharmacists played a key role in maintaining continuity of care. Challenges in emergency preparedness emerged.

Objective: To evaluate emergency preparedness within the pharmaceutical sector in Malta, identify challenges and lessons learned during the COVID-19 pandemic, and propose strategies to improve preparedness for future health crises.

Design: A quantitative cross-sectional study was conducted using a validated questionnaire comprising 19 questions on demographics, emergency preparedness, challenges, lessons learned, collaboration, future preparedness and regulatory measures. Descriptive statistical analysis was performed. Semi-structured interviews with pharmacists from community, hospital, regulatory and industrial sectors will be conducted to reinforce questionnaire findings.

Setting: The study targeted pharmacy professionals working across community, hospital, regulatory and industrial sectors.

Main Outcome Measures: Perceived preparedness prior to COVID-19, challenges encountered, effectiveness of mitigation strategies, lessons learned and recommended improvements.

Results: A total of 49 responses were collected. Pre-pandemic preparedness was rated as neutral or insufficient. Major concerns included lack of personal protective equipment, medicine hoarding and supply chain disruptions. Vaccination programmes, widespread testing and public helplines were rated as highly effective. Key lessons included hygiene practices, digitalisation and crisis management training. Mandatory emergency preparedness training and investment in digital tools were strongly supported.

Conclusions: Malta's pharmaceutical response to COVID-19 was generally effective. Gaps in preparedness remain. Strengthening training, enhancing supply chain resilience and integrating pharmacists into strategic planning are essential to respond to future health emergencies.

Blood Pressure Monitoring and Screening for Obesity and Arrhythmia in Community Pharmacy

Andrea Fenech

Background: Timely identification of atrial fibrillation (AF) improves prognosis by reducing stroke risk and associated complications. Community pharmacists are well-positioned to contribute to integrated AF care through early detection of at-risk individuals and prompt referral.

Objective: To explore pharmacist-led blood pressure (BP), obesity and arrhythmia assessment in a community pharmacy setting.

Design: Participants aged ≥65 years, with diagnosed hypertension (HTN), heart failure (HF) and/or diabetes, and no known history of arrhythmia, were recruited. CardioAfib® (Pic Solution) was used to measure BP and simultaneously screen for arrhythmia. Body mass index and waist circumference were measured. Participants identified as overweight or obese received lifestyle advice, while those with Grade 1 to 3 HTN and/or AF detected were referred for further assessment and monitoring.

Setting: A community pharmacy selected by convenience sampling.

Main Outcome Measures: BP and obesity assessment; arrhythmia screening; time required.

Results: From the 55 participants recruited (30 male, 25 female, modal age range 65–70 years), 48 had diabetes and 20 had HF. Eighteen participants were obese and 18 overweight. Mean waist circumference was 85 cm (range 81–115) in males and 81 cm (range 67–90) in females. Mean systolic BP was 143 mmHg (range 94–176), diastolic BP 80 mmHg (range 54–96), and pulse 74 bpm (range 54–99). Elevated BP was identified in 46 participants: high normal (n=16), Grade 1 HTN (n=20), Grade 2 HTN (n=10). Arrhythmia was detected in 19 participants, including non-specific pulse arrhythmia (n=9), premature ventricular, atrial or nodal beats (n=8), AF (n=2). Mean screening time was 19 minutes (range 11–27).

Conclusion: Community pharmacy-based screening in this high-risk population identified a high prevalence of elevated BP, increased metabolic risk, and a clinically relevant AF detection rate (3.6%). Limitations include lack of electrocardiographic confirmation of AF prior to referral and absence of follow-up to assess patient outcomes.

Advances in Community Pharmacy Practice

Thayane Ferreira Salles

Background: Community pharmacists have taken an increasingly clinical role over the past years.

Objective: To identify advances in community pharmacy internationally and distinguish different models of practice.

Design: A literature review was carried out using PubMed. Peer reviewed articles published between 2020 and 2025 were included. Search terms combined community pharmacy, pharmacy practice, pharmacy models and services.

Setting: Five countries were selected to represent a range of health system contexts: Canada, Italy, Malta, UK, US.

Main Outcome Measures: Advances in pharmacy services, models of practice.

Results: Across all five countries, community pharmacists are taking on more clinical work[1]: offering POCT in Malta[2], managing minor illness in the UK[3], using advanced practice models for chronic conditions in the USA[3] and Canada[4] and providing respiratory care in Italy.[5]

Conclusion: Evidence from the five countries shows a clear expansion of pharmacists clinical roles.

References:

1. Atkinson J. Advances in pharmacy practice: a look towards the future. Pharmacy. 2022;10(5):125. doi:10.3390/pharmacy10050125.

2. Busuttil CA, Wirth F, Azzopardi LM. Establishing a community pharmacist-led vitamin D point-of-care testing service. J Am Coll Clin Pharm. 2023;6(12):1330–1335. doi:10.1002/jac5.1867.

3. Cunha Leal MLG, Rodrigues AR, Bell V, Forrester M. Exploring the evolving role of pharmaceutical services in community pharmacies: insights from the USA, England, and Portugal. Healthcare. 2025;13(15):1786. doi:10.3390/healthcare13151786.

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Strategies for Health and Safety Risk Reduction in Pharmacies

Maria Pia Caruana

Background: Health and safety risks in pharmacy are a concern which may impact patients and pharmacy staff. By identifying and mitigating health and safety risks, a safer environment may be created.

Objectives: To identify and quantify health and safety risks in hospital and community pharmacy settings. Risk mitigation strategies are put forward.

Design: A questionnaire was developed and validated to collect data on risks in community and hospital pharmacy settings. Pharmacists rated risks on a five-point Likert scale, from 1 to 5 (1 being the lowest score) according to frequency and potential severity. The risk priority number (RPN) was calculated by multiplying the frequency and severity of each risk and the average RPN was calculated. Risks were ranked as low (1-8), medium (9-16), or high (17-25). A 3 hour observational study was carried out in ten community pharmacies, selected via convenience sampling, where physical risks within the pharmacy were observed.

Results: The questionnaire was answered by 100 pharmacists, of which 85% have experience in community pharmacy. The risk having the highest RPN in both settings is communication errors (11.5). In community pharmacy settings, the risk having the highest RPN is errors on prescriptions (10.93), whilst that in hospital settings is administration of the wrong dose (4.82). From the observational studies, it was noted that one pharmacy had a ramp which was not clearly marked, three pharmacies do not dispose of sharps correctly, one pharmacy does not dispose of waste from point-of-care testing correctly, three pharmacies had cords which were unsafely placed, and in two pharmacies, step stools and ladders were stored hazardously.

Conclusions: In community and hospital pharmacy settings, communication errors present the highest risk, whilst in community settings, errors on prescriptions present the highest risk.

M.Pharm. Students

DISSERTATION ABSTRACTS

Pharmacotherapeutics

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Adnan Rehmat

Pharmacist Interventions in Ambulatory Cancer Care

Ylenia Marie Xerri

Background: Cancer treatment has drastically evolved over the years, leading to the transition of cancer care from an inpatient to an outpatient setting. Pharmacists can contribute to ambulatory cancer care, given their expertise in the use of drugs and their accessibility in the community.

Objective: To identify pharmacist interventions that support cancer patients in the community, analyse the challenges associated with pharmacist interventions in cancer care and propose solutions to address the associated challenges.

Design: A questionnaire was developed, validated and disseminated to community pharmacists in Malta and Gozo. Interventions carried out by community pharmacists to support cancer patients and pharmacists' perceptions on future considerations were evaluated. Results are discussed within a focus group of healthcare professionals to provide insights for improvement.

Setting: Community pharmacies.

Main Outcome Measures: Identification and evaluation of community pharmacist interventions that support ambulatory cancer patients.

Results: A total of 81 community pharmacists responded to the questionnaire. Patients seek advice from community pharmacists regarding medications (n=63), side effects management (n=62) and guidance on nutrition and lifestyle (n=34). A small percentage of pharmacists feel highly confident in providing cancer-related advice (n=6) and in dispensing anticancer medications (n=7). Lack of training and knowledge (n=65) and limited collaboration with other healthcare professionals (n=59) were the most prevalent barriers to carrying out cancer care interventions.

Conclusion: The findings of this study highlight that lack of training and knowledge is the most significant challenge community pharmacists face in cancer care interventions. Despite their lack of confidence, pharmacists are willing to intervene, emphasizing the need for targeted training programmes and enhanced collaboration with healthcare teams.

Use of Empagliflozin in the Management of Heart Failure

Yosef Jarboua

Background: Sodium-glucose cotransporter 2 inhibitors (SGLT2i) are recommended as a foundational therapy for patients with heart failure with reduced ejection fraction (HFrEF) to reduce risk of HF progression and cardiovascular (CV) mortality. At the time of the study, SGLT2i were not listed on the NHS formulary for HF management.

Objective: To assess use, efficacy and safety of empagliflozin in patients with HFrEF.

Design: Patients with HFrEF receiving empagliflozin and an equal number of age-gender-matched patients not receiving empagliflozin were identified from the HF Clinic database. Patients were monitored over 12 months using hospital records for efficacy and safety outcomes. The Chi-square test was used for descriptive statistics ($p<0.05$ statistically significant).

Setting: HF Clinic, Mater Dei Hospital

Main Outcome Measures: Efficacy and safety outcomes (CV-related hospitalisation, all-cause mortality, side-effects).

Results: Sixty patients were assessed (30 on empagliflozin, 30 not on empagliflozin, 30 male, 30 female, modal age 70-79 years). Of the 60 patients, 4 passed away, all of whom not on empagliflozin, while no mortality was reported in the empagliflozin group ($p=0.038$). Fourteen patients not on empagliflozin had a CV-related hospital admission compared to 5 patients in the empagliflozin group ($p=0.006$). Hospitalisation in the empagliflozin group included HF exacerbation (n=4) and fast AF (n=1), while in patients not on empagliflozin hospitalisation included HF exacerbation (n=11), anterior STEMI (n=1), fast AF (n=1), and pulmonary embolism (n=1). Documented side-effects of empagliflozin included urinary tract infection (n=2), acute kidney injury (n=2), diabetic ketoacidosis (n=1), diarrhoea (n=1), pruritus (n=1), lethargy (n=1), and genital irritation (n=1).

Conclusions: This study provides evidence from local practice that empagliflozin use in HFrEF patients is associated with significantly reduced CV-related hospitalisation and all-cause mortality. Side-effects remain important prescribing considerations for empagliflozin use.

Pharmaceutical Perspectives of Stem Cell Therapy

Emiliya Kuriakose

Background: Stem cell therapy has gained significant attention in regenerative medicine due to its potential to regenerate damaged tissues and organs.[1]

Objective: To evaluate pharmaceutical perspectives of stem cell therapy.

Design: A narrative literature review of articles from 2020- 2025 using PubMed and Google scholar was conducted. Keywords applied included “stem cell therapy applications, challenges and solutions of stem cell therapy”.

Setting: Department of Pharmacy University of Malta

Main Outcome Measures: Identification of therapeutic possibilities of stem cell therapy across various disease areas, challenges and strategic solutions.

Results: Articles identified covered therapeutic applications of induced pluripotent stem cells in neurological, cardiovascular and metabolic disorders alongside challenges.[1’2] Development of autologous stem cell therapies and the use of immunomodulatory stem cells reduce immunogenicity and rejection.[3]

Conclusion: Stem cell therapy represents a promising approach in regenerative medicine. Overcoming scientific, ethical and regulatory challenges through multi- disciplinary collaboration is essential to ensure the sustainable integration of stem cell therapy into clinical practice.[1’2]

References:

1. Balistreri CR, De Falco E, Bordin A, Maslova O, Koliada A, Vaiserman A. Stem cell therapy: old challenges and new solutions. Mol Biol Rep. 2020 ;47(4):3117- 3131. Doi: 10.1007/s11033-020-05353-2.

2. Hussen BM, Taheri M, Yashooa RK, Abdullah GH, Abdullah SR, Kheder RK, Mustafa SA. Revolutionizing medicine: recent developments and future prospects in stem-cell therapy. Int J Surg. 2024;110(12):8002-8024. Doi: 10.1097/JS9.0000000000002109.

3. Brianna, Ling APK, Wong YP. Applying stem cell therapy in intractable diseases: a narrative review of decades of progress and challenges. Stem Cell Investig. 2022; 9:4. Doi: 10.21037/sci-2022-021.

Pharmaceutical Perspectives of Gene Therapy

Muhammed Majid Meepata

Background: Gene therapy aims to treat disease by modifying genetic material within patient cells. Pharmaceutical development focuses on vector design, formulation, stability, delivery, and safety. Although major advances have been made, significant challenges remain in large-scale GMP manufacturing, long-term stability, storage, and regulatory approval. Understanding these pharmaceutical elements is essential for translating gene therapy into routine clinical care.

Objective: To examine clinical use of gene therapy and the pharmaceutical, logistical, economic factors influencing its implementation across the EU, with specific attention to challenges faced by smaller Member States.

Design: A review of existing scientific literature and EU regulatory documents on gene therapy medicinal products (GTMPs). The review summarises regulatory frameworks, manufacturing standards and post-authorisation requirements.

Setting: Department of Pharmacy, University of Malta

Main Outcome Measures: Identification of pharmaceutical and logistical barriers, economic pressure, and strategies to optimise EU-wide access, especially for countries with limited infrastructure.

Results: Gene therapies are now used for conditions like spinal muscular atrophy and haemophilia but implementation is complex. GTMPs require specialised GMP manufacturing, small-batch production and strict ultra-cold storage with rapid transport. High cost (€300,000–€2 million) and varied treatment coverage across Member States limit uptake, while smaller countries face added barriers such as limited infrastructure and reliance on regional centres. Overall, regulatory, economic and logistical challenges continue to restrict equitable access.

Conclusions: Integrating gene therapies in the EU requires coordinated pharmaceutical, regulatory, logistical planning. Investment in infrastructure, trained personnel, and sustainable payment models is essential to ensure safe and equitable access, especially for smaller Member States.

Pharmaceutical Perspectives on CAR-T Therapy

Adnan Rehmat

Background: A significant development in the treatment of hematological malignancies is chimeric antigen receptor T cell (CAR-T) therapy, which has shown remarkable remission rates in diseases including acute lymphoblastic leukemia and diffuse large B cell lymphoma.[1] CAR-T therapy, a live medicinal product, requires proper pharmaceutical control to assure safe and successful clinical use.

Objective: To explore CAR T therapy from a pharmaceutical perspective, with particular emphasis on its relevance to clinical pharmacists.

Design: A narrative literature review will be conducted using clinical guidelines and peer reviewed literature identified through databases such as PubMed and Google Scholar to explore pharmacist related responsibilities across the CAR T treatment pathway. Three key themes will be explored: (1) pharmacist integration into treatment preparation and medication review; (2) involvement in safety monitoring, including recognition and management support for cytokine related toxicities; and (3) long term follow up aligned with pharmacovigilance frameworks requiring extended patient monitoring.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measure: Identification of pharmacist specific roles and responsibilities in the safe use, monitoring, and long term management of CAR T therapy.

Results: Findings indicate that pharmacists play an essential role across the CAR T lifecycle, from coordination of lymphodepleting chemotherapy to post discharge support and pharmacovigilance within clinical settings.

Conclusion: As CAR T therapy continues to expand, enhanced pharmacist training in advanced therapeutics is crucial to strengthening patient safety and optimizing long term clinical outcomes.

Reference:

1. Reddy R, Llukmani A, Hashim A, Haddad R, Patel S, Ahmad F, et al. The role of chimeric antigen receptor T cell therapy in the treatment of hematological malignancies: advantages, trials, and tribulations, and the road ahead. Cureus. 2021;13(2): e13552.

M.Pharm. Students

DISSERTATION ABSTRACTS

Social and Administrative Pharmacy

Pharmaceutical Workforce: Job Satisfaction and Interprofessional Collaboration *28*
Daniela Pisani

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Maya Falzon

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Gabriel Busuttil

Potential Measures to Manage Shortages by Facilitating API Sourcing *29*
Leanne Zammit

Pharmaceutical Workforce: Job Satisfaction and Interprofessional Collaboration

Daniela Pisani

Background: Understanding pharmaceutical workforce needs including satisfaction and aspirations for scope of practice supports workforce development.

Objective: To compare job satisfaction of pharmacists in Malta with international data and investigate effects of interprofessional collaboration (IPC) in primary care on job satisfaction.

Design: A questionnaire was disseminated amongst pharmacists in Malta. A literature review is conducted to note multi-national differences in job satisfaction. A focus group was conducted to identify perceived benefits and barriers to implementing proposals which could enhance IPC.

Setting: Department of Pharmacy, University of Malta, Msida.

Main Outcome Measures: To determine the level of pharmacist job satisfaction in Malta and compare it with international data, to understand the effects of IPC on job satisfaction.

Results: A questionnaire distributed amongst 110 pharmacists in Malta revealed that average job satisfaction of pharmacists is 3.82 (on a 5-point Likert scale), with community pharmacists having the highest job satisfaction. This contrasts with other studies which found that community pharmacists usually have lower job satisfaction than those working in other sectors.[1] The main themes that emerged during the focus group were disconnected electronic systems in healthcare, lack of standardisation in primary care, inadequate legal protection for pharmacists, and unfamiliarity between pharmacists and physicians working in the same area.

Conclusion: Aspects that support improvement in pharmacist job satisfaction should be explored and opportunities to improve IPC could contribute to this outcome.

Reference:

1. Al-Jumaili A.A, Sherbeny F., Elhiny R., Hijazi B., Elbarbry F., Rahal M., et al. Exploring job satisfaction among pharmacy professionals in the Arab world: a multi-country study. Int J Pharma Prac. 2022: 30 (2); 160–168. https://doi.org/10.1093/ijpp/riac011

Pharmaceutical Horizons: Opportunities in Pharmacy

Maya Falzon

Background: Pharmacy's versatility allows student engagement in diverse practice fields and influence on its growth. Despite the demand for pharmaceutical services worldwide, the number of graduates has decreased.[1]

Objective: To identify factors contributing towards students choosing their career path and to recommend a strategy showcasing the versatility of the pharmacy profession in current era.

Design: A literature review was conducted to identify tools assessing factors influencing career choice. A questionnaire entitled 'Awareness and Perception of Pharmacy among Teenage Students Questionnaire' was developed in English and registered with the Ethics committee. An expert panel validated the questionnaire electronically and dissemination was conducted via Google Forms to all sixth form institutions. Study findings were analysed.

Setting: Department of Pharmacy at the University of Malta

Main Outcome Measures: To assess the perception and awareness of sixth formers on the pharmacy profession, to identify existing knowledge gaps and address potential misconceptions to demonstrate the versatility and societal impact of pharmacy.

Results: Personal interest and salary are key factors impacting career choice, with preference for a stable career with balanced work-life conditions. The majority identified chemistry, followed by biology as admission requirements, while fewer considered mathematics and physics. Although 118 participants (59%) value pharmacists in healthcare, students have limited awareness of less visible pharmacist roles, leading to only 28 participants (14%) showing interest in pharmacy.

Conclusions: Findings show notable gaps in students' knowledge of the diversity of pharmacy. Further study is ongoing to promote the profession and resolve these misconceptions.

Reference:

1. Koehler T, Brown A. A global picture of pharmacy technician and other pharmacy support workforce cadres. Res Social Adm Pharm. 2017;13(2):271-279. doi: 10.1016/j.sapharm.2016.12.004

Optimising Ethical Review for Pharmacy Students

Gabriel Busuttil

Background: Pharmacy student research frequently requires ethical approval due to the involvement of human participants and health-related data. At the University of Malta (UM), this is governed by the university research and ethics committee (UREC) and the faculty research and ethics committee (FREC). While this framework ensures ethical compliance, students often encounter difficulties related to consent procedures, data protection requirements, and administrative complexity.

Objective: To evaluate and optimise the ethical review process for pharmacy student research at UM by examining student experiences and comparing UM's system with ethical approval models used by other universities.

Design: A mixed-methods approach was used, including review of UM procedures, analysis of an ethics seminar, a questionnaire distributed to pharmacy students, and comparative desk-based research of international university ethics frameworks.

Setting: UM, with comparisons to universities from other countries.

Main Outcome Measures: Student understanding of ethical requirements, common challenges in the approval process, and key differences between UM's ethical framework and those of other institutions.

Results: Eighteen students completed the questionnaire. Many relied on supervisors or peers rather than official guidance when preparing ethics applications. Common challenges included unclear consent requirements, uncertainty around data protection, and long approval timelines. Seminar discussions highlighted additional concerns regarding amendments after approval, anonymous online consent, handling sensitive data, and conducting research abroad. The systems in other universities were compared to that in the UM to explore other risk-based approaches and structured ethics training.

Conclusions: UM's ethical review system provides essential oversight but could be improved through clearer guidance, targeted training, and a more proportionate review process.

Potential Measures to Manage Shortages by Facilitating API Sourcing

Leanne Zammit

Background: The active pharmaceutical ingredient (API) is the component that provides therapeutic effect. API sourcing helps to provide disruption in the supply chain.

Objective: To assess the procurement of raw materials, particularly APIs, for pharmaceutical products and their sourcing strategies, with an emphasis on the impact of drug shortages on the supply chain.

Design: An observation session was conducted at a registered API license holder, followed by thematic analysis. Questions were developed from the data and validated to assess the feasibility of direct API sourcing. Focus groups with pharmacy professionals from Pharmacy Department and Central Procurement and Supplies Unit (CPSU) were conducted. Responses evaluated by a Strength, Weaknesses, Opportunities and Threats (SWOT) analysis.

Setting: Pharmaceutical industry, CPSU and Pharmacy Department in Mater Dei Hospital

Main Outcome Measures: Evaluating benefits and challenges of the current API supply chain and identifying potential improvements for more efficient and reliable procurement.

Results: The thematic analysis identified key themes and used to develop questions on handling of APIs directly. These questions gather professional insight into operational, technical, and strategic factors that would influence direct API handling as an alternative to fully formulated pharmaceutical products. Responses were organised using a SWOT analysis highlighting strengths, weaknesses, opportunities, and threats associated with direct API management. This analysis provided an assessment of practicality, identified potential risks and benefits, and informed decisions on implementing this approach within the current healthcare system.

Conclusions: Evaluates the feasibility of direct API sourcing in healthcare settings to optimise the supply chain and manage drug shortages. Key considerations include storage, regulatory compliance, quality assurance, infrastructure, and specialised training. The findings provide guidance for a more efficient and reliable API procurement.

M.Pharm. Students

DISSERTATION ABSTRACTS

Pharmaceutical Analysis and Medicinal Chemistry

Establishing a Cannabis Testing Facility for Determination of Potency and Contaminants *31*
Maria Celine Azzopardi

Drug Design and Optimisation at the Verona Integron-Encoded Metallo-β-lactamase Enzyme *31*
Elaine Curmi

Drug Design and Optimisation at the a-Glucosidase Receptor *32*
Evan Bonello

Establishing a Cannabis Testing Facility for Determination of Potency and Contaminants

Maria Celine Azzopardi

Background: Background: Cannabis is analysed for cannabinoid content, mycotoxins, pesticide residues and heavy metals. Analysis of cannabis plays an important role in ensuring quality, safety and efficacy of cannabis-based products.

Objective: To identify equipment used for analysis of cannabis, identify challenges encountered when setting up laboratory for analysis of cannabis and to propose a facility for analysis of cannabis.

Design: A questionnaire was developed and validated to identify the main equipment involved in analysis, and challenges encountered when setting up a cannabis testing facility. The questionnaire was divided into the following sections: Testing, Personnel, Finances, Instrumentation/Equipment and Quality and Accreditation. The questionnaire was distributed by email to six laboratories involved in analysis of cannabis. Focus group discussion with stakeholders involved in analysis of cannabis are held to propose a cannabis testing facility.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Identification of the principal instrumentation used for analysis and the most common challenges encountered when setting up a laboratory.

Results: Questionnaire was completed by five laboratories involved in the analysis of cannabis flower (n=5) and cannabis extract (n=2). Cannabis components analysed included cannabinoids (n=5), mycotoxins (n=3) and heavy metals (n=3). High-Performance Liquid Chromatography with Ultraviolet detection was used for determination of cannabinoids (n=4). Analysis of heavy metals involved use of Inductively Coupled Plasma-Mass Spectrometry (n=2). Barriers reported were related to access to training initiatives for personnel (n=3), cost of instrumentation (n=4) and cost of a quality system (n=4).

Conclusion: While cannabis laboratories rely on chromatographic instrumentation, their use is affected by high equipment cost, limited training opportunities and resources required to maintain a robust quality system.

Drug Design and Optimisation at the Verona Integron-Encoded Metallo-β-lactamase Enzyme

Elaine Curmi

Background: Antibiotic resistance is a major global health threat, largely due to multidrug-resistant Gram-negative bacteria producing carbapenem-hydrolysing metallo-β-lactamases. Verona integron-encoded metallo-β-lactamase-2 (VIM-2) is clinically prevalent, hydrolysing most β-lactams, including carbapenems. Current inhibitors are ineffective against class B enzymes, leaving limited treatment options[1]. Ligand-based pharmacophore modelling and fragment-based drug discovery are promising strategies to identify novel inhibitors.

Design: This study applied integrated ligand-based virtual screening and structure-based fragment-based drug design to identify and optimise novel small-molecule VIM-2 inhibitors.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Endpoints included predicted binding affinity to the VIM-2 active site, pharmacophoric feature alignment, Zn^{2+} coordination potential, physicochemical and drug-likeness parameters, and in silico toxicity classification.

Results: Two complementary cohorts of potential inhibitors were generated. Ligand-based pharmacophore screening yielded lead-like compounds with favourable predicted binding, while fragment growing and linking produced novel scaffolds targeting key active-site residues and catalytic zinc ions. Selected candidates demonstrated acceptable predicted toxicity and lead-like physicochemical profiles.
Conclusions: The dual ligand- and fragment-based workflow identified structurally diverse, lead-like VIM-2 inhibitor candidates. This approach supports early-stage antibacterial drug discovery and provides a robust foundation for further optimisation and experimental validation.

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Drug Design and Optimisation at the a-Glucosidase Receptor

Evan Bonello

Background: Type 2 diabetes mellitus is characterised by chronic hyperglycaemia, with postprandial glucose absorption contributing significantly to disease progression. α-Glucosidase catalyses the final steps of carbohydrate digestion, and its inhibition is an established therapeutic strategy. However, currently available α-glucosidase inhibitors are limited by suboptimal potency and gastrointestinal adverse effects. Baohuoside-1, a natural flavonoid, has demonstrated potent inhibitory activity and favourable binding characteristics, supporting its use as a lead scaffold for rational drug design.[1]

Design: This study combines virtual screening with a fragment-based de novo drug design approach incorporating pharmacophore modelling, virtual screening, molecular docking and conformational analysis to generate novel α-glucosidase inhibitor candidates.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Study endpoints included two molecular cohorts with predicted binding affinity to the α-glucosidase active site, pharmacophoric feature alignment, physicochemical and drug-likeness parameters, and in silico toxicity classification.

Results: The computational workflow yielded structurally diverse Baohuoside-1-derived compounds with improved predicted binding affinity, favourable bioactive conformations, and compliance with lead-likeness and drug-likeness criteria. Top candidates are anticipated to demonstrate acceptable predicted toxicity profiles.

Conclusions: This study identifies novel, lead-like α-glucosidase inhibitor scaffolds with improved predicted affinity and drug-likeness, supporting virtual screening and fragment-based de novo design for early-stage antidiabetic drug discovery.

Reference:

1. Phan M, Wang J, Tang J, Lee Y, Ng K. Evaluation of α-glucosidase inhibition potential of some flavonoids from Epimedium brevicornum. LWT – Food Science and Technology. 2013;53(2):492–498.

M.Pharm. Students

DISSERTATION ABSTRACTS

Global Pharmacy

Global Perspectives on Pharmaceutical Workforce *34*
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Global Perspectives on Pharmaceutical Workforce

Dodette Mercado

Background: A well-distributed health workforce is essential for effective health systems and progress toward universal health coverage (UHC). Despite global initiatives, substantial workforce shortages and inequities persist, particularly in low- and lower-middle-income countries. Pharmacists play a critical role in ensuring the safe and effective use of medicines and supporting public health services; however, the pharmaceutical workforce remains underrepresented in global workforce planning. Evidence shows significant regional disparities in pharmacist density, education capacity, and training infrastructure. Understanding future workforce supply and demand is essential to inform policy and ensure equitable access to pharmaceutical services by 2030.

Objective: To assess the current global pharmaceutical workforce and analyse projected workforce capacity to 2030.

Design: This dissertation employs a data-scoping study design with a narrative review approach to examine global trends in the pharmaceutical workforce toward 2030.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measure: Projected global distribution and growth of the pharmacy workforce by 2030.

Results: The World Health Organization (WHO) projects a global health workforce shortfall of approximately 10–11 million workers by 2030, reduced from 18 million in 2016, with the largest deficits in low- and lower-middle-income countries.[1] Although WHO data specific to pharmacists are limited, the International Pharmaceutical Federation (FIP) estimates a 24% increase in the global pharmacy workforce by 2030. However, disparities in education capacity, training infrastructure, and workforce distribution—particularly in low-income settings—are likely to limit the ability of workforce growth to meet rising demand.[2]

Conclusion: Despite projected improvements, global health workforce shortages are expected to persist by 2030, particularly in resource-limited regions, challenging progress toward UHC.[1] Although the pharmacy workforce is anticipated to expand, uneven growth and systemic constraints suggest pharmacist supply will continue to lag behind demand in many regions.[2] Strengthened workforce planning, expanded education capacity, and targeted retention strategies are urgently needed.

References:

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2. International Pharmaceutical Federation (FIP). Pharmacy Workforce Intelligence: Global Trends Report. The Hague: FIP; 2018. Available from: https://www.fip.org/file/2077

Medical Device Regulation in India

Kebin Paul

Background: Medical devices are essential for disease prevention, diagnosis, monitoring, and treatment. In India, the sector has grown rapidly with rising healthcare needs and technological advances. Earlier regulated under drug laws, devices faced uncertainty.[1] The Medical Device Rules (MDR) 2017 proposed a separate, risk-based regulatory framework aligned with global standards.[2]

Objective: To review the current medical device regulatory framework in India, identify major challenges and examine government initiatives that support safety, innovation, and domestic manufacturing.

Design: This is a descriptive and analytical review based on secondary sources such as regulatory guidelines, government policies, and published studies.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Evaluation of device classification, regulatory requirements, compliance challenges, and post marketing surveillance.

Results: Medical devices are classified into four risk-based classes (A to D).[1] The MDR, 2017 has improved safety and regulatory clarity, but complex rules, frequent changes, limited local production, and high import dependence remain challenges, especially for small and medium enterprises.[2]

Conclusions: India's medical device regulation is developing. Simplifying rules, strengthening regulation, and supporting local manufacturing are key to ensuring innovation and affordable healthcare.[2]

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1. Radhadevi N, Balamuralidhara V, Pramod Kumar TM, Ravi V. Regulatory guidelines for medical devices in India: An overview. Asian J Pharm 2012:6:10-17.

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Pharmaceutical Services for Infectious Diseases in Pakistan

Ayesha Saeed

Background: Pakistan faces a high burden of infectious diseases, including tuberculosis, COVID-19, hepatitis B and C, malaria, typhoid, measles and polio.[1] Pharmaceutical services play a vital role in disease prevention, treatment via medicine, vaccination support and patient education.

Objective: To evaluate the role of pharmaceutical services in the management of infectious diseases in Pakistan.

Design: The study covered public and private health-care facilities, including hospitals, community pharmacies, and immunisation centers. Article published between 2016 and 2025 were reviewed. Data was obtained from national health policies, Drug Regulatory Authority of Pakistan and Expanded programme on immunisation reports, World Health Organization publications, and relevant research literature.

Main Outcome Measures: Evaluation of pharmaceutical services in Pakistan.

Setting: Department of Pharmacy, University of Malta.

Results: Pharmaceutical services supported the management of infectious diseases and vaccines across health care settings. Pharmacists in Pakistan mainly contributed to dispensing and counseling with limited involvement in immunisation. Inappropriate antibiotic use and weak antimicrobial stewardship was commonly observed.[2] Staff shortages and training gaps affected service effectiveness.

Conclusion: Strengthening pharmacist involvement, improving supply chain management, enhancing training, and enforcing regulatory policies are essential to optimise pharmaceutical services and improve public health outcomes in Pakistan.

References:

1. Bilal W, Qamar K, Abbas S, Siddiqui A, Essar MY. Infectious diseases surveillance in Pakistan: challenges, efforts, and recommendations. Annals of Medicine and Surgery. 2022; 1;78.

2. Hassan A, Ur Rehman N, Maqbool S, Arif M. Pharmacist-led antibiotic interventions in infectious disease patients: a Pakistani tertiary care antimicrobial stewardship study. Journal of Pharmaceutical Policy and Practice. 2025; 31;18(1):2450017.

Global Perspectives on E-Prescribing Practices

Rasha Nasr

Background: In the digital era, e-prescribing has become a cornerstone of healthcare systems. It provides an efficient and secure transmission of prescriptions among patients, prescribers, and pharmacies.[1] Its implementation varies dramatically across and within global regions.

Objective: To compare e-prescribing practices across and within major regions, to highlight opportunities while identifying challenges and barriers.

Design: Based on a systematic review of literature and reports. Reliable academic databases such as PubMed and Google Scholar were used.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Definition of e-prescribing practices, global mapping of its adoption levels, and identification of the main challenges alongside the opportunities.

Results: E-prescribing is adopted unevenly globally. In Europe, the Nordic countries are the leaders in the field of e-prescribing. The U.S. has high adoption but faces integration issues, while in developing nations like Kenya, efforts to improve exist, regardless of the barriers.[2] E-prescribing enhances safety and efficiency, but challenges like cost, limited infrastructure, and technical issues create significant obstacles for adoption.

Conclusions: E-prescribing is creating safe and efficient healthcare, which differs substantially worldwide. Encouraging and investing in digital infrastructure are critical for spreading the benefits of e-prescribing fairly and effectively across the globe.

References:

1. Yazdi FB, Barraclough F, Collins JC, Chen J, El-Den S. Stakeholder perspectives on electronic prescribing in primary care: a scoping review. J Am Pharm Assoc. 2024;64(4):102054. doi: 10.1016/j.japh.2024.102054.
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Global Perspectives on Infectious Diseases and Vaccines

Rezin Roy

Background: Infectious diseases remain a major global health burden, contributing significantly to morbidity and mortality worldwide.[1] Vaccination is a proven public health intervention that has prevented millions of deaths from vaccine-preventable diseases.[2]

Objective: To assess the global burden of infectious diseases and evaluate the role and challenges of vaccinations across developed, developing, and least developed countries.

Design: Literature review analyzes peer-reviewed studies, global burden analyses, and official reports from the past 7 years to evaluate infectious disease trends, vaccine coverage, and economic disparities.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Global infectious disease burden, vaccination coverage rates, vaccine-preventable disease trends, and inequities in vaccine access and implementation.

Results: Evidence indicates that developed countries generally achieve higher and more stable vaccination coverage than many developing and least-developed countries.[3] Despite notable progress, significant gaps in immunization persist, leading to outbreaks of preventable diseases in regions with low coverage.[2]

Conclusions: Addressing inequities in vaccine access, strengthening immunization services, and expanding global health efforts are necessary for sustained improvements in global health.[2,3]

References:

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2. World Health Organization (WHO). Immunization Agenda 2030: mid-term review 2025 [Internet]. Geneva: World Health Organization; 2025

3. World Health Organisation (WHO). Immunization coverage [Internet]. Geneva: WHO; 2025 [cited 2025 Jan 8]. Available at: https://www.who.int/news-room/factsheets/detail/immunization-coverage

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Medical Device Regulation in Africa

Obed Oduro Darko

Background: Medical devices are vital components of healthcare systems supporting disease prevention, diagnosis, treatment, and rehabilitation. Effective regulation is critical to ensuring quality and performance. In Africa, regulatory frameworks for medical devices remain uneven and weak compared to the regulatory systems in the European Union.[1]

Objective: This study aims to examine the current medical device regulations in Africa, identify key regulatory gaps and challenges and explore ongoing international initiatives to strengthen regulatory capacity.

Design: A comparative literature review using peer-reviewed journal articles, WHO publications and regulatory reports from African countries.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Evaluation of national regulatory frameworks, degree of risk-based classification, reliance on international conformity assessment, implications for patient safety and local device manufacturing.

Results: Many African countries lack effective legislation or regulatory authorities. Where frameworks exist, external regulatory approvals are heavily relied on with limited pre-market evaluation and weak post-market surveillance. Key challenges include inadequate technical expertise, funding and poor governance.[1] African Medicines Regulatory Harmonization program initiative show potential to improve regulatory efficiency and convergence.

Conclusion: Medical device regulation in Africa is progressing but remains uneven and influenced by economic capacity. Strengthening regulatory institutions and integrating policies that support local production are critical to improving access, safety and sustainability of medical devices across the continent.

Reference:

1. Aderoba A., Fuller S., Molyneux S., Nasir N., Were F., Medical device regulation and oversight in African countries: a scoping review of literature and development of a conceptual framework. BMJ Glob Health 2023;8: e012308. doi:10.1136/bmjgh-2023-012308

Community Pharmacy Practice in Mauritius

Jessika Mungroo

Background: Community pharmacists are an integral part of the primary healthcare systems in both Mauritius and Europe. Their roles and service scopes differ notably between these regions due to variations in regulations, professional training models, and national healthcare priorities.[1]

Objectives: To compare community pharmacy practices in Mauritius and Europe, emphasising key similarities and differences in regulatory systems, service models, and professional roles; To explore how European approaches can aid the development of community pharmacy in Mauritius.

Design: A comparative review methodology is used, including literature reviews and policy analysis. The study investigates aspects such as regulatory affairs, range of services, practice scope, and evolving roles of pharmacists. Data is sourced from government publications, official policy documents, international standards, and peer-reviewed research articles.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Good Pharmacy Practice, scope of pharmacy services, pharmacist professional role.

Results: Pharmacies in Mauritius are easily accessible and play a vital role in promoting public health. Challenges such as affordability issues, limited clinical roles and medicines shortages are encountered. European systems showcase broader pharmacist roles and stronger regulation.[2]

Conclusions: Adopting elements of European pharmacy practice, such as expanded clinical services, improved regulation and integration with primary care, could enhance pharmacist development and patient outcomes in Mauritius.

References:

1. Competition Commission of Mauritius. Market study into the pharmaceutical sector in Mauritius; 2021 Jun 8 [cited 2025 Dec 15]. Available from: https://competitioncommission.mu/wp-content/uploads/2021/06/MS004-FullReport-080621.pdf

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M.Pharm. Students

DISSERTATION ABSTRACTS

Digital Health

Wearables and Mobile Applications: Pharmacist-Led Patient Monitoring *39*
Ylenia Grech

Healthcare Professionals Needs for a Digital Maltese Medicines Information System *39*
Loredana Agius

Wearables and Mobile Applications: Pharmacist-Led Patient Monitoring

Ylenia Grech

Background: Digital technologies are important tools that improve patient's health. The healthcare industry is rapidly transforming with the emergence of digital health, particularly through mobile applications and wearable devices for easier patient monitoring.

Objectives: To assess the use of mobile applications and wearable devices by patients and to identify challenges faced by patients and community pharmacists when using digital health tools.

Design: A questionnaire for community pharmacists was developed, validated and distributed through the Pharmacy Council. A second questionnaire for patients was developed, validated and distributed in ten geographically spread pharmacies across Malta and Gozo.

Setting: Community pharmacy

Main Outcome Measures: Assessing pharmacists' knowledge and patients' perceptions of digital health use in community pharmacies.

Results: A total of 73 pharmacist questionnaires were collected. Of these, 41 (56%) had never recommended a mobile application or wearable device. The majority 62 (85%) reported not feeling adequately trained in digital health, while 72 (99%) stated more patient education is required. The main challenges faced by pharmacists were difficulties in communicating with patients who lack understanding and insufficient knowledge about the latest technologies. From patient questionnaires, 616 responses were collected. Only 30% reported using mobile applications or wearable devices to monitor their health, with 74% of them having tertiary education, 70% being female and the majority residing in the Northern Harbour. The most monitored parameters were pulse (52%), sleep and calories (45%). Amongst non-users, 45% stated that lack of awareness and education regarding digital health was the main barrier to adoption.

Conclusion: The use of digital health tools among patients remains limited, and community pharmacists require further training. Addressing these challenges could enhance the role of pharmacists in supporting digital health adoption.

Healthcare Professionals Needs for a Digital Maltese Medicines Information System

Loredana Agius

Background: Drug Information sources in Malta include the British National Formulary (BNF), the Maltese Medicines Handbook and the Malta Medicines Authority (MMA) database.[1]

Objective: To assess availability of medicinal products' information on the local market in the BNF.

Design: The MMA database was downloaded and duplicates were removed. Using Microsoft Excel, each item was assigned a random number electronically and a sample was generated. The first 800 items were selected from the 4065 items and assessed with respect to availability of information in the BNF. The BNF 85 edition (2023) was used.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Number of medicines listed in the MMA database sample found and not found in the BNF.

Results: Out of the 800 items, 679 (85%) items were found in the BNF and 121 items (15%) were not. The 121 items absent from the BNF were classified by therapeutic class: Cardiovascular drugs were the most frequent drugs (27 drugs), followed by Respiratory drugs (14 drugs) and Central Nervous System drugs (12 drugs). Among the 679 items present in both sources, 10 items were found with the Active Pharmaceutical Ingredient (API) only, 11 items were found with the API and strength, 65 items were found with the API and formulation, and the remaining items amounting to 593 were found with the API, strength and formulation.

Conclusion: This study highlights gaps between local availability and BNF listings and supports further research on healthcare professionals' expectations and development of proposals for on-line medicines information system.

Reference:

1. Farrugia L. Drug Information Sources for Community Pharmacy Practice. Department of Pharmacy, University of Malta [Dissertation]; 2023

M.Pharm. Students

DISSERTATION ABSTRACTS

Pharmacy Education

Generative Artificial Intelligence in Pharmacy Education *41*
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Gap Analysis of Needs of International Students Joining the MPharm Programme *41*
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Shavej Khan

Generative Artificial Intelligence in Pharmacy Education

Tobechukwu Innocentia Anyanwu

Background: Generative Artificial Intelligence (Gen-AI) is influencing the way information is assessed and applied in healthcare education, which can potentially improve learning outcomes and enhance the professional growth of future healthcare professionals, including pharmacists.[1]

Objectives: To analyse evidence from the literature and compare this evidence with contributions from a focus group to reflect on Gen-AI ethical use in pharmacy education.

Design: Using the PRISMA framework, a systematic literature review was conducted from open access journal resources published between 2021 and 2025 on Google Scholar, ResearchGate and PubMed. A focus group discussion consisting of pharmacists and academics will be held, and their perspectives will be compared with the resulting domains of focus from each piece of literature.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Literature resources on Gen-AI use in pharmacy education and developing a policy framework that promotes ethical use of Gen-AI in pharmacy education.

Result: A total of 73 articles in journals were reviewed, with each article selected based on Gen-AI relevance to pharmacy education. More than 20% of these journal articles iterated on the importance of leaning towards the ethical use of Gen-AI, especially when academic integrity is at stake.

Conclusion: Pharmacists, who are highly skilled healthcare professionals, are an integral part of the healthcare workforce; contributing to the development of Gen-AI tools, policy frameworks, and guidelines will help facilitate the leveraging of Gen-AI to enhance pharmacy education and training.

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1. Furey P, Town A, Sumera K, Webster CA. Approaches for integrating generative artificial intelligence in emergency healthcare education within higher education: a scoping review. Critical Care Innovations. 2024; 7(2):34–54. doi: 10.32114/CCI.2024.7.2.34.54

Gap Analysis of Needs of International Students Joining the MPharm Programme

Benjamin Bumkeng Ushahemba

Background: An increasing number of Third Country National (TCN) pharmacists are enrolling in the University of Malta's MPharm programme to obtain EU-recognised qualifications. Variations in prior education, regulatory knowledge, and cultural adjustment pose challenges to effective academic and professional integration. Addressing these factors is essential to ensure competency development and equitable learning outcomes.

Objective: To evaluate educational and professional adaptation needs of TCN pharmacists enrolled in the MPharm programme and compare their competencies with those defined in Nigerian and Maltese pharmacy frameworks.

Design: This mixed-methods study combined document review and survey analysis. Curricular content from Nigeria and Malta was compared against the PHAR-QA[1] and FIP competency frameworks,[2] and a 10-item, anonymous online questionnaire was developed for administration to TCN students and MPharm graduates.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Perceived academic preparedness, competency alignment, adaptation challenges, learning facilitators, and institutional support needs.

Results: Findings from the framework comparison showed substantial overlap in scientific foundations but notable gaps in EU-specific subjects, including pharmaceutical legislation and regulatory affairs. Key challenges included workload intensity, adapting assessments, and uncertainty regarding licensing. Mentoring and structured regulatory guidance were identified as major facilitators of integration.

Conclusion: The study highlights the need for targeted academic and regulatory support to optimise the integration and competency development of TCN pharmacists within the MPharm programme.

References:

1. Atkinson J, Rombaut B, Sánchez Pozo A, Rekkas D, Veski P, Hirvonen J, Bozic B, Skowron A, Björnsdottir I, Wilson K, Bates I. Competency Framework for Pharmacy Practice in Europe (PHAR-QA Project). Eur J Pharm Sci. 2016;80:1–9.
2. International Pharmaceutical Federation (FIP). Global Competency Framework (GbCF v1). The Hague: FIP; 2021.

Pharmacy Practice and Education in Egypt

Lydia Samir Hanna Youssef

Background: Pharmacy practice and education in Egypt has improved drastically during the last few years to match the evolution witnessed worldwide. The introduction of Pharm D degree, clinical pharmacy studies into the curriculum and enhancement of pharmacy practice were measures adopted to upgrade education and professional levels of graduates intended to support the quality of public health and patient safety.[1]

Objective: To provide an overview of pharmacy education and practice in Egypt highlighting progress and development, to show how clinical, technical and commercial aspects influence professional practice.

Design: A literature-based description using articles published between 2010 and 2025 of pharmacy education and practice in Egypt.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Changes in curriculum, scope of pharmacist role and strategies for advancing pharmacy practice in technical, clinical service and commercial aspects.

Results: The incorporation of clinical pharmacy and practice in the Egyptian pharmacy education in 2019 has contributed to allow more advanced pharmaceutical professionals.[1] Lack of equal opportunities between university systems in different governorates and variabilities between public and private universities (which started 1996)[1] have caused graduates to face challenges to practice effectively in hospitals and their role remains primarily dispensing-based.

Conclusion: Pharmacy education and practice in Egypt is showing promising progression, but more amendments are needed to expand clinical roles and promote continuous professional contributions to patient centered care and public health.

Reference:

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Pharmacy Practice and Education in Ghana

Ebenezer Andy Quarshie

Background: Pharmacy education and practice in Ghana have evolved to patient-centered care since commencement of training of dispensers through apprenticeship to present, where training institutions are university-based[1]. Pharmacy education in Ghana is regulated by Pharmacy Council of Ghana (PCG) with eight accredited universities offering the PharmD program.[2]

Objective: To evaluate pharmacy practice and education in Ghana, to compare the practice with global standards and to identify gaps and propose recommendations.

Design: A qualitative analysis of the education and practice of pharmacy in Ghana by reviewing existing literature, past research work, studies on PubMed, curriculum structure and data acquired from PCG.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Comparison of pharmacy education and practice in Ghana with other countries.

Results: Pharmacy practice and education in Ghana is patient centered, which is the current global standard. Admission requirements into the program include West Africa Senior School Certificate Examinations. The course duration is 6 years for the Doctor of Pharmacy degree. Findings showed access to resources was in favour of hospital pharmacists, while community pharmacists benefitted from stronger patient ties.

Conclusions: Pharmacy practice and education in Ghana is gradually undergoing reforms to align with world standards and to enhance better patient outcomes.

References:

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Pharmacy Education in the Philippines

Paulyn Babayen-on

Background: Pharmacy education in the Philippines has advanced under Commission on Higher Education mandated outcomes-based curriculum which include public health, professional, and experiential competencies. The degree to which programs systematically integrate competency standards into curricula differs considerably among institutions.[1]

Objective: To evaluate the extent to which pharmacy education in the Philippines aligns with global frameworks, and to identify strengths and gaps in the curricula.

Design: Comparative review of pharmacy education in the Philippines, drawing from analyses of existing literature, curriculum design, and policy documents is conducted. Data obtained from the Commission on Higher Education (CHED) and from global competency frameworks is considered.

Setting: Pharmacy Educational Institutions in the Philippines.

Main Outcome Measures: Comparison of pharmacy education in the Philippines against international frameworks.

Results: Philippine pharmacy education continues to evolve, with 112 accredited universities, seven of which offer a Master of Science in Pharmacy, and four a Doctor of Pharmacy, including two that offer both. The duration is four years for the Bachelor of Science in pharmacy. Twenty schools were used for curriculum mapping against the FIP competency framework, [2] revealing notable gaps in Pharmaceutical Public Health (mean curriculum coverage=10.67%) and Organization/Management (12.96%), while 33.21% of the BS Pharmacy curricula covers Pharmaceutical Care.

Conclusions: With constant reforms to align with the global standards, pharmacy education in the Philippines is continuously undergoing transitions to become more patient-focused.

References:

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2. International Pharmaceutical Federation. Quality Assurance of Pharmacy Education: the FIP Global Framework (2nd ed.). The Hague: FIP; 2014.

Entrustable Professional Activities in Pharmacy Education

Shavej Khan

Background: Pharmacy education is shifting toward competency-based models to ensure graduates are practice-ready. Entrustable Professional Activities (EPAs) translate abstract competencies into observable workplace tasks. While established in medicine, their integration into pharmacy remains variable as the profession moves toward advanced roles like independent prescribing.[1]

Objective: To evaluate the significance of EPAs in pharmacy education, analyze current practices, and identify implementation challenges in clinical settings.

Design: A qualitative narrative review was conducted using academic databases to synthesize evidence from peer-reviewed literature and policy documents.

Setting: Department of Pharmacy, University of Malta.

Main Outcome Measures: Student and facilitator perceptions, entrustment progression, and the utility of quality rubrics like EQual and QUEPA.[2]

Results: EPAs enhance accountability and autonomy, yet implementation is hindered by facilitator "assessment anxiety," high workloads, and lack of standardized frameworks.[3] Over 85% of students view EPAs as highly relevant3. Notably, students often report a "regression" in confidence as they encounter real-world task complexity. In regions like India, the transition is further slowed by a historical focus on industry over clinical practice.[4]

Conclusion: EPAs bridge the gap between theory and practice. Success requires a co-design approach and validated rubrics to ensure graduates are truly prepared for professional responsibilities.

References:

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Master of Science in Pharmaceutical and Regulatory Sciences

DISSERTATION ABSTRACTS

Assessing Harmonisation of Pharmaceutical Regulatory Sciences *45*
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Assessing Harmonisation of Pharmaceutical Regulatory Sciences

Paul Immanuel Buhagiar

Harmonization is the acceptance of a single set of standards and regulations, creating a more unified community, thus allowing for easier access to the global market. An assessment of current harmonization initiatives along with a comparison of the Indian and European pharmaceutical sector was undertaken. Harmonization efforts include the standards set by WHO, the dossier template created by the ICH, and inspection guidelines published by PIC/S. India is a global supplier of medicines, whilst Europe focuses on innovation and discovery.

Compliance in Quality Control Reviewing Processes of Finished Products

Claudia-Angélè Galea

Reviewing of quality control (QC) documentation of finished products testing is fundamental in ensuring product quality, patient safety and regulatory compliance. The aim was to develop a tool for QC reviewers to apply during reviews of different chemical analyses of finished products. The developed and validated tool, in the form of a checklist, assists reviewers to prevent failures in the reviewing process, such as omitting compliance and data integrity checks. The tool includes the documentation and verification of required actions.

Qualified Person Guidance for Technology Transfer at Acceptor Site

Jonathan Schembri

This study addresses the pivotal role of the Qualified Person (QP) in pharmaceutical technology transfer (TT). Questionnaire responses from industry professionals (n=18) showed a discrepancy in extent of QP involvement (n=16, expecting high involvement) versus actual involvement (n=9), with consensus on the need for structured guidance. Subsequently, a comprehensive framework was developed by integrating regulatory guidelines with practical insights, and validated to establish best practices. The Framework provides a QP checklist across seven TT categories, enhancing standardization, compliance, and efficiency.

Product Quality Reviews performed at a Batch Release Site

Matthew Conti

Product Quality Reviews (PQR) depict analytical trends of pharmaceuticals and contributes to monitoring of consistency of medicines. This research aims to conduct a risk assessment on a PQR template to measure risks of non-compliance with Good Manufacturing Practices. The study includes risk identification through review of scientific literature. Risk analysis using risk matrices, utilizing questionnaire findings administered to quality assurance personnel and Qualified Persons from a batch release site. A focus group and Failure Modes and Effects Analysis will serve as risk evaluation.

Implementation of Continuous Process Verification in the Pharmaceutical Industry

Marija Galdes

Continuous Process Verification (CPV) is a critical component of process validation in the pharmaceutical industry, and its implementation presents notable challenges. The aim was to assess current challenges in CPV implementation, and digitalisation opportunities. A literature review and interviews with industry stakeholders were conducted, followed by a SWOT analysis validated through a focus-group discussion. Implemented CPV practices ranged from basic statistical trending to digitalised systems. Strengths identified include proactive control, with data management standing out as a significant weakness.

Risk Management in the Batch Release Process of Biosimilars

Kimberly Vassallo

The aims were to identify critical risk points in the batch release process for biosimilars and to compile a checklist of critical areas aimed for Qualified Persons (QPs). Through literature review, a process flow chart, QP checklist and risk assessment were compiled and validated. The FMEA is assigned to participants to score, from 1 to 5, the severity, probability and detectability of each failure mode. Some QP checks included in the checklist are container integrity testing and environmental monitoring.

Risk Management in Quality Control for Microbiological Processes

Kimberley Bianchi

The aim was to identify risks in the quality control reviewing process for microbiological and sterility finished product testing, and to propose risk mitigation strategies. A literature review was performed and risks identified were illustrated on a fishbone diagram. A risk assessment, using Failure Modes and Effects Analysis, was conducted. Five-point Likert scales, anchored from 1-5, for severity, occurrence and detectability were given for each of the risks and mitigation strategies were proposed by a focus group of five experts.

Regulatory Pathways for registration for Medicinal Cannabis Products

Chris Desira

The research investigates the registration of medicinal cannabis products and their divergence from conventional medicinal product frameworks across different countries. A qualitative methodology, including semi-structured interviews with professionals, is applied to understand differences and identify ways to improve regulatory frameworks. Thematic analysis is performed to identify variability in dossier requirements, application of Common Technical Document principles, and expectations for quality, safety, and efficacy data. There is regulatory fragmentation, inconsistent evidentiary standards, and the need for a structured, risk-based registration framework.

B.Sc.(Hons) Pharm. Tech.

PROJECT DESCRIPTIONS

Evolution of Environmental Sustainability in the Pharmaceutical Sector *48*
Betta Mizzi

Artificial Intelligence in the Pharmaceutical Sector *48*
Jael Ellul

Developing a Glossary of Terms in Pharmaceutical Regulatory Sciences *48*
Noemi Sciacca

Updates in Pharmaceutical Labelling *48*
John Paul Camenzuli

Proactive vs Reactive Risk Management Strategies in Pharmaceutical Technology *48*
Milos Solarevic

Advances in Cannabinoid Profiling Using Supercritical Fluid Chromatography *48*
Shaia Pace

Wearable Devices in Cardiovascular Health Monitoring *49*
Alex Talmaciu

Evolution of Environmental Sustainability in the Pharmaceutical Sector

Betta Mizzi

Growing global concern for environmental impact has prompted the encouragement of the pharmaceutical sector to adopt more sustainable practices. The aim is to evaluate developments which contribute to the evolvement of environmentally conscious processes within the pharmaceutical sector. A literature review is conducted to examine key milestones and achievements within the pharmaceutical industry from 2018 to 2025. Databases like Google Scholar, PubMed and HyDi are applied for the review. The review will assess major sustainability themes, including green chemistry, energy efficiency, waste reduction measures and sustainable packaging.

Artificial Intelligence in the Pharmaceutical Sector

Jael Ellul

This project aims to identify evidence on applications of artificial intelligence in pharmaceutical processes. The selected publications were required to meet predefined criteria outlining the application of artificial intelligence in the field of pharmacy between 2023 and 2025. A total of 93 articles were identified and screened, from which several recurring themes emerged that reflect current developments in pharmaceutical research. These themes include the use of artificial intelligence in drug discovery and formulation development, integration within hospital and clinical pharmacy services, and growing role in cybersecurity measures across pharmaceutical systems.

Developing a Glossary of Terms in Pharmaceutical Regulatory Sciences

Noemi Sciacca

The project aims to establish the organisation and definition of terminology used in the regulatory field, in a way that is clear, easily accessible and consistent with recent sources and by taking into consideration different frameworks and scenarios. The terminology is collected through review of literature, regulatory guidelines and official documentation from global regulatory authorities, from the year 2000 until the present.

Updates in Pharmaceutical Labelling

John Paul Camenzuli

This project examines and assesses innovative physical characteristics established in pharmaceutical labelling. The study concentrates on five main labelling-related areas: primary label advances, secondary labelling innovations, technology-enabled systems, sustainable solutions, and security-focused features. A thorough review of the literature will support the identification and classification of recent trends and advancements, outline the justification for their development, compare essential attributes, and emphasise their role in enhancing patient safety and promoting accountability towards the environment and fostering consumer confidence in the pharmaceutical sector.

Proactive vs Reactive Risk Management Strategies in Pharmaceutical Technology

Milos Solarevic

This project compares proactive and reactive risk management strategies in pharmaceutical technology. An initial Google Scholar search yielded 2,070 results. After refinement using targeted strings for quality risk management and proactive and reactive risk management systems, 420 articles were screened by title and abstract. Sixty-five articles met eligibility criteria and advanced to full-text screening. Among these, the most common proactive strategy was Quality by Design (QbD) (N=25), while corrective and preventive action was the leading reactive strategy linked to quality, cost and patient safety (N=13).

Advances in Cannabinoid Profiling Using Supercritical Fluid Chromatography

Shaia Pace

This project investigates advances in cannabinoid profiling using supercritical fluid chromatography (SFC) compared with already established methods such as the high performance liquid chromatography and gas chromatography. By analysing cannabis testing data sourced from PubMed and Hydi, the study evaluates each technique's accuracy, precision, and the ability to quantify a broad range of cannabinoids. The goal is to determine whether SFC offers superior performance in accuracy, resolution, and analytical throughput relative to conventional chromatographic approaches.

Wearable Devices in Cardiovascular Health Monitoring

Alex Talmaciu

The project aims to review the use of wearable devices in cardiovascular disease management. A literature search was performed in PubMed® using the search terms "wearable devices", "wearables", "smartwatch", "fitness tracker", "cardiovascular" and "heart disease", yielding 1,365 records. After applying filters, namely last five years, free full text, English and human studies, 435 articles remained for title and abstract screening. From these, 171 articles met eligibility criteria for full-text screening and appraisal to assess device technologies, measurement accuracy, clinical utility, associated challenges and limitations, regulatory considerations and future directions.

B.Sc.(Hons) Pharm. Sci Pharmacy Practice

PROJECT DESCRIPTIONS

51
Fourth Year Students

55
Third Year Students

60
Second Year Students

B.Sc.(Hons) Pharm. Sci Pharmacy Practice

PROJECT DESCRIPTIONS

Fourth Year Students

Digitalisation and Older Persons

Ethan Attard

This study aims to assess extent of use of digital pharmaceutical services by older persons. Challenges regarding patient use of devices and electronic systems adopted for patient monitoring are identified by means of a literature review, and questionnaires. Two questionnaires, for patients older than 65 years (with English and Maltese versions) and for pharmacists were developed. Validation and reliability testing were completed. Most values from the reliability testing were >0.5 for Cohen's and p values for Pairwise t-test >0.05 meaning there is no meaningful change in response of the participants.

Digital Tools in the Pharmaceutical Process

Emilie Daniela Bonnici

The aim of the study is to evaluate the type of digital tools implemented in the pharmaceutical processes and their respective roles within the sector. The application of digital tools will be evaluated through the analysis of current trends and challenges. A comprehensive literature review identifies established and emerging technologies, while semi-structured stakeholder interviews provide practical insights. Local practices are further explored through a SWOT analysis. Digital technologies are increasingly transforming pharmaceutical processes by enhancing efficiency, accuracy, and compliance, while also presenting new challenges for educators.

Digitalisation: Online Accessibility to Medicines

Celine Borg

The aim is to assess the safety, quality and efficacy of online pharmacies. Phase 1 involves interviews with pharmacists to explore opinions. The pharmacists highlighted advantages of purchasing medicines online such as patient convenience, increase job opportunities and better accessibility, while addressing potential risks such as counterfeit medicines, data breeches, no counselling and unsafe self-medication. Online pharmacies should implement strict protocols such as authorisation proof and prescription confirmation. Phase 2 consists of reviewing online pharmacy websites from different countries, using a validated data collection sheet to record online pharmacies compliance.

Renal Impairment after Cardiac Procedures

Katrina Borg

This project assesses renal function in diabetic patients undergoing coronary angiogram or elective percutaneous coronary intervention (PCI). Patients are prospectively recruited into two groups; on empagliflozin (n=50), not on empagliflozin (n=50). Periprocedural risk of contrast induced nephropathy (CIN) is calculated, renal risk medications are identified, and renal function is monitored 72 hours post-procedure. Eleven patients (9 male, modal age 61-70 years, 10 angiogram, 1 PCI, 3 taking and 8 not taking empagliflozin) were assessed. CIN risk was low (n=6), moderate (n=3), high (n=2). Six patients attended follow-up; 1 developed CIN.

Patient Monitoring Needs for Chronic Medication

Letizia Briffa

Inadequate patient monitoring during chronic medication use for cardiovascular and endocrine conditions may increase patient risk. This study assesses current monitoring practices and identifies areas for improvement. Ethics approval was obtained from the Faculty Research Ethics Committee. A questionnaire was disseminated to patients using convenience sampling to collect data on adherence to prescribed medication, awareness of required monitoring tests, frequency of monitoring, challenges faced with monitoring and experiences with adverse effects or missed appointments. The findings contribute to development of strategies aimed at improving patient safety and chronic medication management.

Implementation of Clinical Guidelines in Heart Failure Patients in Community Pharmacy

Desiree Camilleri

This study evaluates implementation of guideline-directed medical therapy for heart failure (HF). Patients (N=100) treated for HF are identified from a community pharmacy and use of the four foundational therapies recommended in the European Society of Cardiology guidelines is assessed. From 20 patients recruited (10 male, 10 female, modal age 70-79 years), pharmacotherapy included beta-blockers (n=20), renin-angiotensin-aldosterone system inhibitors (n=19), empagliflozin (n=14), and mineralocorticoid receptor antagonists (n=10). Five patients received all four foundational HF therapies and reasons for non-prescription included lack of physician recommendation (n=15), side-effects (n=4) and contraindications (n=1).

Risks in Sleep Management in Community Pharmacy

Raquel Marie Caruana

The aims are to evaluate poor sleep risk factors and explore community pharmacists' perspectives on sleep health care. A documentation sheet was developed to identify sleep medications dispensed from community pharmacies and used during observational studies. Patients are interviewed on medication type, duration, dose, dosage regimen, and satisfaction with treatment. Two 15-minute interviews have been carried out. Both patients stated that anxiety causes their insomnia. Patients (n=2) reported better management with slow-release melatonin, taking sedating antihistamines when needed. A focus group to quantify drug use risks is set up.

Use of Cannabinoids and Flavonoids in Pain

Kerrie Ciappara

The aim is to identify use of flavonoids and cannabinoids for pain and to assess views, perceptions, and experiences of cannabis use for pain management. Questionnaires on the use of cannabinoids and flavonoids for pain are developed, validated, and disseminated to healthcare professionals and patients. There is varying awareness, acceptance, and experience with cannabis-based therapies for pain. Randomised controlled trials with long-term follow-up are required to confirm efficacy and safety across patient populations and pain conditions.

Management of Heart Failure in Older Patients

Yasmin D'Amato

Heart failure causes significant morbidity and mortality in older adults. Phase 1 of this retrospective study reviewed prescribed heart failure medications in a rehabilitation hospital cohort from January to June 2025. Key findings showed heart failure type was undocumented in 70% of 150 patients reviewed, limiting guideline-based therapy precision. SGLT2 inhibitors, indicated regardless of heart failure type, were prescribed in only 17% of patients. An intervention will be proposed and optimization of treatment will be re-evaluated for a similar patient cohort in phase 2.

Determination of Shelf Stability of Cannabinoid Products

Rowann Darmanin

The project aims to assess the shelf stability of cannabinoid-containing products through market surveillance and guideline-based evaluation. Cannabinoid products available are identified through Maltese pharmacies and online sources, and are categorised according to matrix type, dosage form, cannabinoid content, packaging, storage conditions, and labelled shelf life. Stability requirements outlined in international guidelines for comparable dosage forms are reviewed and correlated with market findings. Preliminary results indicate that packaging type and shelf life information vary between different cannabinoid products, whereas recommended storage conditions remain similar across formulation matrices.

Digital Health Tools: Risks and Ethical Considerations

Emily Desira

This study aims to identify ethical risks associated with digital health tools through interviews with stakeholders. The first interview involved 3 pharmacists, 2 general practitioners, 1 IT specialist, and 1 ethics board member. Six stakeholders have completed the interview. Reported benefits of using digital health tools included autonomy and clearer prescriptions (n=5), digital illiteracy as a barrier (n=4), and security and access threats as risks (n=4). A second interview will propose mitigation strategies for safer and more ethical implementation.

Cannabis for Medical and Recreational Use

Michael Victor Farrugia

Cannabis exerts different physiological effects and has been used for medicinal and recreational purposes. Local and international policies related to the use, testing, and distribution of cannabis for medicinal and recreational purposes are identified and compared. Policies related to the use of cannabis for medicinal and recreational purposes are developed and validated by an expert panel, to identify and suggest areas of improvement in current legislation.

Anticholinergic Burden in Chronic Medication

Mariah Fava Borg

Through a literature review and focus group discussions (5 pharmacists, 3 lay persons), this study evaluates anticholinergic burden assessment tools in community pharmacy practice. It explores the feasibility of integrating the Anticholinergic Cognitive Burden (ACB) scale, Anticholinergic Risk Scale (ARS), and Drug Burden Index (DBI) to optimise medication management in chronic medication users. Findings from the focus group indicate low baseline awareness of these tools; and pharmacists recognised their clinical value, with ARS identified as the most practical option due to its simplicity and suitability for busy community pharmacy settings.

Direct Oral Anticoagulants in the Older Population

Carla Harrison

Anticoagulants are medications used to prevent and treat thromboembolic events. This retrospective study evaluates direct oral anticoagulant (DOAC) prescribing practices in older patients at a rehabilitation hospital and clinical pharmacist intervention in optimizing therapy. Anticoagulants were prescribed in 30% of 475 patients reviewed between June and December 2025, with 6% on warfarin and 94% on DOACs. For patients on DOACs, non-valvular atrial fibrillation was the primary indication, accounting for 63% of cases. Appropriateness of dose according to renal function was confirmed in 70% of patients on DOACs.

Nuclear Medicine: Use of Radiopharmaceuticals

Aya Swan

This study evaluates the use of radiopharmaceuticals in nuclear medicine, focusing on challenges related to accessibility, supply reliability, and cost. A mixed-methods approach is employed, combining analysis of radiopharmaceutical import data with surveys and semi-structured interviews of healthcare professionals. The study assesses the impact of supply limitations on clinical services and explores feasible strategies, including local production initiatives and regional collaboration, to improve efficiency, and patient outcomes within Malta's healthcare system.

Pharmaceutical Waste Management

Julia Xiberras

The presence of pharmaceuticals in the environment can indirectly adversely affect non-target organisms. This study aims to assess waste generation during pharmaceutical processes and evaluate of implemented waste management systems. A comprehensive literature review is conducted to identify current pharmaceutical waste management practices. Structured interviews are conducted with local pharmaceutical stakeholders to establish types of pharmaceutical waste generated locally. Literature highlighted that the pharmaceutical industry contributes primarily to pharmaceutical pollution. From the community pharmacists' perspective, patients' returns of free medicines and expired medicines contribute most to pharmaceutical waste.

B.Sc.(Hons) Pharm. Sci Pharmacy Practice

PROJECT DESCRIPTIONS

Third Year Students

Sustainability of The Falsified Medicines Directive

Naiya Abdilla

The study investigates compliance with the Falsified Medicines Directive, analysing key implementation challenges such as cost, time, competence, and technology. The Directive's sustainability is evaluated by weighing benefits against risks. Interviews with pharmacists and wholesalers, along with checklist-based observations in pharmacies and wholesalers, provide the basis for developing recommendations for improving the system and further assessing the directive's sustainability

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Pharmacist Consultations in Community Pharmacy

Katrina Abela

Through a systematic literature review, pharmacist observations and patient surveys, the study aims to assess current practices and identify opportunities in pharmacist-patient consultations for self-care requests and chronic disease management. Findings provide evidence-based recommendations to enhance accessibility, quality and consistency of pharmacist consultations to support pharmaceutical care services to meet patients' needs.

Use of Tranexamic Acid in Menorrhagia

Shania Abela

This project explores views of patients, pharmacists and physicians regarding use of tranexamic acid and its potential reclassification as a pharmacy (P) medicine for menorrhagia. Questionnaires for patients, community pharmacists, gynaecologists and family medicine specialists are developed and psychometrically evaluated. Patient questionnaires are distributed by five gynaecologists, while pharmacist and physician questionnaires are disseminated online through respective professional bodies.

Knowledge and Perception of Sustainable Practices in Healthcare Facilities

Albert-Lauren Agius

The healthcare sector contributes to global net emissions, making the adoption of sustainable practices critical. Identifying gaps and barriers is essential for a greener healthcare sector. The aim is to evaluate the application of sustainable practices within healthcare facilities and to assess knowledge and perception of healthcare professionals through semi-structured interviews and focus group discussion.

Risks of Herbal and Dietary Supplements in Polypharmacy

Jodie Bonello

The aims are to identify risks of herbal and dietary supplements in polypharmacy and to outline products available on the Maltese market. A systematic literature review covering articles published between 2010 and 2025 using PubMed and Google Scholar is conducted. An observational study in twelve community pharmacies is undertaken to provide an overview of herbal and dietary products found locally through pharmacies.

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e-Labelling of medicinal products

Nicolai Bonello

A literature review assessed international progress, focusing on the European Medicines Agency's development of an e-labelling system. Malta's readiness to implement this system is evaluated through pharmacist-directed questionnaires on geriatric digital capability and acceptance, alongside analysis of risks and feasibility of reducing or potentially eliminating physical labels, including minorities requiring alternative solutions. Interviews with manufacturers and wholesalers examine current label-change frequency and costs.

Patient Safety Improvement Through Repeat Prescribing Practices

Karl Camilleri

This project examines existing repeat prescribing models to determine their effect on patient safety, focusing on aspects such as pharmacist-led monitoring of progress, patient education, and sustainable provision of service. A mixed methodology approach through pharmacist interviews and anonymous patient questionnaires is used. Results should assess weaknesses with repeat prescribing models and strategies to improve patient safety are put forward

Pharmacist Intervention in Transition of Care

Jade Cauchi

This project evaluates the effectiveness of pharmacist-led medication counselling for patients following discharge from a rehabilitation hospital. Through structured telephone follow-up interviews conducted post-discharge, patient understanding and adherence to prescribed treatment are evaluated. Findings identify existing challenges and evidence-based recommendations to enhance the quality and continuity of patient care are proposed.

Digital Transformation in Pharmacy Practice

Kluivert Farrugia

Literature analysis to identify challenges presented in community pharmacy with digital transformation is undertaken. Evidence is gathered from community pharmacies, selected through random sampling, through observation studies to understand current scenario. Questionnaires are disseminated to pharmacists and patients to get insights regarding challenges and needs. A comparative approach is taken up to highlight current practice, pharmacists' expectations and patient's needs

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Lipid Management in Primary Prevention of Cardiovascular Disease

Roberta Fava

This project evaluates pharmacists' and physicians' knowledge, attitudes and practice regarding risk assessment and lipid management for primary prevention of cardiovascular disease (CVD). Separate questionnaires for community pharmacists and physicians, including general practitioners, cardiologists, endocrinologists, internists, nephrologists and neurologists, are developed, validated and distributed. Gaps in current practice are identified and strategies to optimise lipid management in CVD prevention are proposed.

Sustainability in Pharmaceutical Curricula

Francesca Fenech

Pharmaceutical curricula have an important role in the drive towards sustainable approaches to limit the impact of pharmaceutical processes. The aim is to evaluate the incorporation of sustainable education in pharmaceutical curricula. A literature review is conducted to evaluate the inclusion of sustainable education in curricula. A SWOT analysis is undertaken through a focus group discussion.

Reflections from Patients on Benefits from Medicines Use Reviews

Luca Galea

A literature review was completed using the keywords: medicine use review and pharmacist consultation. A survey is used to obtain reflections from Pharmacy-of-Your-Choice patients about medication use reviews (MURs). The survey is distributed online pharmacies selected by convenience sampling. The project highlights benefits and proposes improvements of MURs.

Pharmacist-Recommended Medications

Eliana Gomez Blanco

This study examines how community pharmacists make medication recommendations and how patients respond to these recommendations. It explores rationale for pharmacist-guided treatments and challenges in self-medication. Using in-depth interviews with pharmacists, selected through random and cluster sampling, this study analyses how professional and ethical factors influence decision-making, evaluating the impact of pharmacist-guided care on safe medication use and health outcomes.

Vaccinations for Healthy Ageing

Maria John Adel Youssef

Through an evaluation of vaccination programmes offered to older persons across different countries, this project compares the scope of vaccines and effectiveness in reducing risk of infectious diseases in this population. Questionnaires distributed in health centres explore perceptions and attitudes toward vaccines, providing insights that can help guide strategies to improve vaccine uptake among older adults.

Perceptions of Pharmacist Workforce

Nicola Mejlaq

This research explores how the pharmacist workforce is perceived by the public and other healthcare professionals. The growing involvement of pharmacists in clinical decision-making, patient counselling and public health are used as markers for the perception. Surveys are undertaken to compile local data and comparison with international data compiled from literature is carried out.

Patient Empowerment on Medical Devices

Katya Marie Pace

Safe medical device usage depends on proper patient education. Through the use of specific tools, this study aims to increase and strengthen general understanding on medical devices. An information leaflet explaining information related to medical devices is developed and validated by an expert panel and disseminated.

Meeting Patients' Needs in Community Pharmacy Practice

Marcette Polidano

This study assesses adverse drug effects and suboptimal patient drug knowledge present within community pharmacy settings. It seeks to establish an understanding of these two issues, including their prevalence and potential correlation. Questionnaires, validated by a multidisciplinary team, are administered to pharmacists and patients to identify, understand and develop strategies to address these issues.

Meeting Patients' Needs in Hospital Pharmacy Practice

Owen Portelli

This project aims to assess the framework by which a hospital pharmacy setting operates in relation to meeting patients' needs. Through patient questionnaires and semi-structured interviews with pharmacists, both qualitative and quantitative data is obtained. This data is used to identify strengths, weaknesses, opportunities and threats for improvements in meeting patients' needs in a hospital pharmacy.

Medicines Safety in Animals

Amy Saliba

This study explores perspectives of veterinarians, pharmacists and pet owners on the role of pharmacists in ensuring safe medicine use in animals. Three questionnaires, currently undergoing validation, are developed for each stakeholder group to assess views, experiences and expectations. Findings will identify challenges in community pharmacy practice and guide recommendations to strengthen pharmacist involvement in veterinary pharmaceutical care.

A Toolkit Preparing for an EU-GMP Inspection

Maya Sciberras

A structured toolkit to enhance EU GMP inspection preparedness is developed using EudraLex and ICH standards. Algorithm-based checklists tailored to manufacturing operations are supported by concise guidance to strengthen usability and regulatory alignment. The toolkit is critically evaluated by a multidisciplinary focus group, generating an evidence-based framework that supports more robust, consistent GMP compliance across manufacturing sites.

Pharmacy-based Point-of-Care Testing for Infectious Disease

Maria Scicluna

This study evaluates the feasibility of implementing pharmacy-based point-of-care testing (POCT) for infectious diseases. It involves conducting a systematic literature review to identify suitable POCT methods by assessing advantages and limitations. Policy analysis of international and local regulations is carried out to determine feasibility and legality of practice. Questionnaires are developed to explore pharmacists' perspectives, including willingness, compliance and barriers.

Polypharmacy and Risk of Drug Interactions

Isabelle Sultana

The aims are to investigate drug–drug interaction (DDI) risks in polypharmacy and to evaluate the performance of commonly used DDI checking tools. A systematic literature review to identify prevalent DDI patterns, followed by a comparative assessment of four tools based on precision, comprehensiveness, and clinical relevance is undertaken. The findings aim to support safer prescribing and strengthen evidence-based decision-making.

A Toolkit Guiding the Placing of Medical Devices in the European Market

Marie Vella

The aim is to develop a streamlined toolkit for placing medical devices on the European market, featuring a simplified Medical Device Regulation checklist. A focus group with medical device experts is conducted to validate the toolkit's effectiveness in improving understanding and compliance. The resulting insights are collected to make recommendations for integration into regulatory and industry workflows.

Price Setting Processes of Medicines

Raisa Vella

Medicine pricing in Malta remains a complex and sensitive process. Through observations, stakeholder meetings and focus groups with experts, this study aims to observe current price-setting practices, identify key gaps and propose areas for improvement. Data collected from literature, thematic analysis and SWOT analysis will contribute to achieving a harmonised process for medicine price-setting.

Medicines Re-use as a Sustainable Approach

Elaya Xuereb

Unused medication contributes towards the generation of costly pharmaceutical waste. Reuse of returned unused medication can be considered to diminish this waste and promote sustainability. The aim is to evaluate the perception of pharmacists and public about re-dispensing returned unused medications. Questionnaires are used to identify barriers and facilitators to implement medicine re-use schemes to reduce waste and enhance access.

Remote Patient Monitoring in Heart Failure

Carl Zahra

This project aims to assess perspectives of patients with heart failure on remote monitoring and to explore the contribution of community pharmacists in supporting remote patient monitoring. A mixed-methods study design is adopted. Interviews with patients are conducted to understand their views, experiences and expectations of remote monitoring, while questionnaires are distributed to community pharmacists to gather their insights.

B.Sc.(Hons) Pharm. Sci Pharmacy Practice

PROJECT DESCRIPTIONS

Second Year Students

Use of Cannabinoids and Flavonoids in Anxiety and Sleep Disorders

Faye Aquilina

Cannabinoids and flavonoids may modulate neurotransmitters for anxiety and sleep disorders. The study aims to explore their therapeutic role and assess views, perceptions and experience of healthcare professionals and patients.

Synthetic vs Natural Cannabinoids

John Attard

Synthetic cannabinoids differ from natural cannabinoids in chemical structure, potency and safety, often producing more unpredictable physiological and psychological effects than plant-derived cannabinoids from Cannabis sativa. This study compares their pharmacological effects, safety concerns and analytical methods of determination.

Educational Needs for Pharmacists about Medical Devices

Julia Borg

This study aims to identify the educational needs of pharmacists regarding medical devices. The objectives are to obtain information on pharmacists' knowledge about medical devices and capture the training needs required to support patients effectively.

Medical Countermeasures for Country Preparedness

Giulia Bugeja

To assess the local situation in relation to medical countermeasures, specifically on supplies that are needed to manage national and international crises. Through qualitative methodology, focus groups will be undertaken to evaluate any stock gaps and to develop joint recommendations.

Pharmacists' Perception of 3D Printing

Karl Matthew Buhagiar

The study aims to evaluate perception of pharmacists about the use of 3D printing for tailored medicines. A questionnaire is developed for pharmacists to evaluate their perception and envisaged benefits and challenges with the use of 3D printing.

Community Pharmacists' Perspectives on Cardiovascular Disease Clinical Practice Guidelines

Victoria Camilleri

Updates to cardiovascular disease (CVD) guidelines necessitate pharmacist awareness to deliver guideline-concordant care. This project aims to assess community pharmacists' awareness of CVD guidelines, identify knowledge and practice gaps, and develop resources to strengthen evidence-based practice and promote seamless care.

Accessibility to Advanced Therapy Medicinal Products

Ilona Cassar

Advanced therapy medicinal products, ATMPs, include gene therapies, somatic cell therapies and tissue-engineered medicines. These offer major clinical benefits but are often limited by aspects such as availability, referral, funding and barriers experienced by patients when accessing them.

Community Pharmacists and Emergency Cardiac Care

Aia Diyab

This project evaluates community pharmacists' perspectives, knowledge, skills, preparedness, and training needs for managing cardiovascular emergencies. Findings will inform the development of a structured, evidence-based toolkit to strengthen the readiness, confidence and contribution of community pharmacists to emergency cardiac care.

Accreditation of Research Laboratory to Facilitate Technology Transfer

Analisa Farrugia Wismayer

This project aims to achieve ISO 17025 accreditation to strengthen laboratory credibility. By improving the quality and usability of research data, the study facilitates more effective technology transfer processes.

Community Pharmacists' Clinical Judgement

Nadia Ibnass

The aim of this project is to assess the level and type of clinical judgment a community pharmacist carries out. This will be undertaken through conducting interviews, in which case studies will be presented to community pharmacists.

Clinical Trials Landscape in Europe

Nikolai Mangion

Clinical trials are conducted to evaluate safety and effectiveness of medicinal products before reaching patients. Despite advances in transparency and digitalisation, Europe has experienced a decline in clinical trials, prompting reliance on real-world evidence to improve trial efficacy.

Entrustable Professional Activities Supporting Competency in Risk Management in Pharmacy

Jeffrey Mercieca

Risk management is a core competency particularly in pharmacy practice. Entrustable Professional Activities (EPAs) offer an assessable approach to competency development. The aim is to evaluate how EPAs can be used to determine competency in risk management in pharmacy practice.

Evaluating Dispensing Errors in High-Risk Medication

Luca Aidan Piccinino

High-risk medications have an increased risk of causing patient harm when used erroneously. The aim is to evaluate frequency and types of dispensing errors, identifying contributing factors, and mitigation strategies. Guidelines for safer prescribing are disseminated to community pharmacists.

Science, Myths and Realities of Vaccines

Anna Portelli

Vaccines are crucial to prevent infectious diseases, yet misconceptions and uncertainty remain. This project aims to evaluate common myths and compare them with scientific evidence. A questionnaire will be distributed to patients to understand their views on vaccines.

Management of Patients with Uncontrolled Hypertension

Nicole Portelli

This project examines management of resistant hypertension, focusing on renal denervation as a therapeutic intervention. It integrates a systematic literature review to evaluate current evidence and a retrospective patient cohort study to assess resistance trends, clinical efficacy and safety outcomes.

Perception of Healthcare Professionals about Green Prescribing

Saviour Portelli

This study aims to evaluate awareness and perceptions of healthcare professionals about green prescribing. A questionnaire is developed to assess perception, understanding, and perceived challenges in adopting environmentally sustainable prescribing practices and assessing opportunities for implementation.

Pharmacist-led Antibiotic Dose Adjustments in the Intensive Care Unit

Kyle Schembri

In the ICU, different dose adjustments for antibiotics used, are essential. This study will evaluate the effect of pharmacist-led dose adjustments. The aspects of antibiotic use and patient safety are analysed, taking into consideration antimicrobial stewardship.

Students' Perspective on Green Pharmacy

Nour Shagruni

This study aims to explore the perspective of pharmacy students about green pharmacy. A questionnaire is developed to evaluate the perception about green pharmacy and its relevance in pharmacy curricula. A focus group discussion is conducted to address identified gaps.

Prediction of Cannabis Potency and Contamination

Jorjii Sky Stellini Wiedersum

Cannabis products may contain harmful contaminants and show wide variability in potency. This project develops a predictive framework using published cannabis analytical data to estimate cannabis potency and contamination risk, supporting early-stage quality assessment and risk-based decision-making in cannabis testing and regulation.

Pharmacist as Health Influencers

Nicole Diana Tomic Felice

In this day and age the public are extensively influenced by social media. The aim is to assess impact of pharmacists as health influencers. Perception and trust of pharmacists as health information providers, and impact of this contribution are assessed.

Pharmacists as Digital Health Champions

Kursten Vella

Pharmacists are taking an important role as digital health champions with evolving technologies in health. This study aims to explore pharmacists' contribution to evolving digital health. The provision of digital health services by pharmacists and their impact on patient empowerment is analysed.

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L-Università ta' Malta
Faculty of
Medicine & Surgery

Department
of Pharmacy

DEPARTMENT OF PHARMACY

Faculty of Medicine & Surgery
University of Malta Msida MSD 2080

+356 2340 2911

pharmacy.ms@um.edu.mt

um.edu.mt/ms/pharmacy