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CONFERENCE ABSTRACTS

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Social and administrative pharmacy

Barriers for recruitment and retention in the diabetes prevention programme (DPP) in a medically underserved area

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Introduction: The national diabetes prevention programme (DPP) was created to address the increasing burden of prediabetes and type 2 diabetes in the United States. This national effort created partnerships between public and private organisations to offer evidence-based, cost-effective interventions to help prevent type 2 diabetes in affected communities. One key feature of the programme focuses on healthy eating and physical activity which showed that people with prediabetes who take part in a structured lifestyle change programme with proper diet and exercise can cut their risk of developing type 2 diabetes.

Objectives: This study explores the benefits and barriers of implementing DPP in a medically underserved area.

Methods: A qualitative study design was used in order to gather information about the benefits and limitations of DPP from patients, community partners, and healthcare professionals. Individual interviews were conducted with past DPP patients about their satisfaction with the programme, healthcare results, and areas of improvement with a five-point Likert Scale. Interviews were also conducted with patients who enrolled in DPP but never attended classes about barriers preventing them from participating. Focus groups with community partners were conducted focusing on challenges of having people enrol and complete DPP as well as methods to improve retention in the programme. Finally, focus groups were performed on local healthcare professionals in the primary care and endocrinology settings about types of services they used for patients with prediabetes and referral processes. Descriptive statistics were used.

Results: Seven patients, 24 community leaders, and eight healthcare professionals participated in the interviews and focus groups. Amongst the patients who did not enroll in the programme, the biggest barrier was not having knowledge about the programme goals. Patients who completed DPP stated that they were satisfied with the programme (100%), were able to understand how to prevent and manage diabetes (100%), and change their lifestyle as a result of the programme (60%). Neither transportation, scheduling, personal commitments, nor health status prevented either of the patient groups from enrolling in the programme. Community partners mentioned that a lack of awareness (25%) of DPP, transportation (22.5%), and the time commitments of the programme (15%) were the main barriers. The majority mentioned that increasing knowledge about the programme, including amongst healthcare providers, would increase the number of referrals. Amongst the healthcare providers, 87.5% were aware of DPP but only 37.5% referred their patients to the programme, with insurance issues (75%), patient refusal (62.5%), and time constraints (37.5%) being the greatest barriers.

Conclusions: The main barriers to DPP success included a lack of knowledge of the programme, a difficult referral process, and time constraints of the programme. This study improves the knowledge of barriers for DPP enrolment and completion to reduce disparities in DPP effectiveness to help prevent diabetes. Future methods to improve programme enrolment may include more advertisement of DPP, providing incentives for referring, and providing shorter virtual training platforms to aid with the programme length.

Development and evaluation of a holistic university weight loss programme

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Introduction: In Somerset County, Maryland, United States, 42% of adults have a body-mass-index of 30 kg/m^2 which is a 50% higher statistic than the State average, especially among minorities. Factors for obesity include the limited availability of healthy foods and food insecurity due to socioeconomic status and distance from a grocery store or gym. Successful college-based obesity programmes have combined personalised nutrition and physical activity counselling with individualised goal setting and self-monitoring interventions.

Objectives: The objective of the study is to develop and evaluate a holistic university-based obesity prevention and risk mitigation programme focused on best practices to reduce obesity health disparities on campus.

Methods: A four-month weight-loss reduction programme combing physical fitness, nutrition, and education was implemented at a historically black college and university and led by an interdisciplinary pharmacy team. The programme was open to students, staff, and faculty. Participants were encouraged to perform physical activity in the workplace through low-stress tai chi exercises and walking classes. These activities were chosen to encourage participants to continue moving even while at work or in-between classes and could be performed safely outside in the setting of COVID-19. A targeted nutrition educational series with cooking demonstrations and meal planning allowed for participants to create individualised nutrition plans. Additionally, a series of virtual educational workshops also allowed participants to increase their knowledge on health and fitness about physical activity and nutrition. The workshops allowed participants to be able to make informed health decisions that support self-efficacy and mitigate their obesity risks. Participants enrolled in the programme also received fitness trackers to monitor their health status throughout the programme. Programme satisfaction scores and the participant's weight changes were evaluated with descriptive statistics at completion for efficacy.

Results: 59 participants participated in the programme, the majority of whom were Black/African American and women. Attendees participated in six 1 – 1.5 mile walks, four tai-chi sessions, six educational workshops, and four cooking demonstrations. After the programme completion, 81.3% had more knowledge of nutrition and physical activities which they could perform to lose weight due to the programme and 81.3% adopted healthy behaviours for eating and exercise due to the programme. On average, participants walked 194.5 miles and burned 116,449 calories over the programme duration. The average weight loss was 4.1 ± 1.2 lbs. Overall, 87.6% reported satisfaction with the programme.

Conclusions: The combination of obesity scientific knowledge coupled with hands-on application of these principles taught by an interprofessional team enabled participants with skills to effectively manage and mitigate obesity risks. This holistic university-based obesity programme promoted health and wellness among ethnically, racially, and socioeconomically diverse adults in Somerset County. The long-term impact of this programme allows for a reduction in obesity health disparities in a medically underserved, rural community that has limited individualised evidence-based programmes to help it achieve health equity.

Implementing a pharmacy-led sexual risk reduction education initiative for adolescents

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Introduction: Unplanned pregnancy and the transmission of sexually transmitted diseases (STDs) are a growing issue among adolescents in Maryland, United States. Rates of chlamydia, gonorrhea, syphilis, and teenage pregnancy continue to rise in Somerset County, a medically underserved area in Maryland, and they are higher than State averages. Making a Difference (MAD) is an evidence-based, eight-module curriculum that provides young adolescents with the knowledge, confidence and skills necessary to reduce their risk of sexually transmitted diseases (STDs), HIV, and pregnancy by abstaining from sex.

Objectives: The purpose of this study was to develop and implement a pharmacy-led initiative promoting safer sexual practices amongst Maryland adolescents using the MAD curriculum.

Methods: One pharmacist and three pharmacy students implemented the MAD curriculum at two afterschool programmes in Somerset County for adolescents aged 11 - 16. A total of 24 modular lessons were covered in the curriculum including focuses on self-esteem, personal boundaries, STDs, HIV, pregnancy, and the benefits of both sex and abstinence. Changes in a five-point Likert survey before and after the curriculum was used to determine programme efficacy. The survey questions assessed participant's likelihood to perform risky behaviours, decision making, emotional behaviours, ability to seek help, long term goals, and programme performance. Descriptive statistics were collected with a paired student T-test with an alpha of 0.05.

Results: A total of 51 youth completed the programme over two weeks with an average age of 12 ± 0.71 years. Most sessions lasted for 1.5 hours. Forty-six students (90.2%) were Black/African American and six students (11.8%) were Caucasian, the majority of whom were female (68.6%). All of the participating youth stated that they were interested in the programme and 50 youth (98.0%) felt that the discussions and activities helped them learn the main programme lessons. After completion, all participants were better able to understand what made a relationship healthy (p = 0.02) and 96% stated they were able to resist sexual pressures (p = 0.04). Additionally, all of the participants were more likely to talk to a trusted adult if someone they were dating made them uncomfortable or pressured them (p = 0.04). Finally, the majority of youth stated that they were able to manage their emotions in healthy ways (92.1%) and think about the consequences before making decisions (98.0%).

Conclusions: The MAD curriculum taught by pharmacy staff appears to have some positive effects in educating adolescents about sexual behaviour in relationships. Adolescents were able to gain knowledge and skills in sexual risk reduction after the programme. Further studies need to be done to assess the long-term impact of the intervention on adolescents in reducing the consequences related to unsafe sexual practices.

Plugging the gap – Person-centred approaches to medication management for people with severe mental illness (SMI): The MEDIATE study

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Introduction: Best practice guidelines indicate that people living with severe mental illness (SMI), such as schizophrenia, bipolar disorder and severe depressive disorder, should be involved in decisions about their medication management. Client-clinician engagement centred on clients' concerns and needs is foundational to person-centred care delivery. Medication management for people with SMI is inherently complex, however, engaging in shared decision-making founded on person-centred care approaches is thought to facilitate medication adherence and lead to improvements in quality of life for patients. Although reasons for medication non-adherence are numerous, patients often report that debilitating medication side effects are a key reason for discontinuing medication. Qualitative research investigating patient perspectives has found that many patients do not feel fully engaged in medication decisions; their concerns are not sufficiently addressed; and information about side effects, treatment rationales, or medication alternatives are not always accessible.

Objectives: To understand what works, for whom, in what circumstances, to optimise medication use with people living with SMI.

Methods: MEDIATE, funded by the National Institute for Health Research in England, has undertaken a realist review incorporating secondary data including grey literature and mental health service user blogs to build explanations for what works for whom in what circumstances to optimise the management of medication for people living with SMI. Realist reviews are a theory driven form of qualitative evidence synthesis which seek to address complexity and identify causality by uncovering hidden generative causal mechanisms. Theories are initially derived and tested throughout the research process.

The findings from this review have been further enhanced by stakeholder engagement with two groups; a lived experience group and a health and social care professional group. Both groups have informed the direction of the realist review; enabled a better understanding of the needs of people living with SMI; have generated pragmatic client-clinician applications for review findings; and have assisted in the identification of priorities for future research.

Results: Early findings from the literature, substantiated by stakeholder groups and service user blogs, have highlighted the important role of information for ongoing decision-making by individuals with SMI whose lifestyle needs are diverse and vary over time. Person-centred approaches, including shared decision-making, address clients' individual concerns about medications. Person-centred client-clinician engagement can decrease clients' fears and anxieties, build client-clinician trust and promote medication adherence.

Working with the wider interdisciplinary team, mental health pharmacists and pharmacy technicians in conjunction with community pharmacists are well-positioned to support person-centred care approaches with people with SMI, particularly in-between routine medical appointments.

Conclusions: Person-centred care approaches, such as shared decision making for medication choices in people living with SMI, is needed for medication optimisation but is currently sub-optimal. People living with SMI may benefit from additional support. Pharmacists can fulfil this unmet need by assisting people with SMI in accessing information support and advice about their medication.

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Personalising preventive care among older multimorbid adults: Development and internal validation of a life expectancy estimator

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Introduction: Providing high value care and avoiding care overuse is a challenge among older multimorbid adults. Polypharmacy is frequent in older patients due to the high prevalence of chronic diseases and multimorbidity, which leads to higher risks of adverse drug events or potential drug-drug interactions - many of which are considered preventable. Avoidable medication-related harm not only leads to a decreased quality of life, but also increased morbidity, healthcare costs and resource utilisation. For the prevention of chronic diseases, many guidelines recommend tailoring interventions in older multimorbid individuals according to life expectancy as patients with a relatively short life expectancy might not have the time to benefit from preventive care interventions. Personalising preventive care to life expectancy might reduce care overuse and therefore reduce avoidable-medication related harm.

Objectives: The authors objective was to develop and internally validate a life expectancy estimator for older multimorbid adults.

Methods: The authors analysed data of the OPERAM (OPtimising thERapy to prevent Avoidable hospital admissions in Multimorbid older people) cohort study in Bern, Switzerland. 822 hospitalized participants aged 70 years old or more, with multimorbidity (three or more chronic medical conditions), and polypharmacy (use of five drugs or more for >30 days) were included. The main outcome was time to all-cause mortality assessed during the three years of follow-up. Candidate predictors included demographic variables (age, sex), clinical characteristics (Charlson-Comorbidity-Index, number of drugs, body mass index, weight loss), smoking, functional status variables (Barthel-Index, falls, nursing home residence), and hospitalisation. The authors internally validated and optimism corrected the model using bootstrapping techniques. The authors transformed the three-year mortality prognostic index into a life expectancy estimator using the Gompertz survival function.

Results: At baseline, the participants (58% men) had a median age of 79 years (min: 70; max: 99). They took daily a median of then chronic medications (min: five; max 38). During three years of follow-up, 292 participants (36%) died. The analysis is ongoing and results will be presented at the congress.

Conclusions: A life expectancy estimator will eventually help physicians and pharmacists to personalise preventive care and optimise polypharmaceutical drug regimens of older multimorbid patients. This can reduce under- and overuse of preventive care, and therefore decrease avoidable medication-related harm.

Cost-effectiveness analysis of Atezolizumab plus Bevacizumab *vs* Sorafenib in first-line treatment for Chinese population with unresectable hepatocellular carcinoma in Taiwan

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Introduction: The IMbrave150 trial showed that the combined treatment of Atezolizumab and Bevacizumab (Atezo-bev) significantly prolonged the overall survival and progression-free survival in unresectable hepatocellular carcinoma (HCC) patients. Moreover, the Atezo-bev treatment had higher efficacy in the Chinese subpopulation when compared to the overall patients. However, the Taiwan National Health Insurance Administration did not reimburse the Atezo-bev treatment. Several previous studies have examined the cost-effectiveness of the combined treatment from different perspectives and found that the dual combination was not cost-effective for treating unresectable HCC compared with Sorafenib.

Objectives: This study aimed to evaluate the cost-effectiveness of Atezo-bev treatment *vs* Sorafenib in Chinese patients from the perspective of Taiwan National Health Insurance Administration.

Methods: Using Sorafenib as the comparator, the authors developed a partitioned survival model to evaluate the costs

and quality-adjusted life year (QALY) of Atezo-bev treatment. The time horizon of the study was 15 years, and the annual discount rate was 3%. The study compares the Atezo-bev treatment with Sorafenib to analyse the incremental cost-effectiveness ratios (ICERs) and net monetary benefit (NMB) from the treatment effects (determined from the progression-free and overall survival outcomes of the IMbrave150 study), direct medical costs (collected and estimated from the National Health Insurance Research Database, Taiwan), and utility parameters (derived from the EQ-5D data collected during the IMbrave150 study with disutility estimations of adverse events), as well as the deterministic sensitivity and probabilistic sensitivity. Scenario analyses were carried out with different parametric survival models, and the probability of cost-effectiveness was one to three times of the Gross Domestic Product (GDP) per capita (USD 31,437/QALY- USD 94,311/QALY).

Results: Compared with Sorafenib, the incremental utility of atezo-bev treatment was 1.7 QALY, with an incremental cost of USD 130,160. The incremental cost-effectiveness ratio was USD 76,696 per QALY, which was less than the predefined willingness to pay in Taiwan (USD 94,311/QALY).

Conclusions: The combined treatment of Atezo-bev is cost-effective compared with Sorafenib, which is currently the first-line treatment option for unresectable hepatocellular carcinoma in Taiwan.

The budgetary impact of alemtuzumab in multiple sclerosis in Quito, Ecuador: Payer's perspective

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Introduction: Multiple sclerosis is a neurological condition that causes disabilities and is most common in young adults. It imposes high financial costs affecting the quality of life of patients, families, and society. It is critical to measure the budgetary impact of new technologies to treat this disease.

Objectives: The aim of the article is to estimate the budgetary impact of introducing alemtuzumab as an escalation therapy in patients diagnosed with Recurrent Remitting Multiple Sclerosis and treated in Quito, Ecuador.

Methods: A cohort of 85 patients receiving treatment with disease-modifying therapies was used, within a five-year timeframe, between 2021 and 2025. The baseline scenario, including the percentages of administration of the different drugs, is compared with the alternative scenario, including alemtuzumab (ten out of 85 patients). The cost assessment included only direct medical resources. To obtain local resources for the management of the disease, a neurologist and clinical expert who treats most of the patients in Quito were consulted.

Results: Considering a cohort of 85 patients with active recurrent remitting multiple sclerosis, the average global budget impact in five years would be USD 10,603,230.00 in the base case and USD 9,995,817.00 in the alemtuzumab scenario.

Conclusions: The inclusion of alemtuzumab as escalation therapy represents budgetary savings over the next 5 years (2021-2025).

Communication of pharmacists' roles and services during the COVID-19 pandemic: A content analysis of Canadian pharmacy organisations

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Introduction: During the first 12 months of the pandemic, Canadian pharmacists were faced with navigating various challenges and policy changes. Historically, pharmacists have been recognised and accepted as drug experts, but this was expanded during the pandemic, as pharmacists were identified as a trusted and reliable information source for guidance, education, and policy. The COVID-19 pandemic presented a unique challenge for pharmacists as they navigated information scarcity on the frontlines while being identified as information experts. They looked to their professional organisations for direction as to what their roles should be in a crisis.

Objectives: Evidence for pharmacists' involvement on the frontlines of the COVID-19 pandemic exists, but how pharmacy organisations communicated during the pandemic had yet to be explored. Thus, the objective of this study was to explore communication of pharmacists' roles and services by pharmacy organisations during the first year of the COVID-19 pandemic.

Methods: The study used conventional content analysis method to explore online communication of pharmacy organisations. A manual search of pharmacy organisations' websites was conducted to extract publicly accessible written documents related to pharmacists' roles and services. Websites and webpages were chosen as sources of documents for their accessibility, ability to rapidly respond to the changing pandemic landscape, and the broad range of possible audiences. Five organisations were chosen that were relevant to Alberta pharmacists, and these were: the National Association of Pharmacy Regulatory Authorities (NAPRA), Canadian Pharmacists Association (CPhA), Canadian Society of Hospital Pharmacists (CSHP), Alberta College of Pharmacy (ACP), and the Alberta Pharmacists' Association (RxA).

Results: The initial search identified 377 sources of information, of which 283 written documents were captured and screened for eligibility and 92 of them met the inclusion criteria. A total of 92 documents were collected from CPhA (60), CSHP (two), ACP (26), and RxA (four). While pharmacists' roles did not change, the context in which they were performed was continually evolving with the ongoing and prolonged nature of the COVID-19 pandemic. Over a third of the documents (32/92, 34.8%) required contextual knowledge to fully interpret the communication. There was a noticeable increase in pharmacists' public health and patient care roles mentioned as the pandemic surpassed the first six months from 46.5% (20/43) to 56.5% (26/46) and 16.3% (7/43) to 30.4% (14/46) respectively. Most of the communication conveyed by the organisations was direct in the messaging and conveyed a positive communication style or neutral and factual communication style. Only a handful of documents used a cautionary communication tone. Additionally, there was an observed shift in the communication after the first six months becoming more direct in its messaging and context.

Conclusions: To navigate the rapidly changing information landscape of this unprecedented pandemic, professional pharmacy organisations provided guidance and direction for pharmacists as to what their roles and services should be in a crisis and society's expectations of the profession. While pharmacists' roles remained unchanged, the context in which they were performed was altered with the pandemic. Pharmacy organisations provided crisis and risk communications to inform pharmacists' actions.

Patients' opinions of pharmaceutical services in a tertiary hospital pharmacy in Nigeria

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Introduction: Patients' satisfaction is a measure of performance in healthcare.

Objectives: The aim of the study was to assess patients' opinions on the services provided in the pharmacy department of a tertiary hospital in Nigeria in terms of availability, quality and cost of medicines, and pharmaceutical services provided in the hospital pharmacy. It also assessed patients' patronage of the hospital pharmacy.

Methods: Semi-structure questionnaire of 12-items only was developed and administered to 161 patients at the General Out-Patient Department (GOPD) and Medical Out-Patient (MOP) of the facility with the exclusion of first-timers. Non-probability purposive sampling method was employed and sample size (n) was determined with the equation n = Z2 pq /d2 (where *p* was set to 9% = 0.09). Approval was taken from the hospital management while informed consent was obtained from all patients who voluntarily agreed to be interviewed. Data were analysed using SPSS to determine frequencies and percentages while open questions was thematically analysed.

Results: The respondents were mostly female (53%) and a quarter were between 50 - 59 years of age. About 90% of the patients had been patronising pharmacy department to get their medicines. While about 36% of the respondent had been using the service of the hospital for over five years, 30.7% of these had been patronizing pharmacy department for the same period (i.e. over five years). Overall, approximately 87% of the patients patronise the pharmacy department while 80% of the respondents prefer to patronise the pharmacy department than any community pharmacy outside the hospital and 70.6% of the respondents succumbed their willingness to recommend the pharmacy department of the facility to their family, relatives and friends. Generally, respondents were not satisfied with non-availability of all medicines prescribed (57.5%), delay and long waiting time in filling prescription (48.8%) and high cost of medicines (31.9%) in the facility.

Conclusions: The respondents were mostly female (53%) and a quarter were between 50 - 59 years of age. About 90% of the patients had been patronising pharmacy department to get their medicines. While about 36% of the respondent had been using the service of the hospital for over five years, 30.7% of these had been patronizing pharmacy department for the same period (i.e. over 5years). In overall, about 87%

of the patients patronize the pharmacy department while 80% of the respondents prefer to patronize the pharmacy department than any community pharmacy outside the hospital and 70.6% of the respondents succumbed their willingness to recommend the pharmacy department of the facility to their family, relatives and friends. Generally, respondents were not satisfied with non-availability of all medicines prescribed (57.5%), delay and long waiting time in filling prescription (48.8%) and high cost of medicines (31.9%) in the facility. Respondents suggested that essential medicines should be made available and subsidised while quality of service should be improved through reduction of waiting time and improved pharmacy - patient relationship.

Evaluating self-medications and complementary and alternative medication (CAM) use during COVID-19 pandemic among students in an Egyptian private university

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Introduction: The increasing numbers of infected cases with Coronavirus disease (COVID-19) has led to a surge in the demand and supply of many complementary and alternative medicines (CAM) and self-medications practices.

Objectives: To evaluate the practice of self-medication and CAM use during the pandemic among Egyptian students in a private university.

Methods: The authors conducted a cross-sectional, observational survey between 17th May and 1st June 2021 through an online structured validated questionnaire. The link was shared to students through e-mails and different social media platforms.

Results: Among 336 students who responded to the questionnaire, 82% were medical students. 219 students (65.2%) admitted using at least one drug without any medical consultation. Analgesics and vitamin C were the most common drugs used as self-medications. Main sources of information included their own knowledge (90.8%) followed by the internet (68.4%). CAM use was reported by 120 students (35.7%) for COVID-19 prophylaxis and in 48 (14.2%) students as a treatment during the pandemic. 19% of the CAM users stated that it had a beneficial role and 80.3% informed that CAM had met their needs. Herbals were utilised by 100% of users, followed by honey (58.9%), then spiritual healing (17.8%). The information obtained from a family member, or a friend was the most frequent source of CAM knowledge followed by social media, users own background, and medical staff recommendations.

Conclusions: Use of self-medications and CAM were common among students. Increasing awareness about risks and benefits of self-medication and CAM use should be considered specially for students.

What are the pedagogical modalities preferred by community pharmacists for their continuing professionnal education?

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Introduction: Continuing professional development (CPD) is necessary for pharmacists to maintain and update their knowledge and skills and thus improve professional practice and quality of patient care. In France, CPD is a legal and triennial obligation for all practicing health professionals. They must follow a set of accredited training courses including at least two of the following three actions: acquisition of knowledge, evaluation of professional practices and risk management. Organisations for continuing education must follow the recommendations of the Haute Autorité de Santé, which are based on 19 teaching methods. In practice, e-learning is a training vector widely offered by private organisations and universities. The authors also note the emergence of new proposals on mobile applications or social networks.

Objectives: The main objective of the survey is to determine the preferences of the community pharmacists (CPs) on the pedagogical modalities for CPD.

Methods: This is a study based on a Best-Worst Scaling type questionnaire. Ten pedagogical methods were selected from the French recommendations and the International Pharmaceutical Federation publications. A total of 15 different choice tasks were submitted to the participants, for which they had to choose among four pedagogical methods which was the best and the worst for them. A multinomial logistic regression was performed to estimate the weight of preferences.

Results: A total of 118 community pharmacists, including 72 (61.0%) women and 58 (49.2%) owner CPs responded. The average age of respondents is 42.1 (Me = 42; Min = 24, Max = 66). Moreover, 1695 choice tests could be analysed. The most preferred pedagogical modalities are face-to-face multiprofessional (β = 0.25; 95% CI (0.18 ; 0.32)), mixed multiprofessional (β = 0.23; 95% CI (0.16 ; 0.30)) and multiprofessional problem-based learning (β = 0.18; 95% CI

(0.11 ; 0.25)). The less preferred pedagogical modalities are podcasting / E-learning (β = -0.08; 95% CI (-0.15 ; -0.02)), simulation (β = -0.17; 95% CI (-0 .24 ; -0.10)) and the web application (β = -0.32; 95% CI (-0.38 ; -0.25)).

Conclusions: The participants showed a strong interest in multiprofessional CPD. This is probably due to the current reorganisation of primary care in France around interprofessional collaboration structures. The preferences reflect the training offer of the French universities that mainly offer face-to-face or mixed courses associated with asynchronous learning and face-to-face seminars. Surprisingly, strict e-learning and web applications are not very popular, while the first one is the most encountered in the private CPD offer and the second one is very promising to attract new audiences. Mentoring does not elicit enthusiasm or rejection. It is probably little known by CPs but it is of major interest for the academics who wish to develop professional practices in the field.

Further work is needed to ensure that pharmacists' preferences are taken into account to develop CPD programmes and to encourage participation. A possible perspective would be to develop mixed CPD programmes, involving modalities other than the classic mixed courses associated with asynchronous learning.

Community pharmacists' recommendation of complementary medicines to their customers: A systematic review

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Introduction: People who use complementary medicines (CMs), such as herbal or traditional medicines, believe that these medicines are safe and harmless. However, half of those who use CMs are at risk of adverse reactions. People can easily access CMs in the pharmacies, therefore, community pharmacists are key professionals in advising or recommending the safe choices and rational use of CMs and providing evidence-based information for customers.

Objectives: To systematically review the extent of community pharmacist CM recommendation, the most recommended CMs and the factors influenced the recommendation.

Methods: Using four databases; PubMed, Scopus, SpringerLink and ScienceDirect, an electronic search was performed from 1990 to 19th May 2022. The inclusion criteria were: 1) about CM recommending practice of community pharmacists, 2) written in English, 3) conducted with quantitative method, and 4) able to retrieve the full text. The QualSyst assessment tool was used for the quality assessment.

Results: 15 studies were included in this systematic review. The rates of pharmacist recommendation of general CMs were ranged between 54% to 87.7%. The CMs mostly recommended by community pharmacists were vitamins and minerals, food or dietary supplements, fish oil and probiotics. Training or education about CMs (r = 0.33) and pharmacists' comfort level to respond to CM queries (r = 0.33) were correlated with the CM recommendations. Common barriers for preventing effective CM recommendation were concerning product safety and ingredients, and lack of reliable information sources. Positive responses from customers, and fewer side effects than conventional medicines greatly influenced the pharmacists to positively recommend CMs. To ensure pharmacists make appropriate recommendations, community pharmacists need CM effectiveness to be scientifically proven and a strengthening of CM trainings.

Conclusions: The percentages of pharmacists recommending CMs were quite high. CM training or education was very important because it associated with CM recommending and increased appropriate CM recommendation.

Implementing a cluster randomised controlled trial of a community pharmacist-led intervention to support consumers living with severe and persistent mental illness: Bridging the gap between physical and mental illness (PharMIbridge)

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Introduction: There is a significant life expectancy gap between consumers living with severe and persistent mental illness (SPMI; e.g. schizophrenia, bipolar disorder) and the general population, partially attributable to physical comorbidities. As one of the most accessible healthcare

professionals and with medications forming the basis of the management of many mental and physical illnesses, pharmacists are ideally placed to identify medication-related problems and provide support to consumers with unmet mental and physical healthcare needs.

Objectives: To describe the design and implementation of a cluster randomised controlled trial (C-RCT) testing the effectiveness of an individualised, community pharmacist-led support service (PharMIbridge) compared to usual care (in-pharmacy medication management service; MedsCheck) for consumers living with SPMI, in the context of the COVID-19 pandemic.

Methods: Community pharmacies were recruited from four Australian regions and randomised to the PharMIbridge Intervention Group (IG) or Comparator Group (CG). Pharmacy staff from both groups attended face-to-face training, which included Blended-Mental Health First Aid (MHFA) and administrative processes. IG pharmacists received additional training on improving consumer medication adherence, goal setting, motivational interviewing, managing physical health concerns, and issues relating to psychotropic medication use, as well as the opportunity to apply MHFA skills through simulated patient role-plays. The PharMIbridge intervention enabled community pharmacists to work with consumers over a six-month period to identify relevant medication-related and other issues, set goals and generate individualised support plans to address consumer participants' mental and physical health priorities. IG pharmacists were supported by a consumer and pharmacist mentor pair throughout the trial. IG consumer participants had at least one follow-up with pharmacists during the intervention period before a final review at six-months. Consumers in the CG received a MedsCheck followed by usual care with a follow-up at six-months. Primary outcome analyses will investigate the difference in medication adherence rates between the trial groups.

Results: 59 community pharmacies were randomised into the IG (n = 28) or CG (n = 31). Consumer participant recruitment and service delivery occurred from September 2020 - December 2021. In total, 332 consumer participants (n = 169 IG; n = 163 CG) were recruited and completed baseline data collection. Changes in trial regions, training design and delivery, mentoring processes, trial timeline, and service delivery were required due to the evolving COVID-19 pandemic. Primary outcome data analysis is underway.

Conclusions: Despite the challenges of the COVID-19 pandemic, the PharMIbridge C-RCT was implemented in accordance with the study protocol. Pharmacists in both C-RCT arms were able to engage with and support consumers living with SPMI during the unprecedented time of the COVID-19 pandemic.

Awareness of occupational exposure to hazardous substances and medicines in the pharmacy

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Introduction: Practicing safe pharmaceutical compounding and handling of medicines helps to protect pharmacy staff from exposure to harmful substances. The small-scale preparation of medicines in pharmacies may involve many different active substances and pharmacy staff frequently have to handle or adapt medicines prior to use. Some substances and medicines have hazardous properties that may pose a health risk to healthcare professionals handling them. Occupational exposure to hazardous substances and medicines has to be controlled in order to prevent occupational diseases.

Objectives: To create awareness about occupational exposure when preparing and handling medicines in pharmacies and to improve the occupational safety and health of the pharmacy staff by advising on protective measures.

Methods: The concept of risk can be captured in the following equation: risk = hazard x exposure. Not all hazards represent a risk; it is exposure which makes all the difference.

The authors conducted a study in collaboration with TNO Innovation for life and developed an inhalation exposure model, based on exposure measurements of some typical situations and handlings in the Dutch pharmacies. A classification model for hazard classes is supplementing this exposure model. Substances and medicines are classified into five toxicity classes based on ranges of indicative limits on internal exposure (µg/day). The toxicity increases from class one to five. The ranges are derived from occupational exposure limits, hazard statements, human toxicological and pharmacotherapeutic information.

A risk assessment, by combining the hazard of the substance and the possible exposure, will help to determine what protective measures should be taken to control the health risk.

Results: The actual risk for the pharmacy staff is a resultant of the inherent toxicity of the handled substances or medicines and the potential exposure, stemming from the type of work that has to be executed.

Exposure during preparation of medicines mainly depends on the amount of substances, the physical appearance of the substance(s), the duration and the ventilation measures. Exposure during handling or adapting medicines prior to use differs per action, with crushing tablets and opening capsules giving the most exposure. Reconstituting parenteral medicines gave minimal exposure.

Conclusions: Occupational exposure during preparation and handling of medicines can occur, but the risks vary greatly with the nature and duration of the tasks. It is important to be aware of the potential health risk when preparing or handling hazardous substances and medicines. The health risks of almost every type of small-scale preparation and common handlings of medicines can be estimated and minimised by the risk model which has been developed.

To prepare or handle safely it is necessary to control occupational exposure and thus risk, especially with the most hazardous substances and medicines such as cytostatics.

Antimicrobial utilization in outpatient upper respiratory tract infections throughout the United States - 2019-2021

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Introduction: The purpose of this study was to evaluate the trends of use of various antimicrobials prior to and during the coronavirus disease 2019 (COVID-19) pandemic. The population cohort are ambulatory care patients who were seen in clinics for upper respiratory tract infections. Despite the inactivity of antimicrobials against common causes of upper respiratory tract infections, they are still employed due the possibility of underlying or 'just-in-case' scenarios of bacterial infection. The COVID-19 pandemic has influenced the dynamic of hospitalised patient care, but potentially outpatient care as well.

Objectives: The authors hypothesise that the utilisation rates of common oral antimicrobials have been influenced by COVID-19 and have decreased over time as the pandemic progressed.

Methods: This study utilised de-identified data and was exempt from IRB approval. The antimicrobial use was collected through the National Center for Advancing Translational Sciences (NCATS) National COVID Cohort Collaborative (N3C) from 1st January 2019 to 12th December 2021. The authors included all patients over the age of 17 years that were seen for an upper respiratory tract infection (URTI). Oral antimicrobials of interest included: azithromycin, clarithromycin, erythromycin, amoxicillin, amoxicillin/clavulanate, cefpodoxime, cephalexin, cefdinir, penicillin, cefadroxil, clindamycin, moxifloxacin, levofloxacin, doxycycline, minocycline, clindamycin, and trimethoprim-sulfamethoxazole. Metrics for utilization were antibiotic prescribing rate (APR) and defined as antibiotics prescribed per total URTI visits. In addition, the authors collected demographic variables to more accurately describe the characteristics of individuals that received antibiotics.

Results: There were 125,851 unique patients that received antibiotics in comparison to 906,456 subjects that received no antibiotics for an upper respiratory tract infection clinic visit. Patients that received antibiotics had a mean age of 50 ± 17 years. Several variables were statistically different ($p < 0.05$) between groups, these include: predominantly female (Abx:66% versus noAbx:63%), Caucasian background (Abx:77% versus noAbx:73%), non-Hispanic origins (Abx:91% versus noAbx:89%), and a history or active COVID-19 infection (Abx:9% versus noAbx:18%). The most common comorbid conditions that were statistically more prevalent ($p < 0.05$) in patients receiving antibiotics were: hypertension (Abx:44% versus noAbx:30%), obesity (Abx:23% versus noAbx:18%), smoking (Abx:17% versus noAbx:12%), chronic kidney disease (Abx:9% versus noAbx:6%), and asthma (abx:4% versus noAbx:3%). The most commonly used antibiotic was azithromycin which accounted for 39.3% of all prescriptions and was followed by amoxicillin/clavulanate at 17%. There was a statistically significant decrease in APR in all studied antibiotics in 2020 (2.58 ± 0.98) and 2021 (3.24 ± 0.73) when compared to 2019 (5.83 ± 0.71), $p < 0.001$. A multivariate logistic regression was performed and this found that COVID-19 history/active status influenced antibiotic prescribing (estimate: -0.5396, std. error: 0.0109, z-value: -49.59, $p < 0.001$).

Conclusions: The authors identified and described the type of patients that received antibiotics for URTIs. The most commonly prescribed antibiotic was azithromycin. The antibiotic prescribing rate decreased across all studied antimicrobials. Patients who received antibiotics for URTIs were typically middle-aged, Caucasian females without COVID-19. The comorbid conditions that were commonly seen in patients with antibiotic prescriptions were hypertension and obesity. The implications of unnecessary antibiotic use in URTI are increased risk for resistant organisms, adverse effects, and superinfections such as Clostridioides difficile. Future studies will include implications of antibiotic use in URTIs and acquisition risk for Clostridioides difficile.

A scoping review of the minority stress processes experienced by sexual and gender minority patients in pharmacy settings: Implications for healthcare avoidance

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Introduction: Sexual and gender minority (SGM) people experience healthcare differently to other groups and may, therefore, avoid healthcare interactions unless absolutely necessary. The minority stress model describes distal (discrimination, violence) and proximal (expectation of rejection, concealment, internalised self-dislike) stress processes as possible contributors to the health disparities and avoidance behaviours observed when encountered in healthcare settings. Pharmacies are accessible healthcare settings yet the extent to which SGM people experience minority stress as a result of pharmacies or pharmacists is unknown.

Objectives: The aim of this scoping review was to determine how distal and proximal minority stress processes experienced by SGM individuals may influence healthcare avoidance behaviours related to pharmacies or pharmacists.

Methods: An electronic search of PubMed, EMBASE, and the American Psychiatric Association databases was conducted to search for relevant literature up to May 2022. The search was supplemented with a review of reference lists and contact with experts in the field. Articles were included in the review if they described SGM patients' lived experiences within pharmacies or with pharmacists and reported an outcome that could be mapped to a distal or proximal minority stress process.

Results: 11 articles met the eligibility criteria and were included in the review. Of these, six reported the presence of distal stress processes, such as perceived stigma, negative pharmacy staff attitudes, and a lack of awareness of population needs. For proximal stress processes, five articles reported on concealment, four reported on expectation of rejection and one reported on internalised transphobia. Developing rapport and increasing competence were identified as ways to help mediate the impact of minority stress processes.

Conclusions: Minority stress processes are experienced by SGM people in pharmacies, which may lead to pharmacy-related avoidance behaviours. Coordinated efforts between professional stakeholders are required to reduce minority stress and ensure pharmacy-based services are accessible to all patients.

Singapore drug supply resiliency: COVID-19 outbreak and beyond

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Like many other countries, Singapore faced unprecedented disruptions and challenges in maintaining drug supplies during the COVID-19 pandemic. Understanding these challenges helped construct the strategies needed for Singapore's drug supply resiliency.

High dependency on imports for drugs makes Singapore susceptible to export bans or lockdowns impacting drug manufacturing. There was also limited buffer capacity of drugs to tie-in during supply breakdowns as pharmaceutical companies, distributors and healthcare institutions tend to practice just-in-time inventory management. The limited number of generic drugs and suppliers in Singapore due to its small market size also posed a risk to the local drug supply pool. Furthermore, the spread of the pandemic drastically increased global drug demand.

A multi-prong data driven strategy was implemented to maintain adequate drug supply for key drug groups. This included procurement of buffer stocks for business-as-usual drugs, intensive care unit drugs and COVID-19 vaccines and therapeutics based on actual and projected consumption levels from healthcare institutions, community care facilities and emerging data on COVID-19 therapeutics. Collaboration with pharmaceutical companies enabled monitoring of drug inventories for early detection of potential stockout situations. A multi-agency effort between the Ministry of Health, ALPS Pte Ltd, Health Sciences Authority (HSA), Ministry of Trade and Industry, Economic Development Board, Ministry of Foreign Affairs, Singapore Association of Pharmaceutical Industries (SAPI) and the pharmaceutical companies in Singapore was necessary to resolve regulatory and supply chain issues. Drug stewardship, which included establishing guidelines for drug conservation and ensuring timely engagement with healthcare professionals to ensure compliance and address concerns, was implemented.

Additionally, having early access to COVID-19 vaccines and therapeutics was crucial. An expert panel was formed to identify, source and secure emerging vaccines and therapeutic candidates through advance purchase agreements. Simultaneously, HSA's Pandemic Special Access Route and Special Access Route, facilitated early access to critical novel vaccines, medicines, and medical devices.

The lessons learnt include the importance of establishing procurement and supply strategies that ensure safe and

sustainable drug supply to meet national needs in peace and pandemic times, and the importance of an established platform for continual engagement with all stakeholders. The authors will continue to strengthen the blueprint for a sustainable and robust supply chain to remain resilient against future pandemics.

Patient-centred training for pharmaceutical good distribution practice in pharmacy of your choice (POYC)

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Introduction: The World Health Organisation advocates for a 'responsive' healthcare system that meets people's needs, whereas patient-centredness in healthcare emphasises the importance of a patient's values and preferences in healthcare delivery. The pharmacy of your choice (POYC) of the Ministry of Health is committed to providing the highest quality pharmaceutical service in Malta while also maintaining a patient-centred service by incorporating patient-centred Good Distribution Practice (GDP) training within the POYC workforce.

Objectives: The goal of this study is to address the training needs of the health workforce at POYC in terms of pharmaceutical good distribution practices, with an emphasis on a more patient-centred approach.

Methods: The methodology is divided into two stages. The first phase addresses the needs assessment. A questionnaire was developed, validated, and distributed to respondents to assess the core competencies of the POYC workforce's services. A key informant interview was conducted to gather feedback from stakeholders on the status of the POYC workforce services. The Phase One study results lead to Phase Two, which is the development and evaluation of a patient-centred training course on pharmaceutical GDP. Following a review of the research topic's literature, a validated questionnaire was created and distributed to 27 POYC respondents.

Results: The statistics show that the most common training needs are for good distribution practices (Mean = 4.3), organisation and personnel (Mean = 4.1), patient-centred care philosophy (Mean = 4.1), and training and development (Mean = 4.1). Another validated questionnaire was used in the key informant interview with stakeholders to extract their perspectives on the research issue. Five themes emerged from the interviews: improving pharmaceutical services through improved patient access and comfort; quality assurance; a fully integrated system of medicine prescription from the hospital to community pharmacy; a holistic and community-based patient-centric approach in healthcare service; and consistency of medicine delivery; as well as POYC's preparedness to handle an emergency like the COVID-19 pandemic. The mixed methods training needs assessment resulted in the development of the online training course 'Roadmap to Patient-Centred Care Good Distribution Practice for the Pharmacy of Your Choice Workforce'; 12 participants completed the online training course pilot implementation.

Conclusions: To meet the revised EU GDP guidelines and to ensure a patient-centred approach to the GDP process within POYC, the appropriate training course on pharmaceutical good distribution practice was required.

Vaccine hesitancy in cancer patients: Identifying factors

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Introduction: The inclination to use vaccines is influenced by education, fear, and public acceptance. Predicted safety and efficacy may dictate the degree to which individuals may accept immunisation against the COVID-19 virus.

Objectives: The objective of this study is to assess the inclination of cancer patients to receive the COVID-19 vaccine and to map possible solutions for the improvement of vaccine acceptance based on their perceptions.

Methods: A cross sectional study was constructed to assess the perceptions of cancer patients towards the COVID-19 vaccine This study was conducted using an online self-administered questionnaire between February and May 2021. The questionnaire consisted of four domains; demographics and cancer disease characteristics, COVID-19 infection acquisition, vaccine awareness and vaccine hesitancy.

Results: A total of 1,029 cancer patients completed the online questionnaire, of which 597 (58%) respondents claimed they were willing to take the vaccine. The male to female ratio was almost equivalent with a mean age of 51.03 ± 14 years. The rate of acceptance according to cancer stage was significant; stage I (149; 65.1%); stage II (172; 55%); stage III (217; 54.70%) and stage IV (4; 67.80%) (p = 0.018). Patients under current treatment made up the largest percentage of respondents intending to take the vaccine (433; 74.7%) (p =

0.011). Pearson correlation showed a strongly positive relationship between new deaths and willingness to get vaccinated in the first five weeks of the study (r = 0.811, p = & lt ; 0.01). Moreover, peer encouragement from friends and family constituted the largest portion of the possible factors contributing to increased vaccine acceptance as demonstrated by the respondents (470; 45.6%).

Conclusions: Fear and peer encouragement were identified as the primary modifiable characteristics linked with greater agreeability in individuals with active malignancy. As a result, recommendations for optimising COVID-19 immunisation uptake measures in cancer patients should include peer-led educational campaigns emphasising the consequences of vaccine rejection.

The impact of community pharmacies on regional equity in access to professional rapid antigen testing for SARS-CoV-2 in Portugal

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Introduction: The COVID-19 disease, caused by the new coronavirus of severe acute respiratory syndrome 2 (SARS-CoV-2), was declared a global pandemic on 11th March 2020. Several public health measures were adopted to reduce the risk of individual transmission improving early detection and isolation of new cases, such as a 100% reimbursement of SARS-CoV-2 professional rapid antigen detection testing (Ag-RDT), by the National Health Service (NHS), to the population at clinical pathology laboratories, community pharmacies and other authorised entities.

Objectives: This study aimed to evaluate the increase in the capacity of professional Ag-RDT offered by the integration of community pharmacies into the NHS testing strategy and compare the equity level in the access to testing, taking into account the existing structures and in scenarios considering pharmacies' participation or not.

Methods: This was an analytical study based on the number of weekly hours available of the authorized structures to perform Ag-RDT and their geographic location until 31st January 2022. The average distance (in kilometres) of the resident population by municipality, to the nearest Ag-RDT site and the average number of weekly hours available to perform the service, per 1,000 inhabitants and municipality, in total and for three groups (Pharmacies, labs, and other structures) were computed. To assess equity, Lorenz curves and Gini index were calculated for both indicators. Analysis and results were stratified by municipality subgroups according to three indices: population density, aging index and per capita purchasing power index.

Results: On 31st January 2022, a total of 1,369 (65.1%) pharmacies, 679 (32.3%) laboratories and 56 (2,7%) entities were providing free SARS-CoV-2 Ag-RDT to the population. Without the participation of pharmacies, the average distance of each person to the nearest Ag-RDT location was 3.7 km, decreasing to 1.8 km with the inclusion of pharmacies. For the distribution of distances, Gini index reduced from 0.50 to 0.42 (a 16.8% decrease in the measure of inequality with the inclusion of pharmacies). Regarding the estimated average of weekly hours available to testing, per 1,000 inhabitants, without pharmacies, there were 2.1 weekly hours available compared to 11.5 hours (5.5 times higher) when including community pharmacies. The Gini index for the distribution of weekly hours of access was initially of 0.42 decreasing to 0.26 with the inclusion of pharmacies, reflecting a reduction of about 39% in the measure of inequality. This result was even higher when considering the more vulnerable groups of society as providing this service at pharmacies allowed for a reduction in access inequalities in municipalities with lower population density (-43,3%), higher aging index (-51,3%) and lower per capita purchasing power index (-54,6%).

Conclusions: Results suggest that pharmacies can fill geographical and socioeconomic gaps in the national territory coverage in the access indicators studied. Without pharmacies, the provision of the Ag-RDT service to the population would have a territory coverage with significant gaps, increasing inequalities in population groups that are already more vulnerable.

Gap analysis of pharmacoeconomics skills provided in the United States professional pharmacy education

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Introduction: Throughout their careers, pharmacists are likely to come across complex decision-making, and resource allocation scenarios that many would not have had prior training in. Expectations of pharmacists in patient care are rising and it is becoming increasingly necessary to be able to incisively handle a variety of situations. Pharmacy curricula must reflect this change and adapt to include the teaching of key pharmacoeconomics skills that aligns with the needs of the healthcare industry.

Objectives: To assess the knowledge gap between current pharmacoeconomics curricular offerings at United States (US) Doctor of Pharmacy (Pharm.D.) programmes and present industry expectations and future needs.

Methods: In this qualitative study, three sets of data were collected and compared, and a gap analysis was conducted. The Accreditation Council for Pharmacy Education (ACPE) standards, Content Areas of the Pharmacy Curriculum Outcomes Assessment (PCOA), and NAPLEX Competency Statements were reviewed to identify pharmacoeconomic skills and competencies for Pharm.D. students to attain. Published studies were reviewed to characterise pharmacoeconomic-related topics covered in US pharmacy schools. Industry employability skills data for Pharm.D. graduates were gathered from real-time job data. Using thematic analysis, key recommendations were extracted regarding competencies, skills, approach to programme delivery, and anticipated outcomes.

Results: From the authors qualitative analysis, gaps between defined competencies and the current job market emerged. The top three competencies consisted of drug development expertise, scientific medical writing, and economic analysis. Four prominent soft skills were identified: communication, problem-solving, interpersonal, and analytical. The hard skills were classified into three groups: Basic/fundamental skills, conceptual/thinking skills, and business management skills. Pharmacoeconomics jobs were grouped into the following departmental categories: clinical research, commercial, health economics and outcomes research, medical affairs, regulatory affairs, and pharmacovigilance. While industry employers emphasise the importance of hard skills, pharmacy educators emphasise the importance of soft skills. Overall, unlike many other pharmacy topics, pharmacoeconomic education in the Pharm.D. curriculum is still relatively 'theoretical'. The integration of pharmacoeconomics into many pharmacy curricula lacks 'hands-on' experience, whether in the form of building decision models or in conjunction with industry exposure.

Conclusions: As pharmacoeconomics continues to expand into more areas of healthcare, future practitioners must pursue and maintain competence in this field to ensure better outcomes for patients. Pharmacy accreditation bodies should update and expand pharmacoeconomics-related standards and competencies to reflect the industry requirement. Pharmacy schools should adapt their pharmacoeconomic education offerings to keep up with current and future industry needs.

Financial management education: An assessment of pharmacy students' perception, attitudes, and abilities

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Introduction: Pharmacy-related financial management training and education are an integral part of the pharmacy curriculum. With the rapid change in the healthcare landscape, opportunities for expanding and implementing new services and programmes, and the high costs of pharmaceuticals, it is crucial to prepare pharmacy students with literacy in business, management, and finance-related topics relevant to their practices.

Objectives: To evaluate pharmacy students' perceptions toward financial management education, their attitudes on its clinical relevance, and their ability to use such knowledge in introductory and advanced pharmacy practice experiences.

Setting: Financial Management is a required three-credit-hour term course in the school of pharmacy curriculum. It is taught in the autumn term of the second academic year of didactic coursework. The course is scheduled for weekly three hour classroom sessions over a 15-week term calendar. The course is organised into three main sections, including an overview of financial management, managing money in pharmacy, and managing pharmacy products and services. In addition to didactic lectures, and guest speakers' presentations, pharmacy students work individually to develop a pharmacy business plan that details a business idea—in this case, a new or expanded pharmacy service or product.

Methods: An online survey was sent to third- and fourth-year pharmacy students. The survey assessed three themes: perceptions toward financial management education; attitudes toward the clinical relevance of financial management education; and the student's ability to use knowledge of financial management in practice. Descriptive statistics were used to summarise the data. Incomplete surveys were only included in the analysis if they contained full responses for all the 12 statements on perception, attitude, and ability as well as partial responses to the demographic questions.

Results: Of 233 students eligible to complete the survey, 139 (60%) students completed the survey, which included 77 third-year students and 62 fourth-year students. The respondents were mostly females (n = 91, 65.5%), less than 25 years of age (n = 79, 56.8%), and reported a bachelor's degree as their highest degree achieved prior to matriculating to pharmacy school (n = 67, 48.2%). Most of the respondents reported having taken a business-related course prior to

matriculating to pharmacy school (n = 57, 65.5%), and had plans to pursue hospital pharmacy post-graduation (n = 42, 48.3%). Overall, the study showed a positive perception and attitude toward financial management education. Pharmacy students had higher perceptions of their abilities to use financial management knowledge in practice.

Conclusions: This survey found an overall optimism in financial management education's role in pharmacy practice and the ability to obtain financial management competencies in professional pharmacy training. With the evolving practice requirement, pharmacy schools should adapt their financial management curricula with relevant skills to prepare students to become effective entrepreneurs, innovators, and practice leaders. The survey responses were conducted from a sample consisting of student pharmacists at one academic institution, which may limit its generalisability and may influence the findings.

Development and validation of two tools to analyse patients' information needs during the medication dispensing process in Spain

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Introduction: Health strategies should encourage patients and their families to become active participants in their own care (empowerment) and enable them to make informed and educated decisions (health literacy). This requires both the provision of adequate support and reliable information. Standardized measuring instruments allow for the improving quality of pharmaceutical care services as part of an integrated health system, thus guaranteeing the safe, effective, and responsible use of medication. Medication dispensing process is a privileged opportunity to obtain a global vision of the patient's perspective.

Objectives: The main objectives were to develop and validate tools that allow analysis of patients' information needs and their information-seeking behaviours during the medication dispensing process, and to describe patients' responses and establish the differences.

Methods: Cross-sectional studies were conducted in two different settings where medication is dispensed: hospital pharmacy services and community pharmacies. The population study included adult outpatients recruited when they collect their medication, regardless of their disease or treatment status.

A new questionnaire was developed and validated in a hospital pharmacy service to analyse outpatients' information needs and their preferred sources of information. The internationally validated European Organization for Research and Treatment Cancer Quality of Life Questionnaire (EORTC QLQ-25), aimed at oncology patients was used as the basis. To be applicable on the new target population, it was crucial to make several changes and ensure that it complies with the validity, viability, and reliability criteria. Alternatively, the Recognizing and Addressing Limited Pharmaceutical Literacy (RALPH) interview guide was validated to the Spanish language and cross-culturally adapted, to assess patients' pharmaceutical literacy skills in community pharmacies. That procedure was conducted in three stages: systematic translation, interviews performance and psychometric property analysis.

Results: Both instruments comply with viability, validity, and reliability requirements.

At the hospital, 153 outpatients filled in the questionnaire. Three factors were identified from the analysis: disease aspects, pharmacological/no-pharmacological treatment and satisfaction/perception of the information received. Participants felt satisfied (41 – 52%) with the quality, amount, and usefulness of the information, although a third stated they wanted to know more. Patients preferred to be informed by a specialist, followed by other health professionals.

Simultaneously, 103 patients were interviewed among 20 community pharmacies. The definitive RALPH guide translated into Spanish maintains the same structure as the original: ten questions framed in the pharmaceutical literacy domains (critical, functional, and communicative), linked to the patient's own medication. However, some expressions were simplified, and three questions were reformulated. More limited pharmaceutical literacy skills were observed regarding critical domain. Spanish patients' responses agreed with RALPH-English original results.

Conclusions: Two validated tools easy to use and replicate for both patients and professionals were obtained. First, the 'Hospital Outpatients' Information Needs Questionnaire' (HOINQ), a self-questionnaire, composed of three sections: information needs, demographic and clinical variables, and patients' preferred sources of information. Second, the RALPH interview guide in the Spanish language, that recognise(d) and address(ed) the limited pharmaceutical literacy skills of patients in Spanish pharmacies, that allowed for international comparison(s) and that could be extended to other Spanish-speaking countries.

Outpatient antibiotic prescribing during the first two years of the COVID-19 pandemic: A nationwide register-based study

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Introduction: The COVID-19 pandemic has imposed an enormous burden on healthcare systems around the world. Simultaneously many countries have reported that the number of other infectious diseases, such as acute respiratory infections, has decreased, leading to a decline in outpatient antibiotic use.

Objectives: The aim of this study is to assess the impact of the COVID-19 pandemic on outpatient antibiotic prescribing in Finland during the first two years of the pandemic.

Methods: Data on all systemic outpatient antibacterial prescriptions (Anatomical Therapeutic Chemical (ATC) code J01) recorded in centralised national Prescription Centre were retrieved for the period 1st January 2017 until 28th February 2022. Interrupted time series analysis with segmented regression comparing the time before and during COVID-19 pandemic was performed. The 'intervention' time was set as March 2020, the month of the declaration of COVID-19 as a pandemic by the WHO. Statistical analyses were conducted using R. Subgroup analyses were performed for several antibiotic groups.

Results: At the baseline, before the pandemic, the level of monthly outpatient antibiotic prescriptions was 247 293 (95% CI: 245 040 to 249 546; $p < 0.001$) and there was a decreasing trend of 989 in monthly prescriptions (-1 089 to -888; $p < 0.01$). After the COVID-19 pandemic began, there was a statistically significant ($p < 0.001$) decline of 67 709 (-70 525 to -64 893) prescriptions (-27.4% from the baseline level). However, after the immediate drop, an increasing change in trend in monthly prescriptions was detected (1 672; 95% CI: 1 496 to 1 848; $p < 0.05$). While declines in antibiotic prescribing were seen in all respiratory tract infection associated antibiotic groups, amoxicillin had the greatest decrease (-53.4%) after the COVID-19 outbreak.

Conclusions: While antibiotic consumption has been decreasing gradually during the past years, a sharp reduction in outpatient antibiotic prescribing occurred immediately after the COVID-19 pandemic began. The decline was seen especially in respiratory tract infection associated antibiotics. Future studies should explore the possible effects of the decline to the antimicrobial resistance.

Risk minimisation strategies through drug utilisation review

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Introduction: The national pharmaceutical service in Malta provides free medicines and medical devices to outpatients through 219 private community pharmacies. Approval of free entitlement to medicinal products through the national service provider prioritises meeting pharmacy administrative processes. Clinical services during the entitlement review will benefit patients, ensuring treatment continuity across the healthcare system.

Objectives: To characterise the process of pharmacists' review at the national pharmaceutical service entitlement unit and include a risk-minimisation strategy through a pharmacist-led drug utilisation review (DUR).

Methods: A focus group discussion was organised to understand needs, advantages, barriers, experiences, and prioritisation of a clinical review process within the pharmaceutical service. A Drug Utilisation Review tool feasible for the setting was developed and validated by two medical practitioners, two national pharmaceutical service pharmacists, and one academic pharmacist for reliability and practicality. Subsequently, the tool was applied retrospectively to records of 150 patients (60% male, 40% female) entitled to at least ten medications for various diseases managed by multiple medical practitioners to identify drug-related problems (DRPs). The risk of identified drug-related problems was assessed for ten selected patient cases by a panel of pharmacists and medical practitioners using the matrix table with the 'probability' and 'consequence' risk ratings on a scale of one to five, indicating very low, low, moderate, high, and very high risk respectively. Very low-risk drug-related problems require no treatment. Low risk requires self-care, moderate risk is DRPs requiring medical treatment, high risk may require hospital treatment and very high-risk DRPs cause death and permanent disability. 'Consequence' is the potential outcome of the drug-related problem, while 'probability' is an estimate of the chance of an event or an incident happening.

Results: 150 patients with multiple diseases and/or healthcare providers and entitled to at least ten drugs were identified for prioritisation in the DUR process established through the focus group discussion. From the DUR exercise, 84% (n = 126) had ten–15 entitled medications, with aspirin (67%), amlodipine (61%), omeprazole (58%), metformin (55%), bumetanide (52%), and perindopril (47%) as the most frequently prescribed medications. Hypertension (81%), diabetes mellitus type 2 (58%), and ischaemic heart disease (53%) were the top medical conditions identified. Among the

1,088 DRPs identified, 34% were potential drug interactions, 21% were increased risk of adverse drug reactions, and 20% were potentially unnecessary drug therapies. The median risk scores for 30 drug-related problems from ten patient cases were three, four, and five, respectively, suggesting moderate, high, and extremely high medication risk requiring medical intervention.

Conclusions: The developed DUR tool provides for a systematic patient-centred pharmacist intervention during the national pharmaceutical service formulary-based entitlement appraisal.

Council of Europe's guidelines to harmonize the medication review process in Europe

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Introduction: The European Directorate for the Quality of Medicines and HealthCare (EDQM) is a Directorate of the Council of Europe, an intergovernmental organisation (based in Strasbourg, France) set up to promote democracy and protect human rights and the rule of law in Europe. The EDQM is in charge of ensuring the basic human right of access to good quality medicines and healthcare in Europe.

In March 2020, the Committee of Ministers of the Council of Europe adopted Resolution CM/Res (2020)3 on the implementation of pharmaceutical care for the benefit of patients and health services. Among other things, the Resolution recommends that medication reviews (MR) be performed under the pharmaceutical care process. The MR process appears to have been implemented in different ways and to different degrees across the Council of Europe member states.

Objectives: To develop, under the coordination of the intergovernmental Committee of Experts on Quality and Safety Standards in Pharmaceutical Practices and Pharmaceutical Care (CD-P-PH/PC), overseen by the EDQM, a guidance document to support the harmonisation of the pharmacist-led MR process in Europe.

Methods: A multidisciplinary working group of pharmacists, academics and representatives of national competent authorities is developing the guidelines through a combination of face-to-face meetings, circulation of draft text and a planned consultation with stakeholders.

Results: Consisting of nine chapters the guidelines harmonise the terminology and definitions around MR to establish a common understanding of what MR is. In addition, the guidelines focus on the process of conducting a MR, how to collect and store the data and the required education, to support the development of this service and to facilitate the implementation into practice at European level. Finally, the guidelines also point to MR resources. Consultation will take place later in 2022 with the aim of publishing in 2023.

Conclusions: The guidelines will assist national competent authorities, pharmacists and healthcare professionals involved with medicines to ensure that MR is carried out in a structured and systematic manner. MR is an important pharmaceutical care tool to ensure efficient medicines management and medicines optimisation, achieve responsible use of medicines, and ultimately improve patient safety and patient health outcomes.

Abem: Programme (solidary medicine network) - Social impact assessment

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The impact assessment of abem: Programme was conducted by an external entity having into consideration all resources and activities developed since its launch, in May 2016. The authors considered the results of the Programme until June 2021.

The major impacts that our beneficiaries referred were:

• Health: an improvement in their health condition, through the compliance that they were able to do as they were able to have access to the medicines they need;

• Quality of life: an improvement in their quality of life since they didn't have to cut down on other essential expenses so they could buy the prescription medicines;

• Inclusion: the access to the medicines that the abem: card allows is essential to the feeling of inclusion that the beneficiaries experience, along with an increase in autonomy.

The other stakeholders of abem: Programme also refer some evident benefits:

• Companies and Pharmacies: a stronger commitment with the society;

• Donors: an increasing in the awareness regarding this social problem, along with the possibility to be part of the solution;

• Referral Entities: a stronger bond with the community and a better solution to help their citizens.

The potentially avoided costs within the scope of the National Health Service are extremely relevant, and it is possible to estimate that only in emergencies and hospitalizations avoided by the compliance with the therapies provided by the abem: Programme, more than 15 million euros were saved between May 2016 and December 2020. This means that, if the abem: Programme reached the approximately 864,000 Portuguese that every year can't buy the medicines they need because they cannot pay for them, an investment of 147 million euros would be necessary to save potentially more than 600 million euros in hospitalizations and emergencies.

Abem: Programme has a clear contribution to the following Sustainable Development Goals: 1 (No Poverty), 3 (Good Health and Well-Being), 10 (Reduced Inequalities), 11 (Sustainable Cities and Communities) and 17 (Partnerships for the Goals).

Abem: Programme also contributes in a direct way to the achievement of a fundamental value in society, which is Universality, since it mitigates geographical asymmetries through its presence distributed throughout the national territory.

Strengthening human resource capacity for health product logistics through engagement of training schools: The pharmacists council of Nigeria experience

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Introduction: The Pharmacists Council of Nigeria (PCN) is the regulatory agency of the Federal Government established by Act 91 of 1992 (Cap P17 LFN 2004) and charged with the responsibility of regulating and controlling Pharmacy education, training and practice in all aspects and ramifications. This includes education, training and practice of logistics and supply chain management of medicines and other health products. Competent, well-trained health workers are essential for delivering health services, and effective supply chain management (SCM) is essential to ensure products are available at service delivery points. In Nigeria, the demand for capacity development of workforce that will manage supply chain systems in both public and private sectors have grown considerably, the available human resources can no longer meet the complex demands of the system and there is need for a recognized pool of experts to solve the problems of logistics and supply chain in the health sector.

Objectives: To develop PCN's strategic plan for strengthening the human resource capacity for health products logistics and supply chain management in Nigeria, propose road map and implement the strategic plan in order to ensure effective regulation of the personnel and pharmaceutical value chain.

Methods: Following various stakeholder engagements and endorsements of memorandum of understanding, the PCN is collaborating with various training institutions to build capacity of pharmacists in health product logistics through postgraduate degrees, certifications and hands-on training. It has also conducted baseline surveys, training needs assessment, advocacy, knowledge translation, facilitation of certification of supply chain personnel. Desk review of the logistics and supply chain management course contents in undergraduate curricula and integration of modules on the health product supply chain in the training curricula in Faculties of Pharmacy in Nigeria were conducted. Faculties of pharmacy were encouraged to commence post graduate courses in logistics and supply chain management, SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis of the PCN as a regulatory agency for supply chain management was undertaken. Domains and Competency Areas for Pharmacists in Logistics and Supply Chain Management were developed, appropriate trainings, partners and funding organizations for the Supply Chain Project were identified.

Expected Results: The project will spur the development of in-country talent pool of supply chain expertise and professionals among pharmacists, medical and sales representatives. New data will emerge such as databank of pharmacists, medical and sales representatives certified in logistics and supply chain management, competencies needed for a practitioner to be considered a supply chain management expert and strategic plan and road map for strengthening the human resource capacity for health product logistics and supply chain management. Other expected results include effective regulation of public health product logistics and supply chain management and innovation through supply chain research and education.

Conclusions: Professionalisation and certification for logistics and supply chain management among pharmacists, medical and sales representatives are in line with the global mission of ensuring that enough professionals, who have the competencies to deliver effective supply chain management, are available to countries' supply chain organisation.

Mask-19 against gender-based violence from pharmacies

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Introduction: The situation of isolation due to confinement as a consequence of COVID-19 could increase the cases of gender-based violence. During quarantine, women were more likely to be victims of aggression from their partners, seeing themselves also locked up and unable to ask for help or escape.

Objectives: To give visibility and assistance to women who are in a potential situation of gender violence.

Methods: The pharmacy was one of the few places that were opened during confinement in Spain. The 'Consejo de Colegios Farmacéuticos de Canarias' (COFCAN) in collaboration with the 'Instituto Canario de Igualdad' (ICI) created Mascarilla-19 campaign. It allowed women who were in situation of risk to their physical, psychological and/or sexual integrity, to go to the nearest pharmacy and request a 'Mask-19' as a code word to ask for help. The pharmacist contacted the emergency telephone number '112' to alert authorities of the situation, providing by so the necessary information, but guaranteeing the utmost discretion and confidentiality.

This protocol was facilitated to all pharmacies, in Spain, and posters were displayed in every pharmacy.

Results: This campaign was implemented in a total of 22,000 Spanish pharmacies. This campaign was reiterated internationally in 20 countries. In the Canary Islands, cases treated through 'Mask-19' were recorded in the annual report, 57 women were assisted from April 2020 to March 2022.

Conclusions: 'Mask-19' has become an icon in the fight against gender-based violence, with a high impact in national and international media, creating greater social awareness and placing value on the work of the pharmacy with society.

Assistance to La Palma: The official pharmaceutical society of Santa Cruz de Tenerife collaborating with the institutions to deal with losses generated by the eruption of the volcano

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Introduction: On 19th September 2021, a volcanic eruption began on the island of La Palma, Canary Islands. After 85 days and eight hours of eruption, the volcanic activity ended on 13th December 2021, with 370 hectares of crops affected and 2,988 buildings destroyed according to the Copernicus satellite system (Copernicus Emergency Management Service).

Objectives: To financially help affected people by the eruption of 'Cumbre Vieja' volcano on the island of La Palma, collaborating with National Organizations and institutions.

Methods: From the Official Pharmaceutical Society of Santa Cruz de Tenerife (COFSCTFE) the bank account numbers authorized by 'El Cabildo de La Palma' and 'Cruz Roja' were shared to contribute financially for this situation. Posters were made with this information, and displayed in all pharmacies in Spain.

In addition, the COFSCTFE and the Official Pharmaceutical Society of Las Palmas created a solidarity fund to help workers at the pharmacies who were affected by this situation. Later, seven institutions joined: General Council of Official Pharmaceutical Society, the Andalusian Council of Official Pharmaceutical Society, COFARTE-Pharmaceutical Cooperative of Tenerife, and the Official Pharmaceutical Society of Ceuta, Toledo, Seville and Huesca. For the creation of this fund, in order to provide the economic support to the people affected, the COFSCTFE signed and agreement with the International No Gubernamental Organization 'Farmamundi'.

Results: The amount of money raised was 69,356€. Farmamundi distributed it equitably and according to the individual situation of each affected person related to our sector.

Conclusions: The volcano destroyed houses and farming areas that provided food and business to many families on the island that had to leave their homes behind. An efficient activity of the COFSCTFE, coordinated with other institutions, made possible to contribute financially in a quickly manner to what this natural disaster had taken away.

Pilot framework for applying FIP Development Goals in your organisation

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Introduction: The International Pharmaceutical Federation (FIP) launched, in 2020, the FIP Development Goals, that provide a tangible, achievable and purposeful scope of work for organisations, with clear priorities for the development and transformation of the pharmacy profession. The FIP development goals are a good starting point for ensuring that pharmacists are prepared for professional practice and pharmaceutical organisations should strive to align their activity with these strategic guidelines.

Objectives: To present a framework developed by the South and Autonomous Regions Branch of the Portuguese Pharmacists' Society (PPS) for applying FIP's development goals in the organisation's activity.

Methods: In way of preparation for implementing the Goals, an in-depth study of each 21 FIP development goals was conducted. After a great understanding of the goals, a four-phase framework was developed, based on the premise that the authors will need to cover all goals in the PPS's activity. Firstly, the authors linked each of their past and present activities to each of the goals. In a second phase, some projects and initiatives were developed within the scope of the FIP development goals, that were currently not being covered in our activity. As a third phase, a strategic analysis of the FIP development goals and PPS' initiatives already implemented was carried out and an action plan to address the areas with less focus in our activity was established. The last phase concerns reporting the work carried out in the practical application of the Development Goals, in order to share good practices with other pharmaceutical organisations.

Results: The analysis carried out in 2021 showed that the various activities and initiatives of the South and Autonomous Regions Branch of PPS were fitted into 16 FIP Development Goals (76% of all development goals), and many of the goals were covered by more than one initiative. An action plan has been developed so that all FIP development goals are covered in the organisations' daily activity, in the near future.

Conclusions: The background analysis conducted highlighted the existing gaps in the empowerment of the Portuguese pharmacists for the present and future demands of the profession. The developed action plan intents to give a clear structure for the organisation to achieve full alignment with the strategic international guidelines for pharmacy profession.

Strategy to empower pharmaceutical sciences students to engage in the future of the profession

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Introduction: The International Pharmaceutical Federation (FIP) developed a framework of Development Goals that aim to promote the advancement of pharmaceutical practice, sciences, and education over the next decade. Specifically, FIP Development Goal six – 'Leadership Development' proposes the creation of strategies and programmes aiming to develop professional leadership skills for all stages of career development, including pharmaceutical sciences students. The Portuguese Pharmacists' Society (PPS) has created a free student membership, which allows all pharmaceutical sciences' students, in the last two years of graduation, to take part in most of the activities and initiatives developed by the society and get involved in their future profession from an early stage of their path.

Objectives: To create awareness in the pharmaceutical community of the need to bring students closer to a professional reality and show the development of a project in this field created by a Professional Society.

Methods: Considering the creation of the student membership, the South and Autonomous Regions Branch of PPS developed the strategy 'OFuturo' – 'The future'. Aligned with the FIP Development Goal six, the project has four major goals - to actively involve university faculty members; to get the PPS close to the students' associations; to approach and impact students from their early journey in university; and to prepare the future pharmacists for the reality of the profession.

With these strategic points in mind, a series of initiatives has been developed over the past few years. Some examples are the involvement of university professors in many activities developed by PPS, the financial and logistic support funds given to students' associations, a trainee programme in which students are able to do an internship at PPS, and an immersive leadership programme for students named 'Youth Summer Academy - 'Our Leadership Journey'.

Results: The presence of students and academic leaders in PPS's initiatives has been notorious over the years. At least twice a year, the South and Autonomous Regions Branch of PPS meets with the student's associations, in addition to collaborating with them in different initiatives, which has led to a great involvement between the organisations.

Conclusions: 'OFuturo' Project has undergone a continuous improvement over the years, which should persist in future, especially with a better definition and tangibility of the results achieved. In recognition of the students' role as the future generation of pharmacists, 'OFuturo' prospects to reach all students and continue to empower them for the current and future challenges of the profession.

Capacity building programme on pharmacy law and ethics: Development and preliminary evaluation of an online curriculum for Portuguese community pharmacists

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Introduction: Professional ethics is crucial for ensuring the quality of services provided by pharmacists and trust in the profession. The International Pharmaceutical Federation and its member organisations encourage 'pharmacists and pharmaceutical scientists to adhere to the highest standards of professional conduct' in the 2012 Centennial Declaration. Aligned with this Declaration and the launch of the Portuguese Pharmacists Code of Ethics in 2021, the Portuguese Pharmaceutical Society, developed a capacity building programme on pharmacy law and ethics. The programme includes two types of educational sessions, to help Portuguese pharmacists addressing ethical issues in their practice: webinars and on-line courses. Sharing information on this programme may inspire professional bodies and pharmacists in other countries.

Objectives: Reporting the development and preliminary evaluation of the first on-line course of the capacity building programme on pharmacy law and ethics.

Methods: A needs assessment was conducted at the inception of the programme, through an anonymous on-line survey, composed of a total of 36 questions, of which two were open-ended. In addition to demographic information, data were collected on aspects such as the level of perceived knowledge and importance of topics (e.g. conscientious objection, confidentiality). The survey was distributed to all registered Portuguese pharmacists in November 2020 (roughly n = 15000). 300 pharmacists responded, mainly from community (43.0% (n = 129)) and hospital (30% (n = 90)) pharmacy.

Based on the responses, an on-line curriculum on 'Dispensing prescription medicines: a practical approach' was developed by a transmural team of three instructors. The curriculum encompasses learning outcomes and two sequential components: an eight-hour asynchronous on-line course, deployed through the Moodle learning management system, followed by a two-hour synchronous online course, organised via Zoom Platform. The asynchronous course consists of four modules (Ethics, Professional Ethics, Law and Professional liability); each has interactive videos and exercises. The pre- and post-course assessments are composed of 20 one-best answer multiple choice questions, informed by best practice on item-writing. Those successfully completing the asynchronous course are invited to register for the synchronous component, which consists of case-based learning in groups interspersed with instructor guided discussions. After the end, participants are invited to undergo an online self-debriefing activity, adapted from Gibbs' reflective cycle. Eight editions of the asynchronous course are planned throughout the year. All course editions are evaluated by participants through an anonymous on-line survey.

Results: By May 2022, four editions of the asynchronous course have been convened. A total of 235 pharmacists signed in, of which 124 completed the course. Average pre- and post-assessments scores were 11.97 and 14.76, respectively, out of 20. Two editions of the synchronous component were held by May 2022, with a total of 29 participants.

Overall, 90.5% of participants were satisfied or very satisfied with the asynchronous course; this figure was 31.3% for the synchronous component.

Conclusions: The Pharmacy law and ethics capacity building programme shows encouraging results with respect to knowledge improvement and overall satisfaction. The 2022 - 2024 plan for this programme envisages the expansion of the course's portfolio to other areas of practice.

The community and hospital pharmacy role in Aotearoa New Zealand's COVID-19 vaccination programme

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Introduction: In February 2021, New Zealand began its largest immunisation programme using the two-course Pfizer-BioNTech (Comirnaty) vaccine, with the goal to vaccinate as many of the eligible New Zealand population as possible against COVID-19. As of 19th May 2022, approximately 95% of the eligible population, aged 12 and over, completed a primary course of Comirnaty, and 71% of those aged 18 and older received a booster. Given the scale and urgency to deliver a COVID-19 vaccination and immunisation programme (CVIP), there was a need to leverage existing service delivery options. Equity of the CVIP for New Zealand's Māori and Pacific Peoples populations was critical as they are disproportionally affected by vaccine preventable and respiratory diseases and have an increased risk of developing serious COVID-19. Leveraging the existing role of community pharmacy in delivering vaccinations, mainly influenza, the CVIP utilised community pharmacies as a key service-delivery option. Community pharmacy was also used for supervised rapid antigen testing and distribution and for provision of official health documentation e.g., COVID-19 Vaccine Passes. Hospital pharmacy cold-chain and wholesale functionality was also established. While the high vaccination coverage demonstrated a successful immunisation programme, the pharmacy contribution has not been fully understood or quantified.

Objectives: To identify the contribution of pharmacy in the COVID-19 vaccine roll-out in New Zealand, with a focus on the equitable service delivery.

Methods: Data from the national COVID-19 Immunisation Register (CIR), a database of all COVID-19 vaccinations in New Zealand, was used to calculate the number of vaccine doses administered in community pharmacies up to 19th May 2022.

Results: As of 19th May 2022, 4,021,898 first, 3,972,683 second and 2,647,288 booster doses of Comirnaty were administered to the eligible population (individuals aged 12 and over), with 29% (3,074,205 doses) of these delivered by community pharmacy teams. Despite being on-boarded last, community pharmacies have been the largest provider of COVID-19 vaccine doses through the roll-out to date, with permanent COVID-19 bespoke vaccination centres second at (24%) and general practice clinics third (22%). Of the total number of doses delivered, 1,320,600 were administered to Māori and 722,207 to Pacific Peoples, of these 276,410 (20.93%) and 136,225 (18.86%) respectively were delivered at pharmacies. This proportion was slightly higher than that delivered at general practice (Māori, 20.57% and Pacific Peoples, 18.14%), and was second only to COVID-19 bespoke vaccination centres. New Zealand's hospital pharmacies were issued wholesale licenses and supported cold chain capability and capacity for both routine and emergency COVID-19 vaccination supply.

Conclusions: Analysis shows community and hospital pharmacy teams played an invaluable role delivering New Zealand's CVIP. The authors highlight the significant role of community pharmacies in providing equitable access for priority groups, namely Māori and Pacific Peoples. These findings support wider vaccine delivery by community pharmacies in New Zealand. Importantly, the findings indicate that other countries should consider leveraging community pharmacies in their vaccination programmes.

Perceptions of clinical pharmacy roles among healthcare practitioners in Ghana

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Introduction: Clinical pharmacy practice is distinguishable from the dispensing model by its focus on direct patient care. The Doctor of Pharmacy (Pharm.D.) programme was established to equip pharmacists with the clinical competencies needed to function effectively in clinical roles. In Ghana, the Pharm.D. programme is in its early stages, with the first set of graduates in 2018.

Objectives: The objective of the current study was to explore the perceptions of healthcare practitioners (physicians, nurses and pharmacists) about the clinical roles of pharmacists.

Methods: Four focus group discussions (FGDs) were conducted with physicians (1), nurses (1) and pharmacists (2), independently. The FGDs were audio-recorded and transcribed verbatim. A thematic analysis of the transcripts was conducted.

Results: Perceptions regarding the roles of clinical pharmacists were in two major categories: (1.) Roles associated with the provision of direct patient care (assurance of appropriateness, optimisation of pharmacotherapy); and (2.) Roles involving participation in inter-professional collaborative care with other healthcare professionals through their (i.) contribution of pharmacotherapy expertise, and (ii.) input in interprofessional education and practice.

Conclusions: Findings from the study highlight the perceived contributions of pharmacists, and potential for increasing relevance in clinical care in Ghana. These also draw attention to the continuing emergence of direct patient care roles for pharmacists in healthcare systems in a global context. There is critical need for advocacy by the pharmacy profession for policy changes in healthcare delivery models, towards maximising the potential benefits of clinical pharmacists to patient care and health outcomes.

Pharmacists' involvement in the prevention and chronic management of hypertension in low-middle income countries (LMICs): A case study in Ghana

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Introduction: Chronic management and prevention of non-communicable diseases like hypertension is an ongoing challenge for nations, worldwide. One of the World Health Organization (WHO) global goals is to reduce the prevalence of hypertension by 25% from 2010 - 2025. As part of the Global Hearts initiative, the HEARTS technical package (Healthy-lifestyle counselling, Evidence-based treatment protocols, Access to essential medicines and technology, Team-based care, and Systems for monitoring) was recommended to enhance prevention and management of cardiovascular diseases including hypertension.

Objectives: The objective of the study was to better understand how pharmacists can effectively participate in the Global Hearts Initiative and contribute to achieving the goal of reducing prevalence of hypertension within the Ghanaian-specific context.

Methods: A cross-sectional, web-based survey was conducted with pharmacists in Ghana. There were eight sections on the survey: demographics, treatment of cardiovascular disease, healthy lifestyle, evidence-based treatment protocols, access to essential medicines and technology, risk-based management, task sharing and team-based care, and system monitoring.

Results: In the preliminary findings, a total of 151 pharmacists participated in the survey. Majority were female (51%) with a mean age of 31 years old. 59.6% had a Pharm.D. qualification, 35% had Bpharm and only 10% of the total worked in rural areas. Licensure ranged from 1995 – 2020. There was a wide range in the number of patients with cardiovascular disease served by pharmacists in a typical week with a minimum of more than ten patients diagnosed with hypertension weekly. Blood pressure monitoring was the service mostly used in diagnosing in addition to lab testing and assessment charts. 66% of pharmacists indicated that they had a referral system.

Conclusions: The study highlights the changes in practice and the roles and relevance of pharmacists in team-based care related to the prevention and chronic management of hypertension. These preliminary findings demonstrate pharmacists' involvement and capacity in contributing to the prevention and chronic management of hypertension. There is clearly potential for further engagement of pharmacists in direct patient care and prevention efforts.

Challenges in the integration of clinical pharmacy practice in patient care in Ghana

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Introduction: Clinical pharmacy practice is becoming more mainstream globally. The expectation of more involvement in direct patient care has led to changes in pharmacy training, hence the establishment of the Doctor of Pharmacy (Pharm.D.) degree programme. In Ghana, this transition is in its infancy with the first Pharm.D. graduates in 2018. Pharmacists' clinical roles require collaboration with other healthcare practitioners in the delivery of patient care.

Objectives: The objective of the study was to identify challenges in pharmacists engaging in clinical roles, as they seek to become an integral part of the patient care team.

Methods: Four focus group discussions (FGDs) were conducted with physicians (1), nurses (1) and pharmacists (2), independently. The FGDs were audio-recorded and transcribed verbatim. A thematic analysis of the transcripts was conducted.

Results: Challenges related to clinical pharmacy practice as an integral part of patient care in Ghana were in three categories: (1.) Practice-related (Self-directed clinical practice, non-existing collaborative treatment protocol, indeterminate clinical functions and scope of practice, difficulty establishing clinical relevance and lack of specialty training); (2.) Provider-related (Lack of knowledge/awareness of clinical competence/role/relevance and lack of awareness of clinical role distinction within the profession) and (3.) Professional development and advancement (Job security, lack of distinction between professional (pharmacist) and technical (pharmacy technician) roles, lack of leadership/supervision, lack of professional advocacy and lack of public education and awareness).

Conclusions: Findings from the study highlight the challenges in pharmacy clinical practice and outline recommendations for addressing barriers to adopting an interprofessional collaborative approach towards enhancing patient care and outcomes. Addressing these barriers will help maximise pharmacists' clinical skills in caring for patients in a global context. Therefore, it is key to promote continuous inclusion and integration of pharmacists into patient care teams, prioritize team-building with other providers, retain more clinical pharmacists within the healthcare systems and push for policies to increase availability and accessibility of pharmacist consult.

Entrepreneurship in pharmaceutical processes

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Introduction: The current environment in healthcare is affected by a number of factors including issues related to rising costs and affordability, the challenges of chronic diseases, evolvement of the workforce, advanced healthcare outcomes, the benefits and challenges of regulatory sciences and situations such as crisis management in a pandemic or conflict. The dynamic landscape of healthcare presents pharmacists with the challenge of undertaking innovative practices to transform the healthcare system and create novel opportunities and revenue streams. Innovation and entrepreneurship are critical aspects which support economic growth and development. The application of entrepreneurship to pharmaceutical processes may enable the achievement of improvements in healthcare.

Objectives: To examine the contribution entrepreneurship has to innovation and to study the concept and role of education in the evolvement of entrepreneurship.

Methods: A systematic literature review consisting of an examination of innovative aspects and how entrepreneurship skills improved innovation was conducted. Semi-structured interviews with entrepreneurs were held to gain perspective, understand concepts and identify issues in areas such as proactiveness and competitive aggressiveness and pedagogical efficacy versus a real-world approach. Responses to the interview questions formed the basis for the development of an educational programme for pharmaceutical entrepreneurs. The programme involved the nurturing of an entrepreneurship spirit within pharmaceutical processes.

Results: The application of entrepreneurial skills enables the evolvement of pharmaceutical processes to meet patients' needs in a robust and efficient manner. Literature suggests that individual characteristics and personality traits are key to motivating entrepreneurial intentions and behaviours, and training is another significant factor. Research shows that no consensus exists for entrepreneurship in pharmacy practice and education.

The semi structured interviews addressed the questions of how entrepreneurship contributes to a pharmacoeconomically sound innovation and the concept and role of education and training in the evolvement of entrepreneurship. The interviews also showed how an interdisciplinary approach carried out through enterprising skills has a higher potential to produce valuable outcomes. The educational programme in pharmaceutical entrepreneurship includes emphasis on creative pharmacy concepts, divergent-thinking patient care, versatility and critical thinking, cultural and social public dealing competencies and persistence in disruptive pharmaceutical development. The educational programme aims to offer the necessary knowledge and skills to identify, create and pursue new opportunities and implements new ideas in a successful and sustainable manner.

Conclusions: In the context of this research, entrepreneurship is considered beyond the traditional sense of business and financial planning. In this study, entrepreneurship is considered as a product of creative thinking, the taking of calculated risk when embarking on new ventures and evidence-based decision making as related to a progressive pharmaceutical scenario. In this regard, entrepreneurship may be considered to be in its infancy.

The influence of COVID-19 on the availability and affordability of essential medicines: Insights from Ghana's National Health Insurance Scheme (NHIS)

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Introduction: The COVID-19 pandemic presented challenges to healthcare systems including alleged shortages and price hikes of medicines due to panic buying. The periodic medicine price surveys of the National Health Insurance Authority (NHIA) of Ghana towards the review of prices on its reimbursable Medicines List (ML) provides useful information on prevalent medicine prices and their availability which could be studied for health system management.

Objectives: To analyse the possible influence of COVID-19 on medicines availability and prices.

Methods: A random cross-sectional nationwide survey of pharmaceutical outlets was undertaken for prices of generic medicines on the NHIS ML in 2019 and 2021. The authors calculated the response rates (percentage of providers who provided prices per medicine) and used this as a proxy for availability and examined the medicines with the top ten response rates (RR) and those with zero RR. The authors calculated the median price of each medicine and determined their deviation from the NHIS reimbursable price as a proxy for affordability. Further, the authors compared the deviations from the NHIS prices of these formulations: injections, tablets/capsules, oral liquids, intravenous fluids, topical preparations, eye drops, inhalers, and suppositories.

Results: The authors surveyed a total of 99 and 158 respondents in 2019 and 2021 respectively. In 2019 the highest RR per medicine was 34% and the top ten RR ranged between 32% and 34%. In 2021 the highest RR was 87% and the top ten range was from 82% to 87%. Ciprofloxacin 500mg, Paracetamol 500mg tablets and Paracetamol 120mg/5ml syrup were common in the top ten most responsive medicines for both years. The most responsive medicine was Cefuroxime 250mg tablet and Iron (III) polymaltose solution in 2019 and 2020 respectively. There was zero response for 17 medicines in both years with seven of them occurring in both years. Median price deviations from NHIS reimbursement prices were as follows for 2019: injections (-95% to 4445%), tablets/capsules (-98% to 4924%), oral liquids (-85% to 479%), intravenous fluids (3% to 96%), topical preparations (-47% to 8991%), eye drops (19% to 614%), inhalers (-20% to 186%), and suppositories (-7% to 202%); and for 2021: injections (-98% to 49094%), tablets/capsules (-95% to 12400%), oral liquids (-97% to 116%), intravenous fluids (-28% to 18%), topical preparations (-73% to 116%), eye drops (-67% to 153%), inhalers (-100% to 140%), and suppositories (-11% to 193%).

Conclusions: On the whole, the availability of medicines on the NHIS Medicines List was better in 2021 than 2019 in sampled facilities. This may suggest preparedness to respond to patient's needs based on the experiences of increased patronage during the height of the pandemic in 2020. The ranges of medicine price deviations from the NHIS price in 2021 for injections and tablets/capsules were wider and higher compared to those for 2019. This could be due to the observed price hikes of some formulations during the peak period of COVID-19 for the predominantly adult population that was affected in Ghana. Further studies on the prices and availability of specific therapeutic classes of medicines in Ghana during this period is suggested.

Implementation of electronic prescriptions during the COVID-19 pandemic in the social security subsystem

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Introduction: The COVID-19 pandemic accelerated the digital transformation process in the social security subsystem of Jujuy, Argentina.

Objectives: To describe the context and scope of the implementation of the electronic prescription system.

Methods: Based on interviews with the parties involved in March 2022, the context of implementation of the electronic prescription is described as follows.

Results: Jujuy's social security subsystem provides health and social services to 25.6% of the province's population. This social security organisation is financed by the contributions and dues of the provincial state workers and voluntary members. All doctors registered in the province, whether or not they reside in Jujuy, are prescribers of said health insurance. There is a shortage of medical specialists and general practitioners especially in areas that are far from the capital city. This deficit increased due to the social, preventive and compulsory isolation measures decreed in March 2020. The health structure in Jujuy lacks a computerized clinical history system, which made it difficult to monitor isolated patients. The implementation of electronic prescriptions began in April 2020 and by June of the same year it included all those prescriptions issued under the scheme to be used by the health insurance members in community pharmacies. The implementation concluded prior to the first outbreak of Covid-19 in the region, allowing users timely access to prescribed medication in person or remotely. The implementation cost was absorbed by the entity that groups 83% of the community pharmacies. The digitization of prescriptions and dispensing records allows access to the data in real time, while eliminating the paper requirement.

Conclusions: The electronic prescription improves equity and accessibility to health coverage. The records generated offer quality information for future planning of health policies.

Development of policies that impact on access to medicines in Angola

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Introduction: Universal health coverage aims to ensure that all people have access to health services without financial hardship to pay for them, including medicines. The formulation, implementation and maintenance of policies that provide access to medicines is a goal in Angola and related studies contribute to achieving the proposed goals. Angola is a young democratic country undergoing consolidation. It is located in the western region of southern Africa. With a population of 25.7 million, the life expectancy at birth is 63 years for women and 55.5 years for men.

Objectives: This study aims to review the policies that impact access to medicines in Angola.

Methods: Data collection was conducted through bibliographic and documentary research. Administrative, legislative, institutional publications from international and national, governmental and non-governmental organisations and grey literature were searched. For data treatment content analysis was adopted.

Results: The process of construction of the health system and consequently the pharmaceutical policy is directly related to the evolution of the national health system: In the colonial period, access was given only to a privileged minority. With the proclamation of independence in November 1975, the National Health System was created, based on the principles of universality and gratuity. The Ministry of Health (MINSA) is the entity responsible for formulating and conducting health policy, with the National Health Development Plan as its main instrument. The National Pharmaceutical Policy was drafted in June 2005 and approved in March 2010. Its objective is to ensure that the entire population has access to effective, safe and quality medicines, anywhere in the country, at controlled prices and the rational use of these medicines. In the same year, other institutions were formalised with a view to improving the medicines procurement process, and to achieving the goals established internationally for developing African countries. Recently, the Medicines and Health Technology Regulatory Agency (ARMED) was created, charged with directing all functions in the pharmaceutical sector, including teaching, research and extension.

Conclusions: Angola has a minimal legal framework that regulates the health system and access to medicines. However, in practice, the regulatory framework appears to be a 'letter of intent' in which the country sets out its intentions in an attempt to comply with internationally established standards. Moreover, many of the proposals have not yet been implemented. This can be explained by multiple factors, such as the political-economic structure of the country (centralised in the capital in all sectors), the external dependence on access to medicines (either through donations or direct purchase from foreign companies, since there is no local production of medicines), lack of trained human resources (the pharmacy course is recent and there is no unified curriculum). All this scenario triggers a fragmented look at health services, which hinders their development.

Impact of national public policies on the development of interprofessional education and collaboration

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Introduction: Interprofessional education and collaboration (IPEC) are recognised as essential strategies to overcome the deficiencies of health systems and services. There is an urgent need to overcome the biological and hospital centred model in force in institutions responsible for the higher training of health workers. There is a need for a paradigmatic change in training strategies and not only the inclusion of disciplines and specific initiatives. Broader, substantial and continued strategies of IPEC can produce significant and sustained impacts for health practices. Public policies are a set of decisions and actions taken by the government, leading to the development of activities that influence the lives of citizens and that exists to respond to a public problem. Public policies are fundamental for the structuring of actions aimed at strengthening IPEC. However, the relevance of public policies on education and health for the development and consolidation of IPEC is still neglected in the context of the studies and guidelines, which are dedicated to the description and analysis of didactic and operational aspects of initiatives of universities or local health services.

Objectives: This study analyses the Brazilian case to identify the impact of public policies on education and health for the development of IPEC in Brazil.

Methods: This is a qualitative, exploratory, documental study of policy analysis at the national level, focusing on IPEC incentives, regulation and implementation.

Results: 21 documents (13 from the Ministry of Health and eight from the Ministry of Education) were identified between the years 1990 and 2020. The chronological analysis of the contents shows that the foundations for IPEC come from coordinated policies between health and education. The Brazilian policies historical construction has shown that IPEC

needs concrete public policies for regulation and financial incentives, since the political conditions of the country are related to greater or lesser development of IPEC. The stimulus to interprofessional education in the universities allied to the generation of demands for hiring professionals for interprofessional teams (particularly for the primary health care services of the Unified Health System) generated periods of greater development of IPEC experiences in undergraduate and graduate levels. After almost two decades of increasing incentives and development, however, the political and economic scenario of the last few years does not favour the strengthening of policies implemented to achieve collaborative healthcare practices and promote interprofessional education.

Conclusions: The historical perspective analysis demonstrated that comprehensive public policies have a high impact on the development and consolidation of IPEC on a large scale, with the ability to effectively change practices in the health system and demands for the educational system. Some significant programmes of incentive for IPEC, particularly in graduate residences, have shown great value and are well established, despite the economic, social and ideological storms recently experienced in the country.

Validation of quality indicators for geriatric pharmacotherapy in primary care: A mixed-methods study

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Introduction: Primary care services are increasingly important for older people with polypharmacy. Although the increasing demand for measuring the quality of care, few studies on the development and validation of quality indicators (QIs) have been conducted in Japan. The authors teams recently developed and conducted an initial validation (face and content) of a set of quality indicators for geriatric pharmacotherapy services provided by community pharmacists using national guideline review and a modified Delphi study.

Objectives: To evaluate the measurement properties of 121 content validated QIs for medicine use in older people in Japan.

Methods: QIs for geriatric pharmacotherapy was pilot-tested for six months to evaluate the five measurement properties (applicability, improvement potential, acceptability, implementation issues and sensitivity to change). The patients of participants were eligible for inclusion if they were aged over 75 years and taking six or more prescription medicines for more than four weeks (polypharmacy). Participants self-reported a denominator and a numerator of each QI item for patients through the web application platform. A web application platform was created for data reporting and visualisation by the authors research team. Descriptive statistics for patient characteristics were summarised as means (standard deviations), medians (interquartile range), or percentages, using Python and R. A two-sided *P*-value of < 0.05 was considered statistically significant.

After the observational study, interviews were conducted to assess the acceptability of and any implementation issues with the QIs. If there were multiple pharmacist participants from one pharmacy, all were invited to a group interview to get a wider range of views about the implementation of QIs in their practice. Interview participants were purposively recruited (based on location, ownership, employment status and the number of patients reported in the study), to maximise the depth, richness and scope of the range of views. Interview data were thematically analysed to evaluate implementation issues with the reporting of QIs by participants. Data were managed using NVivo

Results: 60 pharmacies participated in the study. Of these, participants from 42 pharmacies in ten different prefectures reported data about 457 patients. Participants from the remaining 18 pharmacies (14: no data collection, Four: data collection for one month) were excluded from analyses. The median age of patients was 82 years (IQR: 79 - 86) and 44% were males. In terms of the QI measurement properties, 53 QIs met the criteria of applicability, improvement potential, acceptability and implementation issues. Of these, 17 also had high sensitivity to change. Interviews with 26 pharmacists (response rate 74%, 26/35) identified eight themes (indicator characteristics, web application, policy, patient, time, competence, pharmacy administration, collaboration) in relation to the consequence of implementation of QIs.

Conclusions: This study highlighted the field-testing of a set of QIs in improving and evaluating geriatric pharmacotherapy. This QI set can be used to evaluate the quality of care delivered by community pharmacists. It also can facilitate the prioritisation of care. A system to automatically collect and report data needs to be further established.

Medication management in frail older people: Consensus principles for clinical practice, research, and education

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Introduction: Frailty is a geriatric syndrome associated with decreased physiological reserve and increased vulnerability to medication-related harm. Frail older people often have a lower likelihood of achieving long-term therapeutic benefits from chronic preventive medications. Prescribing recommendations in disease-specific clinical practice guidelines are usually extrapolated from studies conducted in younger or more robust adults, and so may not be generalisable to the frail older population. Despite recommendations from recent guidelines to reduce inappropriate medication use in older people, there is a lack of comprehensive principles to guide medication management specific to older people living with frailty.

Objectives: To report international consensus principles for clinical practice, research, and education related to medication management in frail older people.

Methods and Results: The consensus principles were developed by the Optimizing Geriatric Pharmacotherapy through Pharmacoepidemiology Network (OPPEN), a multidisciplinary group of geriatricians and pharmacists from Australia, Finland, France, Italy, and Sweden. The consensus principles comprised seven principles for clinical practice, six principles for research, and four principles for education. Principles for clinical practice included: (1) perform medication reconciliation and maintaining an up-to-date medication list; (2) assess capacity to self-manage medications; (3) ensure appropriate prescribing and deprescribing; (4) simplify medication regimens; (5) be alert to medication-related geriatric syndromes; (6) regularly review medication regimens; and (7) facilitate multidisciplinary communication. Principles for research included: (1) include frail older people in clinical trials; (2) consider frailty as an effect modifier; (3) report outcome measures important in frailty; (4) assess impact of frailty on pharmacokinetics and pharmacodynamics; (5) encourage frailty research in under-researched settings; and (6) utilise routinely collected linked health data. Principles for education included: (1) provide undergraduate and postgraduate education on frailty; (2) minimise low-value care related to medication management; (3) improve health and medication literacy; and (4) incorporate evidence in relation to frailty into clinical practice guidelines.

Conclusions: The consensus highlighted different considerations for optimising medication management in frail older people. These principles can be used in conjunction with existing best practice guidelines to help achieve optimal health outcomes for this vulnerable population. Implementation of the principles will require multidisciplinary collaboration between healthcare professionals, researchers, educators, organisational leaders, and policymakers. The consensus principles have been endorsed by the International Conference on Frailty and Sarcopenia Research (ICFSR), the European Geriatric Medicine Society (EuGMS), and the Australian and New Zealand Society for Sarcopenia and Frailty Research (ANZSSFR).

Impact of pharmacist counselling on medication-related fall risk awareness among community-dwelling older adults in Saudi Arabia

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Introduction: In older adults, falls are the foremost cause of injury and injury-related deaths. Among the community-dwelling older adults (aged 65 or older), over 30% fall every year, causing disability and early death. Most older adults are aware of the physical, behavioural, and environmental factors for falls but there seems to be a lack of knowledge with regard to fall risk due to medications. Earlier studies have shown the inability of the respondents to identify the high-risk medications related to falls. Additionally, many studies have assessed the knowledge of only a limited number of drug classes excluding over-the-counter (OTC) drugs.

Consequently, the knowledge assessment of medication-related fall risk among community-dwelling older adults should be determined for knowledge gap identification and designing of targeted educational initiatives for effective fall prevention strategies.

Objectives: 1) To evaluate the risk of falling among community-dwelling older adults; 2) To assess the knowledge of older adults related to prescription and OTC medications that can increase their risk of falling; 3) To evaluate the impact of pharmacist counselling on knowledge of medication-related fall risk.

Methods: This study was a questionnaire-guided, interview-based, cross-sectional survey using convenient sampling among community-dwelling older adults (≥ 60 years) in the Jazan region of Saudi Arabia. Apart from demographics, the questionnaire included 12 questions to assess the fall risk (STEADI, Stay Independent screening tool by CDC, USA) and nine knowledge-based items to assess the medication-related fall risk awareness adapted from Falls Risk Awareness Questionnaire. In addition, six knowledge-based items related to OTC medication fall risk were added.

Results: A total of 391 respondents consented to participate, of which the highest number (32%) were from 66 - 70 years and were mostly male (57.8%). More than half of the respondents (58.8%) indicated that they had received pharmacist counselling related to fall risk medication in the past six months. The most predominant chronic conditions were hypertension (56.5%) and diabetes (49.9%). The fall risk assessment showed that 57% were at risk of falling with 38.6% falling at least once in the past year. Alarmingly, two-thirds of the respondents (66.8%) were worried about falling again. Receiving pharmacist counselling was significantly associated with good knowledge of fall risk prescription medications ($\chi 2 = 36.76$, $p < 0.001$). Also, receiving pharmacist counselling was significantly associated with the willingness to change fall risk medication on pharmacist advice ($\chi 2 = 20.66$, $p < 0.001$).

Conclusions: The study highlights a pressing concern related to the knowledge gap related to fall risk medications. Therefore, specific medication-related, educational targets should be addressed by fall prevention programs for older adults. Lastly, the increased willingness to change fall risk medication by those who had been counselled by a pharmacist supports the role of the pharmacist in medication-focused fall prevention efforts.

Impact of internet gaming disorder on the body weight status of health science students

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Introduction: The phenomenon of Internet Gaming Disorder (IGD) has been described as a form of constant and persistent involvement with video games that which often leads to a steady decline of educational activities among students and of daily work among other adults. Even though, playing of most videogames is safe and with some games also demonstrating physical, social as well as cognitive benefits, on the contrary disproportionate playing of video games have the potential to lead to psychosocial and in some extreme cases even leading to medical problems including game-induced seizures as well as in some very rare cases even leading to death.

Objectives: The purpose of the present study is to assess the impact of disordered gaming on the body-weight status of the participants. Another purpose of the present study is to assess psychological impact of disordered gaming among the same population.

Methods: Students, aged 18 – 26 years old, between 11th March to 11th May 2022, from different colleges of Health Sciences in Saudi Arabia. Students completed a 42-item self-report survey and also recorded their anthropometric parameters. Body mass index (BMI) was calculated using an

online BMI calculator. Data was analysed using SPSS (version 23). Pearson's correlation coefficient was calculated to look for any statistically significant associations between scores of different scales.

Results: Significant positive correlation was seen between the IGDS9-SF score and the participants BMI (r = 0.41; $p < 0.01$). This infers that as the IGDS9-SF score increases so does the participants BMI. Significant positive correlations were also seen between the participants' IGDS9-SF score and three-item UCLA loneliness scale (r = 0.12; $p < 0.01$), GAD-2 score (r = 0.06; $p < 0.05$), and Rosenberg self-esteem scale (RSES) score (r = 0.10; $p < 0.01$). This means as the score of one variable increases so does the other.

Conclusions: The findings of the present study warrants the need for meticulous and frequent health education interventions designed to highlight the negative impact of disordered gaming as well as the associated psychological impact of obesity. Educational programs should be designed in such a way that they help these individuals not only to cope up but also to overcome the negative impact of IGD and its associated risks.

Impact of drug policy on the consumption of original and generic antihypertensive drugs

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Introduction: Rational use of medicines requires that patients receive appropriate medications at the lowest cost to them and their community. Pharmaceutical expenditure is increasing in all European countries. As a consequence, third-party payers have introduced multiple reforms and initiatives in recent years to optimise the managed entry of new drugs and, in addition, to help control expenditure on existing drugs through encouraging the increased prescribing of generics at low prices.

Objectives: To evaluate the impact of drug policy on the utilization of original and generic antihypertensive drugs.

Methods: Legislation's' amendments from 2017 to 2019 were retrieved in full text and studied. The original and generic antihypertensive drugs included in the Price List of Reimbursable Medicinal Products in 2017–2019 were studied. Data on antihypertensive prescription medicines were obtained from the information system 'Sveidra' of the Lithuanian National Health Insurance Fund. Retrieved data covered reimbursed and dispensed prescriptions from 2017 to 2019. For the same period aggregated data on overall utilization by antihypertensive drugs was derived from State Medicines Control Agency of Lithuania. Utilization of drugs was evaluated using ATC / DDD (Anatomical Therapeutic Chemical classification system / Defined Daily Dose) methodology. DDDs where obtained from WHO Collaborating Centre for Drug Statistics Methodology, ATC/DDD Index 2019 was used. The results were expressed in DDD per thousand inhabitants per day (TID). Number of inhabitants was retrieved from Statistics Lithuania. Populations at the beginning of the year was used for calculation of TID. Statistical data was processed with R Commander.

Results: During research period six legislations, which regulated formation of the list of reimbursed medicines, prescribing and dispensation were amended. Utilisation of 14 different positions Ramipril 5 and 10mg, Fosinopril 10mg, Telmisartan 80mg, Nebivolol 5mg, Metoprolol 50 and 100mg, Betaxolol 20mg, Lercanidipin 10 and 20mg, Nitrendipin 20mg, Fosinopril and hydrochlorothiazide 20/12.5mg, Quinapril and hydrochlorothiazide 20/12.5mg and Telmisartan and hydrochlorothiazide 80/12.5mg was studied. The change No. 59 of Resolution of Government No. 994 introduced the maximum premiums for reimbursed medicines (20% of the base price, or EUR 4.71). This amendment had a major impact on the use of all 14 drugs studied. The biggest changes were estimated for original drugs which were removed from the reimbursement list because exceeding maximum premiums. Another studied amendment introduced the 'first prescription' requirement. According to this if patient had no previous medicine within six-month period only the cheapest medicines (either original or generic) could be dispensed at the pharmacy. After this change, the use of one drug increased, ten drugs decreased and three drug usages have not changed. Other legislation amendments had no major impact on reimbursed medicines' utilisation. All legislation amendments had no influence on overall utilisation of most studied drugs.

Conclusions: Legislation effecting drugs prescribing and dispensation were amended to reduce medicine costs. The utilization of reimbursed antihypertensive medicines changed but overall utilisation has not in the period studied. This might show that the patients continued to by preferred medicines out of the pocket.

Development and evaluation of an online pocket guide to quality improvement: A preliminary step to build a quality improvement community of practice for pharmacy professionals

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Introduction: Continuous quality improvement empowers healthcare professionals to optimise patient safety and quality care. A virtual community of practice will facilitate knowledge exchange and knowledge translation of quality improvement (QI) initiatives among pharmacy professionals.

Objectives: This project is aimed to develop and evaluate an infographic-based online Pocket Guide to Quality Improvement (PGQI), which will serve as a preliminary step to build a QI community of practice for pharmacy professionals.

Methods: The authors consulted various national and international resources for training healthcare professionals on QI and consolidated into a concise and infographic-based online pocket guide. The authors pilot tested the PGQI to a convenience sample of pharmacists and pharmacy students in Canada and administered a 14-item online survey to gather their user experience of the PGQI during a four-week period in October 2021.

Results: The authors developed an infographic-based online PGQI, which outlines key concepts in QI, including defining quality, identifying a quality gap, applying systems thinking and QI tools (e.g., root cause analysis, model for improvement, plan-do-study-act cycles). The PGQI is a resource to educate pharmacists and pharmacy students on QI. A total of 20 responses were collected from the user experience online survey. The respondents' primary practice was diversely located in community, hospital, administrative, and regulatory authorities, with representation from six provinces in Canada. The length of time to review the PGQI ranged from five to 15 minutes. Users found the materials relevant and easy to understand. Notably, 70% respondents perceived a significant increase in their QI knowledge after viewing the PGQI; 90% would recommend the PGQI to other healthcare professionals; and 65% respondents were interested in planning a QI project in the next 12 months. Many respondents appreciated the effective use of graphics, charts, and visuals to explain and illustrate QI concepts. They suggested to include external resources for further reading, examples/elaborations of QI tools, and case scenarios.

Conclusions: The online PGQI effectively presented QI concepts in an easy-to-read format. This pilot testing revealed that the PGQI can be easily accessible and utilised by pharmacists and pharmacy students who wish to learn more about defining, planning, and conducting a QI project. The PGQI will serve as a foundational resource to support a virtual QI community of practice for pharmacy professionals.

Ten years of the apothecaries project: The development agent pharmacist

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Objectives: The objective is to show the results of ten years of work by the Boticarios Project as a model of pharmaceutical intervention in PVD. This project was started in 2012 with the aim of optimising pharmaceutical cooperation through the participation of pharmacists specifically trained to carry out development cooperation interventions, humanitarian aid and other activities of the social area of pharmacy. This goal is justified in the need to cover with human resources areas that the authors believe belong to the pharmacist in fields such as comprehensive drug management, pharmacotherapeutic follow-up, and health protection in the rational use of drugs, nutrition, water, and sanitation.

Methods: It is a multi-year project that is developed in three stages. The first, eight months of training through the course 'Specialization in Pharmaceutical Cooperation'. After this phase, students have the option of entering the field intervention phase (PIT) in FSFE projects or those of other entities that belong to the project network. Finally, a work network has been created – Red apothecary – with the pharmacists participating in the programme.

Results: In ten years, 353 pharmacists have been trained, of which 117 have participated in 59 cooperation projects in 21 countries, working with 35 local entities in diverse countries.

Conclusions: The authors have carried out the evaluation of the project, especially in everything related to training, as well as studied its impact, including in the study all the human resources that form it-students, FSFE staff and local counterparts.

At the international level, this project was presented as a model of pharmaceutical care in cooperation and humanitarian aid at the World Congress of Pharmacy and Pharmaceutical Sciences organised by the International Federation of Pharmacists (FIP) Buenos Aires-August 2015.

Patient preferences and cost-benefit of hypertension and hyperlipidemia collaborative management model between pharmacies and primary care in Portugal: A discrete choice experiment alongside a trial (USFarmácia)

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Introduction: Little is known on patient preferences and value of pharmacy collaborative disease management with primary care using interprofessional communication technology-driven under real-world conditions. Discrete Choice Experiments (DCEs) are useful for quantifying preferences for nonmarket services.

Objectives: 1) To explore variation in patient preferences and estimate willingness-to-accept (WTA) annual cost to the National Health Service (NHS) for attributes of a collaborative intervention between pharmacies and primary care in Portugal using a DCE; 2) to incorporate DCE into an economic evaluation using cost-benefit analysis (CBA).

Methods: A convenience sample of hypertension and hyperlipidemia intervention and control patients was selected to complete the DCE at the end of a collaborative trial between pharmacies and primary care in Portugal. The authors used five attributes: waiting time to get medical appointment, model of pharmacy intervention, integration with primary care, chance of having a stroke in five years, and annual cost to the NHS. The authors used an experimental orthogonal fractional factorial design. Data were analysed using conditional logit.

Results: Waiting time for a medical appointment on the same day (urgent) and within 15 days (non-urgent) was the most important attribute, followed by 30-minute pharmacy intervention in private office every six months for point-of-care measurements and for medication review of all medicines, and full integration with primary care (protocols pre-agreed with physicians, possible to schedule medical appointment with GP via pharmacy IT). The cost attribute was not significant. Intervention patients were willing to accept NHS annual cost of €877 for their preferred scenario. The annual net benefit per patient is €788.20 and represents the monetary value of patients' welfare surplus for this model.

Conclusions: This study is the first conducted in Portugal alongside a pharmacy collaborative trial, incorporating DCE into CBA. The findings can be used to guide the design of pharmacy collaborative interventions with primary care with the potential for reimbursement for uncontrolled or at-risk chronic disease patients informed by patient preferences. Future DCE studies conducted in community pharmacy may provide additional contribution to this research.

Cost analysis, cost-effectiveness, and cost-utility of hypertension and hyperlipidemia collaborative management between pharmacies and primary care in Portugal alongside a trial compared with usual care (USFarmácia)

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Introduction: There is little experience in the economic evaluation of pharmacy collaborative health interventions with primary care using interprofessional communication technology-driven under real-world conditions.

Objectives: The aim of this 'proof-of-concept' study was to carry out costing, cost-effectiveness, and cost-utility analyses of a real-world collaborative care intervention in hypertension and hyperlipidemia management using information technology between pharmacies and primary care in Portugal versus usual (fragmented) care alongside a trial.

Methods: An economic evaluation was conducted alongside a six-month trial. The target population were adult patients on hypertension and/or lipid-lowering medication. The authors used a societal perspective. The authors collected patient-level resource use, costs and outcomes using

different real-world data sources in several time points. The authors used National Health Service (NHS) unit costs and micro-costing including Time-Driven Activity-Based Costing (TDABC) to estimate cost of pharmacy and primary care interventions, and the human capital approach for paid and unpaid productivity loss costs. Effect outcomes included blood pressure (BP) and quality-adjusted life years (QALYs). Bootstrapping was used to estimate uncertainty. Cost-effectiveness planes and acceptability curves were estimated.

Results: The intervention was not shown to have reasonable levels of cost-effectiveness or cost-utility when compared to usual care, as denoted by the levels of uncertainty expressed in wide confidence intervals. The probability for the intervention to be cost-effective is 28% at the threshold €20,000 per QALY gained and 57% at the threshold €500 per mmHg systolic BP decrease. The probability in the sensitivity analysis is similar to the base case.

Conclusions: Considering the limitations of the trial which affected effectiveness and economic outcomes the authors findings are not generalisable for community pharmacy and primary care in Portugal. This research offers, however, valuable lessons on research methods and strategies that can be used to guide future TDABC costing and economic evaluations of pharmacy-based collaborative public health interventions with the potential for reimbursement.

Perceptions of the dimensions of complexity within pharmacy amongst United Kingdom early career pharmacists

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Introduction: Managing patient complexity is a growing challenge for the global healthcare community due to the increasing presentation of multi-morbidities, chronic conditions, and polypharmacy. Furthermore, modern healthcare is afflicted by a high degree of uncertainty due to multifaceted care delivery models, social and economic pressures, and local cultural and behavioural differences, creating further complexity within health systems. Previous research has shown that early career pharmacists (ECPs) struggle with the transition to independent practice which is associated with challenges of role accountability and working environment. Within medicine, a framework has been developed to guide the approach to understanding and management of patient complexity, however, there is a lack of clarity and absence in definition of complexity within pharmacy.

Objectives: To investigate perceptions of the dimensions of complexity within pharmacy amongst early career pharmacists (ECPs) practising in the United Kingdom (UK).

Methods: A purposive sample of ECPs across the UK within their first five years of post-licensing practice was recruited. Semi-structured interviews were conducted with 15 ECPs in person and by telephone. Interviews lasted between 60 - 90 minutes and were audio recorded and transcribed verbatim. The data was coded using a grounded approach and was thematic analysed using the constant comparative method within Nvivo version 12. Ethics approval was gained from the university Research and Ethics Committee.

Results: The data suggests there are four perceived themes of complexity relevant to ECPs; a) clinical and patient-related; b) pharmaceutical care and service provision; c) personal skills and capability; and d) task orientation within the workplace. Clinical and patient-related complexity was most frequently associated with practice and with patient co-morbidities, including more complex medical conditions that required specialist care. ECPs felt that there was a high degree of clinical risk in managing such patients. Pharmaceutical care complexity was linked to medicine regimes (an additional factor associated with co-morbidity) which require reconciliation and monitoring as patients move around the health system. Participants highlighted that poor record keeping and a lack of guidelines contributed to this pharmaceutical care and service provision complexity. ECPs felt that situations where they were required to make decisions and take accountability for decisions were inherently complex. Decision making was perceived to be more challenging in new situations, as ECPs were unsure of the actions to take or felt they did not possess the appropriate skills to resolve issues. Complexity was also linked to the quantity or workload, of activities where numerous actions had to be completed, and cases and tasks where a consideration of multidimensional factors was necessary.

Conclusions: Managing complexity is an element of professional and clinical practice for healthcare professionals across various settings but is particularly problematical for ECPs. Moreover, the volume and extent of complexity associated pharmacy practice is increasing due to patient factors and external system pressures within healthcare systems. Future research should explore whether complexity influences patient care, service delivery, and professional development. This could inform the review and development of new models of care, and education programmes to provide the pharmacist workforce with capabilities to effectively manage complexity.

Knowledge, attitude and practices about antimicrobial resistance and antimicrobial stewardship among the general public

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Introduction: Antimicrobial resistance is a major public health challenge worldwide and is becoming more widespread. The contributory factors may include self-medication practices, lack of awareness of antimicrobial resistance, poverty line, over the counter availability of antimicrobials etc. The community plays an important role in development and spread of both infections and infectious organisms hence the community is a critical focal point in control of antimicrobial resistance and stewardship.

Objectives: The aim of the present study was to evaluate knowledge, attitude and practices of residents in Lagos State about antimicrobial use, antimicrobial resistance (AMR) and antimicrobial stewardship (AMS).

Methods: A cross-sectional study was carried out using an online questionnaire created using Google forms. Link to the form was sent across various WhatsApp groups and platforms targeted at residents in Lagos state. The sample size was set at 461 respondents. Ethical approval with approval number as ADM/DCST/HREC/APP/4442 was obtained from the Health Research and Ethics Committee (HREC) of the Lagos University Teaching Hospital, LUTH, Idi-Araba, Lagos, Nigeria. The informed consent form was read through by participants who were then required to indicate their consent before gaining access to the survey. Data were analysed by descriptive and inferential statistics using Microsoft Excel and Statistical Package for the Social Sciences (SPSS version 23.0). A *p*-value of less than 0.05 was considered significant. Results obtained were presented as tables and charts.

Results: Demographic profile shows that majority were female (55.7%) and were within the 31 - 40 age range (52.1%). The findings showed that 83.3% displayed good level of knowledge of antimicrobial use while 80.5% of the respondents displayed good attitude and practice towards antimicrobial use. The results revealed that there was a significant relationship between the knowledge and practice of antibiotics resistance amongst the general public ($r = 0.812$, $p > 0.00$).

Conclusions: The study shows that even though the respondents possess a good level of knowledge of antimicrobial resistance and antimicrobial stewardship as well as good attitude and practices towards antimicrobial use, a significant proportion also displayed poor attitude and practices. Hence awareness and education should be done as a tool for mitigating antimicrobial resistance.

An overview of orphan drug utilisation in Taiwan in 2020

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Introduction: The analysis of the orphan drug utilisation is very important for clinicians and rare disease patients.

Objectives: This research analysed the utilisation of orphan drug in Taiwan to provide government the reference for importing medications, physicians for prescribing medications, pharmacists for providing medications.

Methods: In order to let all rare disease patients obtain medication smoothly, the government has even created several regulations related to orphan drugs management such as the Ad Hoc Applications for Orphan Drugs Regulation to support the whole administration needs.

For those orphan drugs that already obtain license approval, the PSUR (Periodic Safety Update Reports) is needed to be provided to TFDA every year. For those orphan drugs that without license approval but with special import permit, the hospitals need to provide the utilization evaluation report to MoHW.

Results: In 2020, the hospitals reported total 106 orphan drugs in utilisation. There are 17 orphan drugs with special import permit and used by 365 patients. In 2020, there are 310 utilization evaluation reports collected and the recovery rate is 84.93%. Studying those reports, the adverse events happened in 43 patients (incident rate: 13.87%). Those events include flushing, diarrhoea, rash/urticarial, etc.

Conclusions: The efficacy and safety of orphan drugs has been closely monitor in Taiwan. The monitor and management has kick off since granting Orphan-Drug Designation, pre-license management, post marketing risk management to efficacy and safety re-evaluation.

Council of Europe 'Resolution on the implementation of pharmaceutical care' - A step forward in the promotion of appropriate use of medicines and patient-centred care

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Introduction: The European Directorate for the Quality of Medicines and HealthCare (EDQM) is a Directorate of the Council of Europe, an intergovernmental organisation (based in Strasbourg, France) set up to promote democracy and protect human rights and the rule of law in Europe. The EDQM is in charge of ensuring the basic human right of access to good quality medicines and healthcare in Europe.

Pharmaceutical care addresses the medication needs of patients directly and comprehensively, and it contributes to promoting patient-centred care, optimising medication use and improving a patient's quality of life. However, the intergovernmental Committee of Experts on Quality and Safety Standards in Pharmaceutical Practices and Pharmaceutical Care (CD-P-PH/PC), coordinated by the EDQM, found that there was significant variation in the acceptance of pharmaceutical care among stakeholders outside of pharmacy organisations and in the implementation of pharmaceutical care in Europe.

Objectives: To issue a Council of Europe resolution (*i.e.* a soft law instrument) providing member states with a legal basis for the implementation of the pharmaceutical care philosophy and working methods in their national healthcare systems.

Methods: A multidisciplinary working party was established in 2018 consisting of pharmacists, academics and representatives of national competent authorities. Through a combination of face-to-face meetings, circulation of the draft text and informal consultation with stakeholders, a text was prepared that was accepted and approved and, after a legal and structural review, translated into French (*i.e.* one of the two official languages of the Council of Europe).

Results: A Council of Europe resolution on the implementation of pharmaceutical care for the benefit of patients and health services was adopted by the Committee of Ministers of the Council of Europe in March 2020. The resolution provides health authorities with guidance and recommendations supporting the promotion and implementation of pharmaceutical care as a quality-enhancing element in healthcare systems at regional and national levels. It also provides healthcare professionals and associations with a legal basis for the implementation of pharmaceutical care and related services in their daily activities. A webinar was held in November 2020 to illustrate the content of the resolution and its added value as well as provide some practical examples on its implementation in daily practice at national level. More than 270 participants from 35 different countries attended this event.

Conclusions: The implementation of the resolution's provisions in national healthcare systems and daily practice is expected to play an important role in achieving the benefits of responsible use of medicines, promoting rational use of healthcare resources and reducing inequalities in healthcare for the benefit of all European patients, especially the most vulnerable in society. The EDQM continues to monitor the implementation of this resolution as well as the implementation of pharmaceutical care and clinical pharmacy services through targeted surveys.