

CONFERENCE ABSTRACTS

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Academic pharmacy

Supporting our teaching staff: Aligning educational scholarship and teacher development

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Introduction: The department of pharmaceutical sciences at Utrecht University, the Netherlands, is known for its innovative educational culture, in which educational (research) projects are a means of continuous curriculum improvement. However, the projects are not driven by a shared vision and support for teachers is lacking.

Objectives: This project aimed to develop a shared vision of the roles of educational scholarship and educational innovation for quality of education and teacher development within the department. This project was conducted as part of the Educational Leadership Program, one of the professional development programs at Utrecht University.

Methods: Interviews were held with a variety of governing bodies responsible for the quality of pharmacy education, front-runners in educational scholarships, and various teaching staff and students within the department. Participants were asked about their vision of the roles of educational scholarship, teaching innovation and teacher development in our department. In addition, they were asked to share their views on 'barriers and facilitators' contributing to educational innovation and educational scholarship.

Results: The analyses of the interviews resulted in the shared vision that the focus of educational research and innovation

should be 'demand-driven' and 'pharmacy-specific'. In addition, recommendations could be disseminated as to what type of roles, activities, and organisational structure would support teachers in achieving this vision.

Conclusions: The departmental vision will further align educational (research) initiatives and support our teachers in the continuous development of education and teaching. In addition, this vision and the recommendations will be used for the development of an organisational structure, 'The Centre of Pharmaceutical Teaching and Educational Research (CoPTER), to align educational scholarship and teacher development to better support our teaching staff.

Improved knowledge of substandard and falsified (SF) medical products through a dedicated course for pharmacy students at three universities in sub-Saharan Africa

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Introduction: Too few pharmacists receive formal training on substandard and falsified (SF) medical products. Strengthening knowledge among pharmacists is considered a moral and ethical duty of academia, that is, to build the health systems' capacities to combat this global health threat these poor-quality products represent.

Objectives: The aim of this study was to evaluate whether a dedicated educational course for undergraduate pharmacy students can improve their knowledge of these products.

Methods: A survey was conducted at three sub-Saharan universities. Knowledge was assessed through scores on a 20-point questionnaire with questions related to the course content. Scores were compared before and after the course, and a linear mixed-effects model analysis was used to analyse score differences. Students were further asked for feedback and self-assessment. In addition, the teachers were interviewed in the context of the course introduction. These data were analysed descriptively.

Results: Among the 335 out of 355 students who completed the survey (n=41/53 in Cameroon, n=244/252 in Senegal and n=50/50 in Tanzania), knowledge of SF medical products was enhanced, with the increase in all countries, overall, by 3.5 (95% CI 3.1-3.9) score points. Students improved in all offered modules in each country. Students confirmed their improvement through self-assessment. The course was well-received among students and teachers. Barriers included time constraints and access to practical means (equipment availability, room allocation, internet accessibility and affordability). These barriers can be overcome by key enablers such as the support from university leadership and early involvement of the university in the course design.

Conclusions: The course improved students' knowledge of SF medical products. These findings encourage further full implementation of this course in existing curricula beyond the pilot and can inform possible future scale-up. This has the potential to reinforce the capacity of health systems to protect communities from SF medicines by empowering all pharmacists across the health systems to intervene.

Outcomes of the FIP Pharmabridge exchange programs based on program hosts' and participants' surveys

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Introduction: Pharmabridge is an initiative supported by the International Pharmaceutical Federation to strengthen pharmacy services, education, and pharmaceutical research through the exchange of resources and experiences around the globe.

Objectives: The goal of the project was to measure outcomes achieved by past hosts and participants of the Pharmabridge program and to identify areas for improvements for the future exchange program.

Methods: Two online surveys were developed with *Qualtrics*. The first survey was sent to 154 Pharmabridge participants, and the second survey was sent to 37 program hosts. Study participation was voluntary without any compensation for both survey categories, and survey responses were collected anonymously from June to October 2019. The surveys included various question types, such as multiple choices, scale questions, drop-down menus, and free-texts. Respondents were allowed to skip questions and close the survey without completion. All responses were screened, and the ones having a completion rate of at least 70% were included for further analyses. Analyses were conducted with JMP Pro version 16. This project was granted exempt status by an Institutional Review Board.

Results: The response rates were 29% for the participants (N=45) and 51% for hosts (N=19). Participants indicated they were from ten countries, with Nigeria (42%) and India (33%) being the most common. These participants were hosted in seven countries between 2008 and 2019, and 69% of the experiences were in the United States. Participants' years of experience ranged from two to thirty-five years before the Pharmabridge program (average: 16 years). They were most commonly affiliated with "university/academic institution"

(44%) and “hospital pharmacy” (42%) at the time of the Pharmabridge participation. Forty participants (89%) found the Pharmabridge experience helpful in advancing their careers. Participants disseminated their learning through 34 presentations, 15 articles, and 24 policies/procedures. The majority of participants noted impacts on *medication use/monitoring, patient communication, work efficiency, teaching/education, pharmacist role/responsibility, and interaction with other healthcare professionals*. According to the host survey, Pharmabridge participation resulted in nine agreements signed with the participant’s institution. The majority of the hosts noted an impact on their institution in terms of: broadening perspectives/views, enhancing staff motivation, staff professional development/learning, widening professional network, facilitating project/research collaboration, and achieving global impact of their organisations.

Conclusions: The Pharmabridge exchange programs were impactful for both participants and hosts, with enduring positive influences on their local environments. The findings from the two surveys can inform future program candidates and hosts about the potential benefits and encourage their participation as the Pharmabridge exchange program reboots after the Covid-19 pandemic period.

In future, I will have more understanding of people living with dementia: An experiential learning activity on dementia for first-year MPharm students

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Introduction: There are estimated to be 800,000 people living with dementia in the United Kingdom (UK); therefore, a significant part of pharmacists’ roles in all practice sectors is interacting with and supporting patients and carers. Research carried out in 2013 determined that the emphasis on mental health teaching within UK Schools of Pharmacy was mainly theoretical and that MPharm students have little exposure to mental health patients. More recent research found that mental health teaching remains focused on theoretical aspects, with less emphasis on practical skills, such as communication. As part of Aston Pharmacy School’s professional experience strategy enhancing interaction with patients and the public, a set of activities was developed for first-year MPharm students to develop their understanding of living with dementia.

Objectives: To enhance MPharm students’ understanding of living with dementia and support the development of skills or the delivery of person-centred care.

Methods: The set of learning activities was developed as part of a Professional Development (PD) week and involved the delivery of Alzheimer’s Society’s Dementia Friends session, a poetry activity exploring what it is like to live with dementia, and a collated set of videos on patient and carer experience. All activities were delivered by pharmacists due to Covid-19. Students were surveyed on their learning experience, what they liked most and felt about the week and examples of how they will apply their learning.

Results: The PD week involved 160 students, and only 51 completed the evaluation survey. Sixty-one students signed up to become “Dementia Friends” following the information session. Out of the 51 respondents, 92% claimed the week was a positive learning experience and 73% regarded dementia activities as the best; the dementia poem activity (n=17, 33%), the Dementia Friends session (n=8, 16%) and the patient and carer videos (n=12, 24%). A participant also admitted the poetry activity to be the worst. The perceived application to future practice included; increased empathy, understanding of the lived experience of dementia, being considerate towards those affected by dementia, motivation to learn more about dementia, person-centred care and putting their patient first.

Conclusions: This was a successful activity to enhance the first-year MPharm students’ understanding of person-centred care, generally, and the lived experience of dementia, specifically. Students appreciated the combination of the different delivery methods. Due to Covid-19, all sessions were delivered online, which some perceived to be a less-than-ideal experience. In future, the activities will be delivered using a blended approach. Although the poetry activity has previously been used with third and final-year students, this was the first time delivering with first-year students with no previous teaching on dementia. The feedback indicates that delivering to this year’s group was successful and forms a solid basis for their therapeutic teaching later in the course.

This combination of learning activities was successful in developing first-year MPharm students’ empathy towards and understanding of the lived experience of dementia.

On difficulty: pharmacy students' struggles within the MPharm curriculum

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Introduction: The pharmacy curriculum presents a range of challenges or difficulties for students. An alternative way of conceptualising difficulties may be found in George Steiner's (1978) essay 'On Difficulty'. In considering why readers find some types of poetry difficult, Steiner defined four broad categories of difficulty; Contingent difficulty (the need to look up a word or a term in a dictionary), Modal difficulty (not necessarily removed by immediate recourse to a reference), Tactical difficulty (linguistic, structural or conceptual concerns that need to be actively processed) and Ontological difficulty (which requires the reader to change to understand). Identifying conceptual difficulties or obstacles and areas of discomfort may enable support to be put in place within the curriculum.

Objectives: To explore pharmacy students' struggles within pharmacy education, both in terms of what they struggle with and how they get through these difficulties.

Methods: Semi-structured interviews were conducted with pharmacy students who were asked to bring along three artefacts that represented learning as a pharmacy student for them. Some participants reflected on issues they have struggled with without prompting, and oftentimes, their artefacts related to these. Where struggles did not emerge naturally, participants were asked about aspects of the curriculum they struggled with, how that felt and how they got through these struggles. Data were analysed thematically, and Steiner's conceptual framework was applied to categorise the types of difficulty experienced by participants.

Results: Eighteen pharmacy students in one UK School of Pharmacy were interviewed. The affective dimension of participants' learning experiences was highly evident, with participants using phrases expressing negative emotions like "frustrated", "scared", "stressed", "feeling stupid/like a failure", "panic", "nervous", and "grieved". Participants who used the phrase "belief in themselves" indicated an expression of positive emotion, and this was a major perceived factor that got them through their struggles.

Using Steiner's categories in analysis, the majority of difficulties recounted were categorised as either modal (modes of thinking or ways of thinking and practising) or ontological (being and becoming a pharmacist), with none categorised as contingent (terminology or pharmaceutical definitions) and very few as tactical (conceptual concerns that need to be dealt with cognitively before understanding can be reached). Many participants reflected that additional

support from tutors would not have helped them through struggles and that they had to get through them for themselves.

Conclusions: The affective dimension of participants' learning experiences is a significant one which is often ignored by the literature on learning and by teaching, learning and assessment practices. Supporting students through the difficulties they experience should involve an explicit acknowledgement of emotion and support.

In this study, Steiner's categories of difficulty appear to be a useful heuristic for understanding the nature of struggles experienced by pharmacy students. Participants primarily expressed modal or ontological difficulties, those that relate to 'being' or 'becoming', which can be related to them developing a professional identity. Ways of thinking and practising appear to be a helpful way of understanding the modal difficulties experienced, implying a need for more explicit acknowledgement of these dimensions by those teaching pharmacy students.

This has helped me realise that my beliefs are strong, but I need to put them aside and think about what is best for the patient: learning about spirituality for third-year MPharm students

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Introduction: Spirituality is a concept that is difficult to define, with disagreement about whether it can include non-atheistic or atheistic worldviews. At its broadest, definitions of spirituality see it as fundamental to an individual's "rules of life"; the foundation on which one bases one's ethics and relationships. It can be seen as an essential component of an individual's welfare, particularly their mental well-being, although there can also be direct links with physical well-being. There is research on the attitude of health care students to spirituality and religious belief in the United States; however, there has been little equivalent work in Europe, including the United Kingdom. Equally, healthcare curricula often pay little attention to spiritual care, which may neglect an area that is important for the well-being of practitioners and their patients. As part of Aston Pharmacy School's professional experience strategy, activities were developed for third-year MPharm students to develop their understanding of spirituality in person-centred care.

Objectives: To enhance MPharm students' understanding of spirituality in healthcare and support the development of skills for the delivery of person-centred care.

Methods: The learning activities involved a set of videos followed by two interactive sessions.

Videos consisted of:

- Short introduction to the scope of spirituality, description of major worldviews, brief revision of ethics emphasising the influence of an individual's worldview on ethical choices and the structure of the activities.
- Four videos of pharmacists from Muslim, Hindu and Christian backgrounds explaining key features of their beliefs, concentrating on how these influenced their work as pharmacists.
- A description of the work of chaplaincy by a Muslim university chaplain.

The interactive sessions were a Q&A session with another university chaplain and small group work on case studies. The chaplain, a Christian with healthcare experience, spoke about her experience of chaplaincy in a hospital setting. The case study session involved discussion and feedback on four case studies from a Bahai, a Buddhist, a Confucian and a Humanist perspectives.

Students were surveyed about their learning experience, what they liked most and least about the week and examples of how they will apply their learning.

Results: Around 50 students completed the activities and 14 completed an evaluation survey. All respondents said that it was a positive learning experience which they enjoyed, although this is likely to include significant selection bias. The perceived application to future practice related to greater respect for different worldviews, the availability of chaplains in a hospital setting, awareness of neglect of the spiritual/mental healing of patients compared to physical healing and awareness of the impact of their own beliefs and putting their patient first.

Conclusions: The combination of learning activities was successful in developing third-year MPharm students' understanding of the impact of spirituality in person-centred care. Students appreciated the blended approach and would have liked further case studies. This was the first time delivering this topic, and given the positive reception, the authors intend to repeat the session with further case studies.

Ugandan third versus fourth-year pharmacy student knowledge of pharmaceutical care

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Introduction: Pharmacists trained at the undergraduate level provide the majority of the pharmaceutical care services in Uganda, and their adequate training is of paramount importance. Recently, there have been efforts to strengthen the training of pharmacists in pharmaceutical care to improve the use of drugs and positively impact patient care. A pharmaceutical care skills training curriculum was developed and implemented in Years three and four of undergraduate pharmacy training for the past five years. The implementation of this curriculum has been sub-optimal due to the challenges of a few skilled faculty to deliver the curriculum, the increased number of students and recently, the challenges of the Covid-19 pandemic. The curriculum is also lacking in terms of innovative online transformative pedagogical approaches to training. More so, the curriculum is due for revision.

Objectives: As part of a larger study to develop improvements to the pharmaceutical care skills curriculum, it would be helpful to know how well fourth-year pharmacy students are retaining knowledge compared to their third-year counterparts who have not yet been formally exposed to pharmaceutical care knowledge and skills.

Methods: A 30-question, multiple-choice pharmaceutical care knowledge assessment was developed. Included were questions on the process of identification of drug therapy problems, the steps of the pharmacist-patient care process, general communication skills, an overview of pharmacokinetics, adverse drug reactions, and therapeutic diabetes content. Third-year students took the assessment at the beginning of the semester before any formal exposure to this curriculum, and fourth-year students took the assessment at the beginning of their fourth year, which was nine months to one year after being taught this curriculum.

Results: There were 42 third-year and 40 fourth-year students who took the assessment. The average score was 46.3% (33.3%-73.3%) and 51.1% (30%-76.7%) in the 3rd and 4th year students, respectively.

Conclusions: The score indicated no appreciable retention of pharmaceutical care knowledge in the fourth-year students as compared to the third-year students. This data emphasises the need for improvements to the curriculum that encourage long-term knowledge retention. Planned curriculum

enhancements will include video tutorials as well as interactive components, including role-play and peer-to-peer feedback.

Longitudinal educational aptitude development: taking the lead on curricular relevance – students' impression

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Introduction: AACP graduating student survey responses have suggested a growing ambivalence about the perceived relevance of foundational coursework in the provision of patient care. We identified a need to develop connections to assist students with understanding the importance/relevance of foundational courses. Current efforts across the academy remain fragmented and literature presents more theoretical models than actual studies.

Objectives: This project describes students' impressions of connections between pre-pharmacy, foundational pharmaceutical sciences, and pharmacy coursework.

Methods: P2-P4 students (n=359) were sent a *Qualtrics* survey consisting of 28 questions (matrix-table and open-ended responses). The survey probed student perceptions of relevance, value and advice to faculty/students regarding four courses (biochemistry (B), pharmacology/medicinal chemistry (PMC), pharmacokinetics (PK), and pharmacetics (PC)) related to courses taught later in the curriculum. IRB was exempted due to the CQI design.

Results: Responses totalled 201 (56%) P2-P4 students with equivalent representation from each class. Perceived relevance of courses (R) and application to practice (A) varied, with PMC achieving the highest scores ($R=3.63\pm 0.56$, $A=3.64\pm 0.5$) and B the lowest ($R=2.29\pm 0.89$, $A=2.26\pm 0.9$). The majority of respondents stated their opinions of courses did not change as they progressed through the curriculum, although PMC was equivocal (no=52%, yes=48%). However, upon reflection, 59% stated they would change their approach to learning knowledge, skills and attitudes in foundational courses. How students would alter their learning approach focused on staying up-to-date, studying to retain information long term, not just for the assessment, but focusing on the "big picture" of how courses relate to professional development.

Conclusions: These results are being shared with all the faculties and students in the School of Pharmacy as well as

our curriculum revision task force to further discussions for enhanced curricular integration and efficiency.

Remote versus onsite learning: A retrospective review on student achievement and academic integrity

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Introduction: The Covid-19 pandemic forced many educational institutions, including Northeastern University, to abruptly shift learning and assessment processes from in-person to remote formats. The impact on student learning in these revised learning environments required evaluation.

Objectives: We examined the academic performance between in-person versus remote assessments for six cohorts of part two (P2) and part three (P3) students in a four-semester therapeutic course series (CDM) over five years, and the teaching modality was comparable. The course series covers patient evaluation; identification of drug-related problems; pathophysiology; and clinical management of diseases.

Methods: A retrospective study was conducted to compare in-person versus remote CDM exam score means from 12 exams for six cohorts of graduating students from 2018 to 2023. Data was sorted by cohort, and each exam was compared to corresponding exams from other cohorts. In-person cohorts were used as the control. Exam score means and distribution of grades was compared using one-way ANOVA and non-parametric Kruskal-Wallis H tests.

Results: Statistically significant differences were found between exam scores from remote learning compared to those taken in person ($p < 0.05$). Exam means were 5.4 (± 2.1) points higher, and the number of higher letter grades earned (A or A-) increased 47.65% vs 20.55% ($p < 0.05$) in remote classes compared to in-person. A mixed cohort (had exams in-person and remote) followed the same academic performance trends as observed in the fully in-person or remote.

Conclusions: Evidence from exam scores show that student exam scores taken remotely were statistically significantly increased when compared to in-person exam data. However, the same cohorts showed regression back to in-person mean exam scores when they returned to in-person assessments

bringing into question the academic integrity of remote assessments.

Virtual course delivery of pharmacy management effect on student pharmacist performance

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Introduction: Washington State University College of Pharmacy and Pharmaceutical Sciences (WSU-CPPS) maintains two campuses, a main campus in Spokane, WA and a branch campus in Yakima, WA. Course content is delivered via a flipped classroom model with pre-class lectures recorded and in-class time spent utilising active learning sessions facilitated by the corresponding campus faculty, who may or may not be the content expert in the subject material. The Covid-19 pandemic led to a drastic transition to virtual learning in education programs globally. In-class courses for fall 2020 and spring 2021 was delivered via a videoconferencing platform and facilitated by a faculty member with both campuses in attendance. In-person instruction returned in the fall of 2021; however, some courses stayed in an all-virtual format, including Pharmacy Management. Pharmacy Management is taught fall semester of the second professional year and maintained an all-virtual model in fall 2021, like virtual delivery of in-class material in fall 2020, with content split between three faculties based on expertise versus live facilitation on both campuses, one of which would not be from the content expert, which was the format in fall 2019 and prior.

Objectives: The study aimed to compare Spokane vs Yakima, WA course averages in Pharmacy Management over four years to determine if in-person versus virtual active learning sessions impacted student performance. Assess student preference and comfort around virtual learning through a class of 2024 qualitative survey.

Methods: An unpaired t-test was performed to compare course averages between cohorts and between the two WSU-CPPS campuses. The content was delivered in person in the fall of 2018 (class of 2021) and fall of 2019 (class of 2022) and tested via the same testing model, thus were directly compared. Similarly, the fall of 2020 (class of 2023) and the fall of 2021 (class of 2024) were delivered virtually and tested via a new testing model, thus, these classes were compared. A *Qualtrics* survey directed to the class of 2024 (fall, 2021 cohort) presented them with questions regarding preference for content delivery methods and comfort with virtual learning.

Results: The difference in course averages for the class of 2023 and the class of 2024 was statistically significant. The difference in course averages for the class of 2021 against the class of 2022 was not statistically significant. There was no significant difference between Spokane and Yakima campus course averages for all four cohorts. A total of 95 students were surveyed, but only 20 (21%) completed the survey. About 95% reported having a conducive space for learning and testing virtually. Responses to questions regarding confidence in fully virtual courses vs in-person courses were variable between agreeing and disagreeing. About 57.89% strongly agreed with the question regarding feeling confident in the materials taught.

Conclusions: Quantitative analysis indicated a decline in student performance for the class of 2024 not seen in prior years. Given this was not seen in the class of 2023 it can be assumed the decline was not due to virtual delivery. Qualitative analysis showed students have conducive spaces for virtual learning. The virtual delivery method of the course increased most students' confidence levels in the course material.

Factor analysis structure and psychometric properties of a resilience scale among pharmacy students and academics in the Eastern Mediterranean Region

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Introduction: Resilience is a complex concept often referring to “the process of adapting well in the face of adversity, trauma, tragedy, threats, or even significant sources of stress— such as family and relationship problems, serious health problems, or workplace and financial stressors”. The Connor-Davidson Resilience Scale (CD-RISC) has been identified as one of the most widely used tools to evaluate psychological resilience. The CD-RISC-25 is a self-administered scale comprised of twenty-five items, each rated by a five-point Likerts scale, with higher scores reflecting a greater level of resilience. The scale has been shown to exhibit five different aspects of resilience, including personal competence, trust in one's instincts, positive acceptance of change, control and spiritual influences.

Objectives: This study aimed to investigate the reliability, validity and factor structure of the CD-RISC-25 among pharmacy students and academics in schools of pharmacy in the Eastern Mediterranean Region (EMR).

Methods: A cross-sectional study was carried out between October 2020 and January 2021, targeting pharmacy students and academics in the EMR who were invited to complete the self-administered CD-RISC 25 questionnaire. Exploratory factor analysis using principal components analysis with Oblique rotation (Oblimin with Kaiser Normalisation) and enforcing a five-factor solution was performed on the data (n=616). The internal consistency for each factor and the CD-RISC scale was evaluated by using Cronbach's alpha coefficient. Acceptable values of Cronbach's alpha range from 0.7 to 0.9.

Results: Five factors were isolated, accounting for 51.5% total cumulative model variance. Identification of factors showed high convergence with the five-factor structure of the original scale. The reliability analysis on the CD-RISC-25 items in the study population revealed an Alpha value which equals 0.898 which indicates high reliability. However, three items (questions 2, 3 & 20) displayed poor reliability as their correlation with the overall total was 0.203, 0.27 and 0.3 respectively. These items should be removed as their poor reliability is affecting the findings from the whole scale.

Conclusions: Findings from the current research propose a modified five-factor structure to resilience, with a 22-item unidimensional model of the CD-RISC scale.

Academic fraud during online learning among medical and pharmaceutical students in higher education (Russian Federation, Republic of Belarus)

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Introduction: Academic fraud is believed to be one of the major problems in today's system of higher education. Academic cheating among university students has gained special attention all over the world as the phenomenon is associated with students' inability to prove their competence during employment. COVID-19 has affected all social spheres, including higher education was not an exception. Despite different pros and cons, online learning was heavily critiqued due to the lack of hands-on practice. The impact of distance learning on academic fraud must be properly evaluated in medical universities as the education of future doctors and

pharmacists directly affects the health and lives of the entire population.

Objectives: The research is aimed at exploring the reasons for increased academic fraud among medical students in the period of distance learning, as well as discovering the most common methods of academic dishonesty.

Methods: The study was conducted by surveying students from three major medical universities in the Russian Federation and the Republic of Belarus. The survey included 282 participants from the pharmaceutical faculty of the People's Friendship University of Russia, Moscow, 24 participants from the pharmaceutical faculty of Moscow State University and 223 medical students from Grodno State Medical University, Belarus. Respondents were asked to answer two multiple-choice questions. The questions involved choosing the most common methods of academic fraud during online learning sessions and students' opinions on the reasons for its increased level. Then the data were analysed statistically.

Results: The dominant method of academic fraud in three universities was "cheating with electronic devices" (more than 30% of respondents in each university). "Using someone else's help in passing online tests" took second place among students from Moscow State University and Grodno State Medical University, while at the People's Friendship University of Russia students consider providing false information to the teacher to be the second most common method of academic fraud. One of the most common motives that lead to students' cheating is an increased volume of homework and lack of supervision. Students of People's Friendship University of Russia and Moscow State University selected "lack of motivation and interest in studying the subject in an online format" as the second considerable reason for the increase in academic fraud (22% and 25% respectively), while participants from Grodno State Medical University believe that low self-discipline prevents students from studying properly (17% of respondents). However, 17% of the students from Grodno State Medical University confirmed a low incidence of academic fraud.

Conclusions: Studying academic fraud among university students is relevant to the development of appropriate higher educational processes. Moreover, the advantages and disadvantages of online learning require deep evaluation and modification to correspond to the needs of employers in all spheres, especially in healthcare.

Teaching and learning across time zones: A collaborative online international pharmacy course

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Introduction: Participation in international experiences has been shown to promote personal growth and enhance students' understanding of global health issues. However, many students in schools of pharmacy may face obstacles in pursuing study abroad, including restrictive curricula, high costs, and language barriers. During the COVID-19 pandemic, when travel restrictions prevented international travel, the University of Southern California (USC) School of Pharmacy in Los Angeles, California and the Nirma University Institute of Pharmacy in Ahmedabad, India, collaborated to deliver a joint online course to promote international education among pharmacy students in India and the United States.

Objectives: The purpose of this report was to describe the design, delivery and outcomes of an online course taught jointly by faculties from Nirma and USC to students from the two universities.

Methods: The idea for a jointly delivered course was presented by Nirma in August 2020 and formal course planning began shortly thereafter to prepare for course delivery starting in January 2021. The decision was made to focus the course on diabetes based on international interests and faculty expertise. Faculties from the two universities participated in teaching and brought expertise in pathology, pharmacology, clinical practice, natural products, regulatory science, health economics and industrial drug delivery. Enrolled students attended a three-hour live online session each week for ten weeks. Students were organised into small groups with a representation of students from both universities. Small groups worked on two main projects and competed in a final "Quiz Bowl" competition. Upon completion of the course, students completed an end-of-course evaluation and written reflection.

Results: Twenty-five students from Nirma and 13 students from USC completed the course. At the end of the course, all 38 students completed a required reflection on their experiences. Student reflections were qualitatively analysed to reveal five main themes: (i). Learning experience: new perspectives and knowledge (ii). Teamwork (iii). Course design (iv). Soft skills development and (v). Impact on a future career. The end-of-course surveys completed by 22 students collected quantitative feedback on (i). international impact and logistics, and (ii) knowledge acquired and assessment. The survey results showed that students appreciated the

opportunity to learn from different international perspectives and overwhelmingly agreed that this broadened awareness about diabetes prevalence worldwide (90.9%), helped them to identify differences and similarities in pharmacists' roles in different countries (95.5%), and also exposed them to new or different roles for pharmacy graduates (90.9%). Students were likewise satisfied with course organisation, classroom technology, engagement, small group interactions, and assignments. The survey item with the most dissent addressed the timing of the sessions (evening in India and morning in the United States), where only 68% of students agreed or strongly agreed that the timing was acceptable.

Conclusions: The synchronous online delivery of a jointly taught international course expanded students' awareness about pharmacists' roles and global health. This experience showed that effective international collaboration could be achieved virtually with careful planning, but widely differing time zones do present a persistent challenge.

Integration and internationalisation: an international summer program integrating four pharmacy disciplines

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Introduction: The practice of pharmacy continues to evolve worldwide, with pharmacy graduates serving in new and expanding roles in clinical practice, research, and the pharmaceutical industry. Graduates must be able to integrate different disciplines to fulfil these roles. While many schools report the integration of the foundational sciences with therapeutics topics, examples of integration beyond these areas have not been well-documented, and the ability to provide a comprehensive education in clinical, economics, regulatory and scientific principles is relatively rare among schools of pharmacy.

Objectives: The purpose of this study is to describe the development and outcomes of the integration of clinical pharmacy, health economics, pharmaceutical sciences and regulatory sciences into a single international summer course.

Methods: The 2021 University of Southern California School of Pharmacy International Student Summer Program (ISSP) enrolled 176 students from 24 institutions across nine countries for a two-week online course. Students were assigned to a preferred area of focus: clinical practice, health economics, pharmaceutical sciences, or regulatory sciences.

They were then organised into multidisciplinary and multinational teams to investigate a newly approved drug from the perspective of each of the four focus areas. Students attended separate course sessions during the first week, then joined together to share their expertise and respond to prompts promoting the investigation of their assigned drug. During the second week, focus areas were brought together to explore areas of agreement and tension among the perspectives. Survey data were collected before and at the end of the course to examine student perceptions of the curricular integration.

Results: Out of the 176 enrolled students, 154 answered the pre-course survey (88%) and 131 answered the end-of-course survey (74%). Students were asked to rank their level of interest in each focus area from one (not interested) to ten (very interested) before the course began and after it concluded. In the pre-class survey, the students indicated the most interest in the clinical focus area (8.0/10), followed by pharmaceutical sciences (6.8/10), and regulatory science and health economics (both 6.2/10). Upon completion of the course, there was a significant increase in the level of interest in all focus areas. The largest increases were in regulatory science (from 6.2 to 6.9) and health economics (from 6.2 to 7.2). Students were also asked to share their impressions on the integration across areas. Students enrolled in the other focus areas perceived clinical pharmacy to be the most well-integrated with their area. In the end-of-course survey, 85.2% agreed or strongly agreed that participation in the course exposed them to new or different roles for pharmacy graduates and 91.3% agreed or strongly agreed that it helped them to understand how different areas of pharmacy are interconnected.

Conclusions: The integrated ISSP curriculum demonstrated that participation in an integrated course can increase student interest across all areas of focus. The institutional benefits of this approach to integration include the potential to develop other courses that bring together different areas of pharmacy. This is likely to lead to new avenues for pharmacy graduates working at previously unexplored interfaces between these areas.

Exploring pharmacy students' perception of pharmacists' roles to support professional identity formation using an arts-informed method

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Introduction: Professional identity represents how professionals see themselves with regard to their professional roles: who they are and how they should act. Roles represent a social prescription for behaviour, whereas identity is an internal self-understanding of the professional role. Professional identity formation is a socialisation process that develops from personal experience, views, and knowledge of an occupation. Individuals begin to form their own professional role identity through educational and training processes. To support professional identity formation, educators seek to include a focus on being a professional along with performing professional roles. While students of pharmacy begin to develop a professional identity in their pre-registration years, there is a need to address professional identity explicitly in pharmacy education programs. Exploring students' knowledge of pharmacists' roles upon entry into the pharmacy degree program will support professional identity formation as they begin to think, act, and feel like a pharmacist.

Objectives: The purpose of this study was to explore the first-year pharmacy students' perceptions of pharmacists' roles.

Methods: An arts-informed research was used to collect rich data and gain insight into how people make sense of their experiences in the world. The act of drawing was used in pharmacy education to understand pharmacy students' experiences and perspectives. Data were collected using an adaptation of the "Draw and Write Technique" called the iSquare protocol. Students were invited to answer the question "What is the pharmacist's role?" by drawing on one side of a square piece of art paper and writing a description of the drawing on the reverse side. Data were collected in conjunction with an in-person orientation session held for first-year Doctor of Pharmacy students (n=124) at the University of Alberta, Canada, in September 2021. Data were analysed using a combination of compositional analysis and thematic analysis. The study was approved by the University of Alberta Research Ethics Board.

Results: A total of one hundred squares were collected. The students perceived pharmacists as having a multifaceted role involving social, professional, and material aspects. Social aspects of the role were depicted as patient care activities (dispensing, counselling, prescribing, administering drugs by

injection), communication, and interprofessional collaboration. Professional aspects of the role were represented as pharmacists having knowledge, images of pharmacists' white coats, and self-portraits. Technology, medications, books, and other tools for practice captured materials aspects of pharmacists' roles. Some drawings portrayed pharmacists' roles and services associated with the COVID-19 pandemic.

Conclusions: Students entering the Doctor of Pharmacy program perceived pharmacists' roles as multifaceted, involving both traditional and expanded roles and services. Documenting how first-year pharmacy students view pharmacists' roles can set the stage for professional identity formation activities throughout their degree program. The findings in this study can be integrated into instructional material and learning activities designed for individual students or group activities. Educators may use arts-informed approaches to facilitate reflection on thinking, acting, and feeling like a professional to support professional identity formation and its evolution.

Health education via public service announcements, telehealth education, and digital health video project in doctor of pharmacy education

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Introduction: The pandemic has forced the sudden transition to virtual learning for students and the use of telehealth education and virtual outreach for patients. Professional student organisations have limitations to conduct health fairs and outreach in the community due to isolation and social distancing. A review of the literature shows limited articles/publications on the use of health education to the public through digital and video means. In the classroom, information videos are commonly used to educate students but are rarely produced by students to educate patients. Over time visual aids have been shown to improve understanding of healthcare-related issues and topics in patients with low-literacy skills. By incorporating the use of telehealth education via videos including public service announcements in PharmD programs, there is potential to have an increase in public health education and community outreach for patients by pharmacy students.

Objectives: To identify the use, documentation and publication of public health education via public service

announcement (PSA), video project, telehealth education, digital or public health video in Doctor of Pharmacy (PharmD) education.

Methods: A review of four pharmacy education journals (American Journal of Pharmaceutical Education, Pharmacy Education, Currents in Pharmacy Teaching and Learning, and Pharmacy Innovation) with the search terms: public service announcement, telehealth education, digital health education, video project, and public health video was conducted.

Results: A review of four pharmacy education journals produced over 1,853 articles with the search terms provided in the "Methods" section. Out of those 1,853 journal articles, ten articles specifically mentioned public service announcements or videos that could be considered public service announcements. Five articles showed up in multiple searches throughout the four journals reviewed. The AJPE produced five articles out of 1,024 that were populated, The Pharmacy Education Journal produced no article out of the 168 that were populated, Currents in Pharmacy Teaching and Learning produced three articles out of the 545 that were populated, and the Pharmacy Innovation Journal produced two articles out of the 116 that were populated. Out of the ten articles found, five articles specifically stated that the announcement project was given to students and used as an assignment/assessment tool for their understanding and public education purposes. The other five articles found discussed the use of previously made public service announcements in educating current pharmacy students.

Conclusions: The results show that the use of health education via public service announcements (PSA) and video projects is very limited in pharmacy education. Increasing the use of PSA videos in the pharmacy curriculum would allow future generations of pharmacists to capitalise on innovative ways to educate patients.

Charting the course and preparedness for recognition of global leaders: creating and charging the phi lambda sigma international affairs committee

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Introduction: Phi Lambda Sigma (PLS) is a pharmacy leadership society established in the United States in 1965. The mission of the society is to support pharmacy leadership by recognising leaders and fostering leadership development. The PLS has chartered more than 130 chapters in the United States and has begun to international charter chapters. To facilitate and support international expansion, the PLS created and charged an International Affairs Committee.

Objectives: To describe an international expansion initiative and strategy of a professional pharmacy leadership society for recognition of global leaders.

Methods: An International Affairs Committee (IAC) was created in 2018 and given formal strategic charges by the PLS National Executive Committee in 2020. The IAC works closely with the Communications Committee to ensure all materials and communications are consistent with the Society's mission.

Results: As a result of the last several years of the committee's efforts, the IAC has produced several outputs, including the charter of the first international PLS chapter (University of British Columbia, Vancouver, Canada), a Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis to international expansion, updates to chartering and membership procedures, and a list of logistical factors to consider when planning international-inclusive events. The IAC also compiled future recommendations, including establishing an international advisory committee.

Conclusions: International expansion is a challenge facing many national American organisations. The inclusion of international chapters brings challenges, including time zones, language barriers, and cultural differences. This expansion also brings opportunities such as charter and program diversification, expanded networking opportunities, and the opportunity to share and fulfil the mission and vision of the society globally. Dedicating a committee and resources to this effort and encouraging regular communication with

other Society committees has been beneficial in the effort to expand and prepare to recognise leaders globally.

Perceptions of healthcare professional students on the stigma surrounding substance use disorders: A qualitative study in the United States

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Introduction: Substance use and misuse continues to be a major public health issue around the globe. The stigma associated with Substance Use Disorders (SUD) remains a major factor in the rising cases of opioid and other substance misuses over the last decade because it creates challenges in accessing evidence-based care. An opportunity may exist to optimise healthcare professional students' training to overcome this barrier to treatment. This becomes increasingly important as healthcare teams become more inclusive and transform into interprofessional teams where their actions and recommendations have an even greater impact. Limited qualitative data, however, exist characterising healthcare professional students' collective perspectives about patients with SUDs.

Objectives: To explore the healthcare professional students' views about the stigma surrounding substance use disorders and the impact on patients' interactions.

Methods: Healthcare professional students were recruited from six health profession colleges at a health science centre in the mid-South of the United States. Online semi-structured focus groups (FG) were conducted between March and June 2021. The FG guide was informed by the "Conceptualising Stigma" theory by Link and Phelan (2006). Thematic analysis was performed by two researchers using Dedoose® (qualitative software). Codes were grouped into categories based on similarities that facilitated the emergence of themes. Rigour was achieved using Lincoln and Guba (1985) criteria.

Results: Five FG were conducted, and a total of 31 participants attended. The average age was 27 years of age. Most students were White (n=19), female (n=21), and from the College of Pharmacy (n=14). Thematic analysis revealed a theme: "Empowering patient-provider relationship for successful outcomes."

This theme demonstrates the importance of having the patient and the provider on the same team, and this

relationship is a crucial part of the patient care process. In addition, allowing the patient to be a part of their own medical experience empowers the providers and facilitates a sense of being a source of help to alleviate suffering.

"I think we've kind of all been trapped where, if a patient, I guess, is not compliant, you start becoming combative as a provider..." (Participant 5, FG3)

"I think just the way we talk about, like- the public and healthcare professionals all have stigmas about substance use disorder patients- I think they [patients] have stigmas about healthcare providers." (Participant 3, FG3)

Conclusions: This study's findings highlight the need for greater opportunities to establish a patient-provider relationship to better address the needs of patients with SUDs as well as to learn how to decrease SUD stigma. It is evident that healthcare professional students view patients as an integral part of the healthcare team and should be included accordingly. In contrast, interprofessional training often focuses on the inclusivity of other providers but rarely on the patient. This research is part of a project larger in scope assessing faculty, staff, and student perceptions of patients with SUDs. Whether additional training in the health profession curriculum is necessary to be more inclusive of the patient's perspective to possibly decrease SUD stigma should be evaluated.

Parsing the pandemonium: An analysis of student perceptions of online teaching and learning

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Objectives: To examine students' comfort and perceived barriers to online teaching and learning resulting from the shift to remote learning during the COVID-19 pandemic.

Methods: In the spring and fall semesters of 2020, an anonymous online survey was distributed to professional year one through year three students (P1-P3). The survey contained questions ranging from self-assessment of comfort and barriers with the didactic online learning environment to impact on course delivery, function, learning and student experience. All spring responses were analysed, and based on students' experiential learning schedule, longitudinal perceptions were analysed in both semesters. This evaluation was deemed IRB-exempt.

Results: Overall, 100 students (P1 33%, P2 46%, P3 21%) completed the survey in the spring, and 147 (P1 48.3%, P3

51.7%) completed the survey in the fall (69.6% overall response rate). Student identified barriers included lack of student-faculty relationship (spring=80.9%, fall=81.6% A/SA), lack of social interaction in class (spring=61.9%, fall=76.2%), impersonal nature (spring=69%, fall=61.2%), and time management concerns (spring=64.2%, fall=43.54%). Students were comfortable completing online assignments (spring=81.7%, fall=68.7%), receiving feedback remotely (spring=75%, fall=76.2%), engaging in discussion boards (spring=75%, fall=70.8%) and ensuring academic integrity (spring=76.7%, fall=79.6%). Over time, students' perceptions remained consistent across most questions. Notable changes over time included a decrease in time management concerns, an increase in the lack of social interactions, and decreased comfort in submitting online assignments.

Conclusions: Most students felt online learning was impersonal, lacked essential peer and faculty relationships, and required better time management skills. Students were apathetic about potential academic integrity issues. Results were useful in tailoring online teaching and learning experiences and resulted in modifications to course policies and procedures and redefining student expectations during the COVID-19 pandemic.

Longitudinal educational aptitude development: Taking the lead on curricular relevance – Faculty perceptions

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Introduction: Student surveys have revealed a growing ambivalence about the perceived relevance of foundational coursework. The authors identified a need to develop connections to assist students with understanding the relevance of foundational courses. Current efforts across the academy remain fragmented and literature presents more theoretical models than actual studies. This project was created in an attempt to gain a better understanding of the faculty views regarding the relevance and value of knowledge, skills and attitudes delivered in foundational courses in the Doctor of Pharmacy programme.

Methods: A 16-question (matrix table and open-ended responses) *Qualtrics* survey was sent to School of Pharmacy faculty that probed relevance, value and advice to students on different courses (immunology (I), biochemistry(B), pharmacology/medicinal chemistry (PMC), pharmacokinetics (PK), and pharmaceuticals(PC)) related to courses taught later in the curriculum. IRB was exempted due to the CQI design.

Results: The responses totalled 27 (60%), with a preponderance from practice faculty (85%). Strong correlations were found between B to I (67%) and anti-infectives (56%), PMC was strongly correlated by >90% of respondents with all courses evaluated, PC correlated with PK (73%), and PK correlated with PMC (67%), PC (64%) and therapeutics (67%). Comment trends highlighted two main themes: the need to add clinical application exercises to foundational courses for context and relevance to students, and to focus on skills in foundational courses instead of knowledge and memorisation.

Conclusions: The faculty highlighted the importance of PMC as a foundation course for all other courses in the curriculum and for pharmacy practice. These results are being shared with all faculty in the SOP as well as our curriculum revision task force to further discussions for enhanced curricular integration and efficiency.

Longitudinal educational aptitude development: Taking the lead on curricular relevance – Preceptor perceptions

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Objectives: Graduating student survey responses have suggested a growing ambivalence about the perceived relevance of foundational coursework in the provision of patient care. We identified a need to develop connections to assist students with understanding the importance/relevance of foundational courses. Current efforts across the academy remain fragmented and literature presents more theoretical models than actual studies that address relevance. This project describes preceptor impressions regarding the relevance and value of foundational courses in the PharmD program.

Methods: A 12-question (matrix table and open-ended responses) Qualtrics survey was sent to School of Pharmacy preceptors who received students during the 2019-2020 APPE year that probed relevance, value and advice to students on 4 different courses (biochemistry(B), pharmacology /medicinal chemistry (PMC), pharmacokinetics (PK), and pharmaceuticals (PC)) related to courses taught later in the curriculum. IRB was exempted due to the CQI design.

Results: Responses totalled 32 (38%), with 59% NU graduates and 56% with over ten years of practice experience. Common practice settings of respondents included community (34%), inpatient-academic (19%) and inpatient-community (16%). All foundational courses were perceived to have a strong

correlation with all other evaluated courses, with the more critical evaluators of themselves than their preceptors, which is an opportunity for further IPPE, curricular, and student emotional intelligence development.

Evaluation of a novel teaching module: the art of pharmacy

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Introduction: Empathy and compassion are essential in delivering person-centred care. We all have some inherent degree of empathy, but evidence from the literature suggests that the arts can be effective in helping to develop this further. At Keele University, UK, an option topic was designed with two aims: 1) to further develop students' empathetic approach to patients with specific illnesses, such as dementia, drug addiction and mental health conditions; and 2) to help students to understand the role that different art forms can play in supporting patients through rehabilitation. Innovative teaching methods were employed through the media of poetry, music, film, pottery and painting to achieve these aims.

Objectives: To evaluate a novel teaching module that uses different art forms to further develop empathy in pharmacy students.

Methods: After the option topic ended and the final assignment was submitted, an electronic survey developed on MS Forms was emailed to all students. The survey consisted of 26 questions that addressed student views on the individual elements of the option topic, as well as their opinion on the option topic as a whole. This included how well intended learning outcomes (ILOs) were met and their views on the elements of assessment. The questions were mainly based on a Likert scale (1-strongly disagree to 5-strongly agree) and there were two free text boxes. A reminder email was sent two weeks later to encourage a greater response rate. Data were analysed descriptively due to small numbers. As this was an evaluation of teaching, no ethical approval was required.

Results: Ten of the eleven students enrolled on the module completed the evaluation (response rate 91%). Nine respondents were female and all were in their fourth and final year of study. The statement, 'learning objectives were met' scored an average of 4.9 out of five. Both statements, 'the option topic was relevant to my future practice' and 'I enjoyed doing the option topic' scored a maximum of five. "The option topic should be mandatory for all students" scored four, and "the option topic helped me to relate to the

experiences of patients" scored 4.8. When asked how much each method helped them to understand the patient journey, external speakers' stories scored most highly with an average of five, followed by poetry, scoring 4.8 and paintings scoring 4.7. Pottery received the lowest average score of 3.7 out of 5. The module was described by the students as 'enjoyable', 'interactive' and 'stimulating'. All questions related to assessments scored between 4.7 and 5.

Conclusions: Although only a small number of students undertook the option topic, this evaluation shows that students found the innovative methods employed to be very engaging and effective in helping them to understand the patient's journey through their illness. This option topic will be repeated with a larger cohort in the next academic year, and elements of it have been introduced into full cohort teaching.

Exploring the development of professional identity in pharmacy students

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Introduction: Organisations that accredit undergraduate pharmacy courses specify standards that encompass professional identity (PI) and professional behaviours. A professional identity is primarily formed through the action of internalisation, i.e. the shift from an external to an internal focus. Self-determination theory suggests that the motivation to make this shift depends on three psychological needs: relatedness, autonomy and competence. Educators need to use valid tools to assess professional identity and behaviours.

Objectives: This study compared undergraduate pharmacy students' professional identity formation and motivation across four-year groups in one UK school of pharmacy.

Methods: This quantitative study involved the use of two pre-validated tools: the pharmacy motivation scale (Pharm-S) and the MacLeod Clark Professional Identity Scale (MCPIS-9), both utilising Likert scale questions. In October 2019, an email was sent to all students enrolled in the MPharm course informing them of the study, with a participant information sheet and consent form attached. The questionnaires and consent forms were then disseminated and completed during a teaching session. The data was input into an Excel spreadsheet and analysed using IBM SPSS Statistics with the help of a statistician. A single numerical score was calculated for each student and, then the data was analysed inferentially using ANOVA or two-sample T-test, and correlation analysis. Ethical approval for the study was obtained at the school

level. This is part of a wider study by the UK and overseas Schools of Pharmacy.

Results: An overall response rate of 60% was obtained (n = 265 out of 442), although this ranged from 71% in Year one to 50% in Year four. Sixty-eight per cent of respondents were female, 57% were <21 years old and 69% had worked in a pharmacy. A statistically significant difference in both scores was found across all four-year groups (Pharm-S score (motivation) ANOVA test $p = 0.00$; MCPIS-9 (professional identity) ANOVA test $p = 0.02$). Students PI scores remained high in the first, third and fourth year with no significant change, however, there was a slight reduction in Year two. By comparison, the level of motivation decreased significantly from years one to four.

There was no significant difference in scores between genders, but both scores were statistically significantly higher in students who had undertaken previous work in a pharmacy. Furthermore, motivation scores were statistically significantly higher in younger students less than 21 years old. A correlation analysis showed a weak but statistically significant positive relationship between Pharm-S and MCPIS-9 scores, as determined by a Pearson correlation coefficient of +0.36, $n=265$, where $p < 0.01$, (2-tailed test).

Conclusions: Although the results are limited by a relatively low response rate and cohort differences, they suggest a potentially worrying decline in motivation scores throughout the course. Fortunately, this does not appear to have affected professional identity formation. Ideally, teaching staff should consider introducing changes to the curriculum and engaging teaching methods that address the needs of relatedness, autonomy and competence, and so support the development of a high internal motivation to become a pharmacist.

Development of a comprehensive instrument to evaluate existing international experiential training sites

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Introduction: International experiential training has many positive benefits for pharmacy students. And while there are reasons why these international partnerships are instituted at the outset, they are often not reviewed on an ongoing basis. Therefore, there is a need to systematically evaluate existing international training sites and determine if they are still able to meet the educational needs of students. Previous research has focused on evaluating new international sites, but there is limited information on strategies to evaluate and prioritise existing sites.

Objectives: To develop an instrument to comprehensively evaluate existing international experiential training sites for pharmacy students.

Methods: A literature evaluation via several databases (PubMed, Global Health, Business Source Premier) and a broad internet search were conducted using the search terms: International, Partnership, Evaluation, and Tool. The search strategy was designed to identify existing instruments used to evaluate international partnerships and experiential learning sites as well as tools that are used to evaluate community partnerships. Both freely available tools and peer-reviewed articles relating to the topic were included.

Results: The search strategy yielded thirteen existing tools from which relevant factors were selected and organised into a comprehensive instrument that can be used to evaluate existing international experiential learning sites. The tool consists of 21 questions in five primary categories: institution compatibility, logistics and feasibility, financial considerations, sustainability, and student experience. For each question, a three-point Likert scale was used to assess whether the site was below, meets, or exceeds expectations for that category. Each question also allowed for comments to be added by evaluators. The points were totalled to provide the site with its final score which allows it to then be directly compared with other existing sites.

Conclusions: The instrument provided a structured process for evaluating international experiential training sites for pharmacy students and can be adapted for each user's needs. By building on the work of previously developed tools, this instrument ensured that an international site was fairly and methodically assessed while allowing for open discussion regarding the expectations for experiential placement sites. Ultimately, the structured process provided by this tool will help ensure high-quality international experiential learning sites are offered to students.

Development of a survey to categorise global activities among professional pharmacy students

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Introduction: As healthcare professionals working in an increasingly globalised world, pharmacists must have the

skills to care for culturally diverse populations and view themselves as global health practitioners. To prepare pharmacy students for their careers, efforts must be made by academic institutions to support students in developing a global mindset and growing their cultural competence. Currently, academic institutions offer many global activities, yet international placements and global health electives are often the only opportunities advertised. In reality, global learning opportunities are much broader, but they are typically not promoted as global activities. Because of this, many students engage in activities that develop a global mindset without reflecting and contextualising the experience.

Objectives: To develop a method by which engagement in global activities among professional pharmacy students can be longitudinally quantified and recognised at one school of pharmacy.

Methods: A survey, called the Eshelman Global Guarantee, was developed by compiling globally focused activities offered by the UNC Eshelman School of Pharmacy. Global activities were categorised into three tiers based on the level of engagement and effort required to participate. Each tier was assigned a point value. The total number of points accumulated during a student's co-curricular, didactic, and experiential coursework would then determine which of three global achievement levels a student would obtain. To pilot-test the program and refine aspects of program delivery, an electronic survey was sent to all final-year pharmacy students. The survey asked students to provide quantitative and qualitative data regarding their involvement in global activities throughout their pharmacy school experience.

Results: Twenty-seven final-year pharmacy students submitted responses to the pilot survey. Out of the 27 respondents, 59% (n=16) would have attained the highest achievement level, 15% (n=4) would have achieved the middle level, and 19% (n=5) would have achieved the lowest level. Two students did not accumulate any points. Most respondents (63%) were interested in the program. Regarding the frequency of reporting activities, 46% wished to report each semester and 38% wished to report as they occurred. A plurality of students (42%) preferred to report activities using a web-based survey whereas 28% preferred using a learning management system.

Conclusions: The results of the pilot survey led to several adaptations being made to the process of capturing and categorising global activities. Most notably, program designations were restructured based on relative percentages instead of the number of points accumulated to accommodate fluctuations in the availability of global activities, as was seen during the COVID-19 pandemic. Given the high level of interest, the survey and designations will be implemented for all professional pharmacy students at the beginning of the 2022-23 academic year. Future research will evaluate the impact of this program on global involvement and the development of key skills and knowledge needed to be a globally-minded healthcare professional. In all, a Global

Guarantee program is a novel model through which academic institutions can contextualise, promote, and reward global engagement among their students.

The perception of pharmacy undergraduate students to teaching activities and OSCE assessment on medication reconciliation

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Introduction: Medication reconciliation is fundamental to ensure the collection of the patients' most accurate medication history and reduce the rate of medication errors. This process could ideally be taught to undergraduate pharmacists before venturing into practice in real life. Objective Structured Clinical Examination (OSCE) has been regularly used as an assessment tool for both Pharmacy and Medical students.

Objectives: This study aimed to measure the students' perception of the teaching lessons and assessment of medication reconciliation skills through OSCE as part of the Clinical Pharmacy Practice course for third-year Pharmacy students at Future University in Egypt.

Methods: Third-year Pharmacy students received a 2-hour interactive and tutorial session which included case base role play activities on medication reconciliation. The students' clinical skills were later evaluated using OSCE assessments where the students interviewed standardised patients, recorded their medication list, reviewed their physician order sheets, and documented the medication reconciliation process. A cross-sectional post-test survey questionnaire was conducted to measure the perception of the students of the teaching activity and the OSCE assessments.

Results: A total of 152 students completed the survey study, of which 68.4 % stated that they had no adequate prior knowledge of medication reconciliation before the course. The majority (78%) were satisfied with the teaching and role-play activities and 85.5% felt confident to complete all processes of medication reconciliation. Most of the participants agreed that OSCE succeeded to evaluate their communication skills (86.2%) as well as their clinical skills and medication reconciliation abilities (77%). However, 14.5% of the students admitted to it being stressful.

Conclusions: Undergraduate Pharmacy students participating in the current study were overall satisfied with the teaching activities on medication reconciliation. The students found

the OSCE feasible and adequate in assessing their clinical skills.

Assessment of mental well-being and its associated factors: An international survey of undergraduate pharmacy students from 14 countries

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Introduction: Quality education, and good health and well-being are two crucial sustainable development goals of the United Nations. Pharmacy students will assume a future role as frontline healthcare workers. Evaluating their current state of mental well-being and its associated factors is essential for better planning to ensure healthy lives.

Objectives: To assess mental well-being and its associated factors among undergraduate pharmacy students in 14 different countries in the post-pandemic era.

Methods: A cross-sectional survey study was conducted among undergraduate pharmacy students in 14 different countries that belong to three different WHO regions: Bahrain, Bangladesh, Egypt, India, Indonesia, Iraq, Jordan, Libya, Malaysia, Oman, Pakistan, Saudi Arabia, Sudan, and the United Arab Emirates. A 37-item questionnaire was developed, validated, and pilot-tested, and it included the validated Warwick-Edinburgh Mental Wellbeing Scales (the 14-item WEMWBS) to assess mental well-being. Data collection was performed online between February 1st and April 15th, 2022. Descriptive and inferential statistics were employed, and the analysis was carried out using SPSS version 28.

Results: A total of 2665 responses were received, mainly from females (68.7%) with a dominant presence of private universities (59.1%). However, variations in the response rate between countries did not allow cross-country comparison. Among the participants, 93.9% reported the absence of any chronic disease. About 18.8% of participants were overweight, 4.2% were obese, but only 8.9% had a regular exercise routine. Enrolment in the Pharmacy programme was 56.1% based on their interest and passion, while 29.9% was based on their family recommendation. More than half (58.2%) reported challenges with online learning during the pandemic. The percentages were 34.9%, 57%, and 8.1%, respectively, for the low, medium, and high mental well-being levels. Higher mental well-being levels were reported among males ($p < 0.001$), irregular and regular exercisers compared to no-exercise ($p < 0.001$), normal BMI compared to overweight ($p=0.014$) and underweight ($p= 0.001$), and those who chose the pharmacy programme based on their interest and passion compared to family recommendations ($p < 0.001$) and those who chose the pharmacy programme as their only available/reasonable choice ($p=0.013$), those in private universities compared to those in public universities ($p=0.012$), and finally, among those who did not face challenges with online learning during the pandemic compared to those who did face challenges ($p < 0.001$).

Conclusions: More than a third of the participants were found to have low mental well-being levels. Students' mental well-being appears to be linked to their gender, exercise routine, body mass index, university type, the primary reason for studying pharmacy, and experiences of challenges with online learning.

Evaluation of grit and its associated factors: An international survey of undergraduate pharmacy students from 14 countries

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Introduction: Grit is a measure of a student's ability to persevere in the face of adversity and is proposed as an essential trait for academic achievement. Therefore, evaluating the current state of grit and its associated factors could aid in academic support planning.

Objectives: To evaluate the grit level and its associated factors among undergraduate pharmacy students in 14 different countries in the post-pandemic era.

Methods: A cross-sectional survey study was conducted among pharmacy students in 14 different countries that belong to three different WHO regions: Bahrain, Bangladesh, Egypt, India, Indonesia, Iraq, Jordan, Libya, Malaysia, Oman, Pakistan, Saudi Arabia, Sudan, and the United Arab Emirates. A 31-item questionnaire was developed, validated, and pilot-tested, and it included the validated short grit scale for grit assessment. The data was collected between February 1st and April 15th, 2022. Descriptive and inferential statistics were employed, and the analysis was performed using SPSS version 28.

Results: A total of 2665 responses were received, mainly from females (68.7%), living in urban areas (69.2%), with a dominant presence of private universities (59.1%). About 36.5% reported no exercise routine, while 54.6% and 8.9% reported irregularly and regularly exercising, respectively. The majority of participants (56.1%) selected the pharmacy programme based on their interest and passion, while 29.9% were based on family recommendations, and 7.7% were inspired by pharmacists they knew. About 65.1% were fully vaccinated, 19.9% received their booster dose, and 8.2% were non-vaccinated. Approximately 58.2% reported challenges with online learning during the pandemic. Variations in the response rate between countries did not allow for cross-country comparison. The overall grit score (mean \pm SD) on a scale of five was 3.15 ± 0.54 . Higher grit levels were reported among students living in urban compared to rural areas ($p=0.020$), irregular and regular exercisers compared to no-exercise ($p < 0.001$), regular compared to irregular exercisers ($p=0.021$), fully vaccinated ($p=0.007$) and booster-vaccinated ($p=0.002$) compared to unvaccinated students, those who chose pharmacy programme based on their interest and passion compared to family recommendations ($p<0.001$), those who chose pharmacy programme based on their interest and passion ($p < 0.001$) and as inspired by pharmacist they knew ($p=0.011$) compared to those who entered pharmacy programme as their only available/reasonable choice, those students with higher academic performance as excellent and very good grades compared to lower academic grades ($p < 0.001$), those in private universities compared to those in public universities ($p=0.025$), and finally, among those who did not face challenges with online learning during the pandemic compared to those who did face challenges ($p=0.003$).

Conclusions: The findings revealed moderate grit levels among participants. Students' grit levels are thought to be correlated with their residence area, exercise routine, vaccination status, university type, academic performance, the primary reason for studying pharmacy, and experiences of challenges with online learning.

Virtual global collaborations to empower students to advocate for pharmacy immunisations during Covid-19 and beyond

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Introduction: Due to the COVID-19 pandemic, international exchange programs have ceased for the last two years. However, this challenge served as an opportunity for collaborative education among faculty at different schools and countries using virtual learning platforms.

Objectives: To describe a global educational partnership between the United States and South Korean faculty. This partnership was established to advocate for pharmacy vaccinations, foster student insight to expand the scope of practice, and fulfil unmet coursework in South Korea.

Methods: A needs assessment was conducted to identify a topic for collaborative exchange based on partner interests and curricular needs. The lecture was delivered through an online platform (Zoom) through Ewha Womans University's course for P3 students, "Pharmaceutical Experiment Laboratory VI." A Strength, Weakness, Opportunity and Threat (SWOT) analysis was conducted regarding a potential pharmacist-provided immunisation program in South Korea.

Results: The educational experience featured an interactive video simulation on patient counselling, a lecture, and a small breakroom discussion (75 minutes in total). There were more than 100 pre-registered attendees, consisting mostly of University students, faculty, external students and faculty, and pharmacists from the local pharmacists association in South Korea. The SWOT analysis indicated that to advocate for pharmacists as immunisers in South Korea, areas for opportunities to advance global practice and weaknesses such as lack of resources for advocacy need to be addressed.

Conclusions: This partnership could serve as an example for other global partners to collaborate and implement effective strategies in quality education, especially in immunisations and advocacy. This is an important public health initiative considering the context of the ongoing pandemic.

An innovative e-learning continuing professional development (CPD) platform designed for pharmacists

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Introduction: The Commonwealth Pharmacists Association (CPA) is a charity representing pharmacists across the Commonwealth, with the vision of empowering and collaboratively developing the profession; utilising the full potential of pharmacists to strengthen healthcare systems through supporting better access to, quality and use of medicines and related services. There is a recognised need across the Commonwealth to focus on developing, implementing and fully utilising pharmacy professional services to progress Universal Health Coverage (UHC) and achieve the United Nations Sustainable Development Goals (SDGs), particularly in lower-middle-income countries (LMICs). However, a knowledge gap currently exists in understanding pharmacists' professional development priorities in Commonwealth nations. This study explored the CPD needs, priority therapy areas and functional requirements for developing CPD digital platforms.

Objectives: The CPD platform aims to upskill the workforce, aligning with the UN SDG3 (Good health and well-being) towards providing UHC. The pharmacy workforce needs to grow and upskill into more patient-facing roles to meet increasing demand. By providing an easy-to-access CPD platform, focused on pharmacists and pharmacy practice, the CPA is delivering on UN SDG3.

Methods: Data were collected virtually on video call by conducting interviews using a semi-structured interview guide developed for CPA councillors representing National Pharmacy Associations (NPAs), or their equivalents if no official body existed. The interviews explored barriers and challenges for pharmacists participating in CPD across LMICs. The interviews covered the compulsory and voluntary status of CPD, accreditation of courses, challenges in offering pharmacists digital CPD programmes and requirements for technical features that would make a digital offering functional and attractive. An inductive, reflexive, thematic analysis was performed for data analysis.

Results: Thirty councillors were interviewed from 30 LMICs. The main area identified across the cohort was to improve pharmacy education through a digital offering that was cost-effective, readily accessible, mobile-friendly, high quality and applicable for everyday pharmacy practice. Mobile-first, with availability across multiple devices, the platform launched in November 2020 and currently, 7500+ pharmacists from 16+ countries have access. The courses delivered on the platform align with the development needs identified, including

antimicrobial stewardship and tuberculosis. In development are malaria and non-communicable diseases (diabetes and cardiovascular diseases). All content is written and reviewed by pharmacists following a strict governance process to ensure the highest quality of learning and compliance with low data usage, reducing barriers to internet connectivity. In April 2022, the Commonwealth Health Digital Awards recognised the CPD e-learning platform as a finalist.

Conclusions: The CPA's CPD platform is a first in its field and delivers on the need to upskill pharmacists in an inclusive and self-directed manner. The platform provides CPD content and supports the delivery of live webinars. Monitoring and evaluation are embedded in the platform to ensure essential metrics are analysed. A key success is strengthening health systems by offering free access to pharmacists that are already members of their local NPAs.

Foundation for pharmaceutical education in Mexico A.C-FEFARM

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Introduction: After careful strategic planning by HEIs and professional pharmaceutical organisations to determine the bottlenecks of professional training in Hospital Pharmacy, it was decided to form a foundation that could support solving these needs. The data obtained elaborated the Mission of the FEFARM which is to grant scholarships for study or short-term stays in pharmacy and in related areas, through a public call that will not be supported by government institutions. It has a vision of a dynamic and inclusive organisation, both national and international scope, integrated by pharmacists who identify with the mission and institutional values, open to coordinating efforts in pharmaceutical matters with other public and private organisations.

Objectives: It is to analyse the data obtained from quantifying the number of applications received for Support Scholarships in Bachelors, Specialty, Masters and Stays of the FEFARM, which indicate if the foundation is having the expected impact.

Methods: An analysis was carried out by the Higher Education Institutions (HEIs) and regions of the applications received and the granting of FEFARM scholarships to students in Pharmaceutical Sciences.

Results: FEFARM has received 2,005 applications for scholarships to support bachelor's degrees, specialities, master's degrees and stays, from 38 HEIs and 53 faculties; the Central West region (27.4%), South-Southeast (23.3%), to the Metropolitan (18.2%), South Central region (14.7%), Northeast (13.1%), Northwest (2.5%) and without data (0.8%); FEFARM has since awarded 298 scholarships equivalent to 14.9% of the total applications received, 33.2% to Metropolitan, 23.5% to South Southeast, 15.8% to Central West, 14.8% to South Central, 10.7% to Northeast and 2.0% to Northwest. Highlighting the initiative "*Pharmacists taking care of our Pharmacists within the Health Team*", to support during the pandemic.

Conclusions: It is important to note that, since November 2019, the Foundation has granted specific support to pharmacists in training, contributing to their academic improvement according to their testimonies and the opinions of the involved institutions.

Provider experiences of changes to qualifications for pharmacy support personnel in South Africa

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Introduction: Pharmacy support personnel (PSP) has been in practice in South Africa for many years. A register was introduced in 1987, and the first formal qualification for PSP was established. However, scopes of practice for PSP were first published in 2000, and the second iteration of the qualifications followed. The third iteration was published in 2009, followed by the fourth iteration in 2018, although, as yet, there are no accredited providers.

Objectives: This study aimed to explore providers' experiences and perceptions of how the changes to the qualifications affected the providers' curricula. It sought to answer two questions 1) How did providers experience the qualification changes from one iteration to another? and 2) How did the changes to the qualifications impact the providers?

The focus of this study was on the enactment of the curriculum. The enacted curriculum is defined as the providers' interpretation of the qualification in terms of the learning material that should be included and how it is presented. The enacted curriculum is also affected by tutors and facilitators of contact sessions, experiences, values, and competence in the workplace. The research questions sought

to answer how providers experienced the changes to the qualification and how the differences impacted them.

Methods: Semi-structured interviews were conducted to gain insight into the provider's experiences of the qualification changes and how these changes affected the enactment of the curriculum. Participants were facilitators or administrators of the curricula who had experienced at least one transition of the iterations of the qualification, whether past (1st or 2nd iterations), current (3rd iteration) or future (4th iteration). The interview transcripts were analysed using thematic analysis following Braun and Clarke's (2006) six phases. Atlas Ti[®] was used to manage the data.

Results: A total of 13 interviews were conducted, and four different providers were represented. Provider interviews gave insight into the effects the changes had on the enacted curriculum and four main themes were derived from the data: the Programme, the Provider, the Profession, and the Pupil. Each of the themes had several subthemes.

Conclusions: The impact of the changes in the qualification on the providers, particularly from the 3rd to the 4th iteration, has potential negative consequences for the providers' business models. In addition, the standardisation and quality of the 4th iteration of the programme compared with the current iteration, which encompasses new roles of tutors as preceptors, and facilitators as educators in the curriculum enactment, may result in knowledgeable learners who are not able to complete work-based hours because of a shortage of preceptors. The changes to the qualifications were thus not one-dimensional but instead had a cascading effect on several role players. Although some positive effects were observed, many of the experiences and consequences of curriculum change were negative.

Quality improvement innovation in pharmacy education 4.0

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Introduction: In the 21st century, the digital transition we have been witnessing, namely "*Artificial Intelligence (AI)*" tools, "*online networks*", "*Internet of Things (IoT)*", "*Virtual Reality (VR)*", Reality Augmented Computer Entertainment (AR) has significantly transformed the educational process associated with learning methodologies in a digital environment. The digital transition was even more accelerated due to the COVID-19 pandemic, associated with new challenges and reflections on the transversality of concepts, philosophies, organisational management and

economic practices. In this context, the emergence of “iGeneration” or “digital natives” has brought even more challenges for teachers and an urgent need for innovation in pedagogical methodologies in general and in Pharmacy in particular.

Objectives: In the attempt to pursue progress, and similarly to the parallelism between Industry 4.0 and Teaching 4.0, improvement tools known in several Industries can also be associated with pedagogical methodologies. In particular, it was considered relevant to ask the following question: Is the association of the Kaizen Methodology with Teaching 4.0 likely?

Methods: To answer the question formulated, a literature review was carried out (e.g. dedicated articles and specific websites in English and Portuguese language). At Portugal’s national level, the topic is hardly discussed. Internationally (mainly, Japan, India, England, United States), there is a growing interest and relevance of this combination, probably less and less improbable.

Results: In the current context of digital transition in Education, pedagogical methodologies must focus on “People and Processes” and not just on “Technology”. The Kaizen methodology, consisting of the organisation of people and processes, should be implemented before technology. Specifically, we demonstrate that the improvement of the technology application process can be maximised by using a Kaizen innovation strategy based on “Fishbone diagrams”. These diagrams are practical and guide in identifying the root cause of a problem. Diagrams are useful for identifying the causes of a problem and thus promoting improvements. The problem we evaluated was related to the “blended student learning model”. Understanding the process is critical to reducing errors.

Conclusions: The digital transition requires innovative strategies that promote quality improvements. The implementation of the Kaizen methodology is an example of innovation in improving the quality of higher education in the 4.0 era.

Healthcare providers’ perception of hand sanitisation during Covid-19 pandemic: Pharmacists’ gaps of knowledge

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Introduction: Healthcare providers are the first line for COVID-19 pandemic management and can be both under threat and a source for transfer.

Objectives: We aimed to assess healthcare providers’ perception of hand sanitisation during the COVID-19 pandemic to improve the quality of care.

Methods: A cross-sectional study was conducted of healthcare providers in different settings from 27 October to 3 December 2020, using a pre-validated questionnaire. Participants (n = 523) were healthcare providers practising in different settings. Descriptive and association statistical analyses were produced on the data using SPSS 26.

Results: A significant difference was recorded in total knowledge mean according to gender ($p = 0.030$) in favour of males, among different professions ($p = 0.047$) in favour of physicians, and between pharmacists and other healthcare providers ($p = 0.002$). No significant difference was generally noticed between those who attended hand hygiene training and those who did not.

Conclusions: Healthcare providers’ knowledge of hand hygiene was generally good among participants regardless of training and possibly increased because of fear of COVID-19 infection. Structured, more frequent, and tailored training on hand sanitisation, in addition to new educational strategies are recommended for healthcare providers, in particular, pharmacists for a better quality of care, especially in pandemics.

Development of an advanced diabetes certificate training program focusing on the use of pattern management in a tele-practice setting

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Introduction: Through the use of newer technology and devices, continuous glucose monitoring (CGM) has become increasingly reliable and has demonstrated efficacy in terms of improving A1C, reducing hypoglycemia, and improving the time in the target glucose range. Pharmacists and other healthcare providers can use the data provided by the CGM devices to identify patterns, glucose pattern management (GPM), detect reasons for poor glycemic control and improve management strategies. Interpretation of this data is individualised and becomes more complex as a patient's condition becomes more complex. There are numerous educational programs available focusing on GPM and some of these programs include simulated patient cases. However, these programs lack a practical training component that would allow learners to apply these concepts and skills in an actual pharmacy practice setting.

Objectives: To develop and deliver a training program that is designed to prepare pharmacists with the knowledge, skills, and practical training to use pattern management and technology to provide patient-centred diabetes care.

Methods: The focus of the Advanced Diabetes Certificate Training Program is on pattern management for complex diabetes patients. The program provides comprehensive didactic instruction on key concepts for managing complex diabetes patients using current standards of practice and technology as well as practical training where pharmacists apply concepts in actual pharmacy practice settings. The Advanced Diabetes Certificate Training Program is broken up into three components: Part one, the self-study component includes six hours of asynchronous materials delivered through an online learning classroom. Part two, the case discussion component includes two hours of live session virtual patient case discussions with the University of Colorado School of Pharmacy (CUSOP) faculty. Part three, the practical training component includes 40 hours of practical training with CUSOP telehealth partner RxVIP. Practical training is completed over eight weeks and consists of eight hours of self-directed orientation, 32 hours of direct patient care with complex diabetes patients overseen by a preceptor, office hours with preceptors, and weekly grand rounds sessions. Participants must complete all three program components to gain the certificates of completion for the program.

Results: The Advanced Diabetes Certificate Training Program was launched in April 2021. Fifteen pharmacists have completed the program and two are in progress. The overall rating for this program was 4.83 out of five. Program evaluations for the live case discussion show that all learners felt that the program met their educational goals (67% strongly agree; 33% agree). Evaluations for the practical training component with RxVIP show that 83% of learners felt this program will positively impact how they practice; 100% felt the program provided valuable knowledge (83% strongly agree; 17% agree) and the practical training component was rated as 4.83 out of five.

Conclusions: Our innovative Advanced Diabetes Certificate Training Program provided the pharmacists who completed the program with the knowledge, skills, and practical training to use pattern management and technology to provide patient-centred diabetes care.

An interdisciplinary academic initiative: Seminar on vaccinology as relevant to Covid-19

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Introduction: The incidence of COVID-19 was a global pandemic with an immense toll on individuals, communities, and countries across the world. The response of the research and scientific communities across the globe to the COVID-19 pandemic has been an outstanding illustration of innovation, integrative cooperation and process implementation. Vaccinology as relevant to COVID-19 is one of the priorities on the agenda of the Malta Medicines Authority (MMA).

Objectives: The objective was to develop an educational seminar on vaccinology as relevant to COVID-19 for the interdisciplinary exchange of expertise and real-world evidence about the landscape of COVID-19 vaccines.

Methods: In March 2022, the Academy for Patient-Centred Excellence and Innovation in Regulatory Sciences, under the auspices of the MMA, organised an interactive seminar on vaccinology as relevant to COVID-19. The seminar was led by interprofessional specialists, including an expert in vaccinology from the European Medicines Agency. The six-hour programme comprised a series of presentations, a panel discussion and a networking session.

Results: The fifty-three (53) national and international participants from the public and private health sectors, who

participated actively in the seminar, included representatives of pharmaceutical companies, patient advocates, regulatory affairs professionals, public health specialists, physicians, pharmacists, pharmacy technicians, pharmaceutical technologists, researchers, academics, and pharmacy students. Topics encompassed the development process, regulatory considerations, vaccines that are under investigation, evaluation and approval for use in the EU, therapeutics, vaccination during childhood, safety monitoring and adaptation to variants. Challenges and confidence in COVID-19 vaccines, alongside the response to the pandemic and future perspectives and preparedness, were also addressed. The academic activity was awarded one Continuing Professional Development (CPD) point by the Malta College of Doctors.

Conclusions: The seminar served a good purpose as a key platform to disseminate information and enable partnership amongst diverse stakeholders with an interest in the field. The nature of the educational initiative provided a window into the composite landscape of COVID-19 vaccines and presented an opportunity for the MMA to strengthen international relationships and foster collaborative impetus for long-lasting research consortia, knowledge propagation, innovation and public health sustainability in the field of vaccinology. This seminar is an example of how pharmacists could lead an interdisciplinary activity for the benefit of all stakeholders.

Pharmaceutical care supervised projects in the pharmacy curriculum and FIP sustainable development goals

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Introduction: Supervised Project (SP) is an optional subject of the pharmacy curriculum that aims to introduce students to research. Students are integrated into a research group with preceptor supervision. Our group network includes several healthcare organisations, such as hospitals, primary care centres and community pharmacies. Research in healthcare sustainability was one of the topics offered to students.

For the first time, in the academic year (2021/22), students enrolled were required to reflect on the contribution of their research projects according to the United Nations (UN) sustainable development goals (SDG). In addition, pharmaceutical care researchers and preceptors were asked to relate their research projects to 21 FIP development goals (DG).

Objectives: To describe and analyse the contributions of the research projects carried out by students to the SGD and FIP DGs.

Methods: A guideline was developed by the SP coordinator that allowed students to identify the SDGs they worked on in their research project. The guideline included a self-questionnaire on research need/problem (project goal); possible contribution (hypothesis); main results; the final impact of the project if it continued beyond the SP, society impact; agents (institution, stakeholders, and recipients) involved; identification of the SDG related to the project and

the organisation. Data was collected and analysed by peer review.

Results: A total of 8 students (15.1%) carried out a SP during the studied academic year related to pharmaceutical care, two in the field of primary care pharmacy and 6 in the field of hospital pharmacy. Research topics were related to the effectiveness and safety of biological medicines and biosimilars, physical compatibility of drugs in "Y" administration, duration of antibacterial treatment, patient-reported outcome measures, glycemic control with iSGLT2, and opioid prescription. The recipients involved in the DGs were patients with colorectal cancer, anaemic patients with CKD, patients with moderate to severe plaque psoriasis, ICU patients, type 2 diabetic patients, patients with non-oncological chronic pain, people living with Human Immunodeficiency Virus, patients with community-acquired pneumonia, general population, and the environment. All the organisations directly involved in the SP have also their own Agenda 2030 UN Sustainable Development.

All students identified SDG 3 (Good Health and well-being) in their research topics. The most frequent FIP DG goals allocated (8/8) were one (Academic Capacity), two (Early career training strategy), three (Quality Assurance), five (Competency Development), six (Leadership Development), eight (Working with others), ten (Equity and Equality), eleven (Impact and Outcomes), fourteen (Medicines Expertise), eighteen (Access to Medicines, Devices, and Services), nineteen (Patient Safety) and twenty-one (Sustainability in Pharmacy). Specifically, 1/8 addressed sixteen (Communicable diseases) and 1/8 addressed seventeen (Antimicrobial Stewardship).

Conclusions: Most of the research projects on pharmaceutical care carried out by pharmacy students are aligned with FIP DG and the 2030 Agenda for Sustainable Development Goals. Assessment of the pharmaceutical care research topics carried out by students allowed us to identify topics of further research development in our research group, such as Pharmacy intelligence, in line with FIP DGs.

A comparative analysis of professional background and experience for the responsible person position in pharmaceutical wholesale distribution

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Introduction: According to the 'Guideline on Good Distribution Practice of Medicinal Products for Human Use'

(European Directive 2001/83/EC), the role of the Responsible Person (RP) is vital to uphold principles of GDP requirements. Structured educational programmes for accession to the Responsible Person (RP) position are not yet established globally for personnel working in the pharmaceutical wholesale distribution setting.

Objectives: To identify the current scenario of the RP's educational and work experience requirements across the European Union and internationally.

Methods: The methodology consisted of a baseline study which included an extensive literature review to establish the current scenario, and to identify the type of work experience and education or expertise required for the RP position. Information was compiled per country from competent authorities namely: professional background requirements and the years of experience required. A list of the educational requirements to become an RP in Europe was primarily developed. Subsequently, an analysis of the requirements at an international level was performed. The criteria analysed statistically were the 'professional background' required to become an RP (pharmacist or other professional) and the 'number of years of experience' required to enter the RP role.

Results: The data analysed showed that 17 countries out of 22 international countries from Europe, the United States and the Western Pacific require the RP to be a pharmacist. The remaining five countries state that alternative scientific degrees are also acceptable for the RP position. In the European Union, all 19 European countries adhere to legally binding requirements in the European GDP guidelines while the other international countries have similar GDP-related legislation. The number of years of experience required for the RP position is not specified in 16 countries, and at least two years of experience are required in five countries. A lack of consistency in the nomenclature given to the RP title across countries was also found. Although in the majority of the countries, the RPs nomenclature is identical, inconsistencies between some countries exist. In Finland, the RP is referred to as the '*accountable director*', while in Romania, the RP is referred to as the '*chief pharmacist*' and in Spain, the '*pharmaceutical director*'.

Conclusions: There is a variation between the educational and workforce requirements to attain the RP position within Europe and globally. This research provides the basis for further investigation as to the professional competencies required by the RPs to fulfil their legally binding duties and responsibilities. The study raises areas that may be addressed to contribute towards harmonisation in GDP educational requirements to support patient-centric and safe wholesale distribution practices.

Applications of social theories of learning to foster students' professional identity in health professions education programs: A scoping review

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Introduction: In health professions education programs (HPEPs), theory-based learning practices have a greater impact on optimising the learning environment and facilitating professional identity (PI) formation among students. However, learning theories are not regularly and consistently implemented in educational practices. This is partly due to a paucity of specific in-context examples to help educators consider the theories relevant to their teaching setting.

Objectives: To provide an overview of the use of social theories of learning (SToLs) to develop students' PI in HPEPs.

Methods: A scoping search strategy was designed to identify the relevant articles using three key concepts: SToLs, PI and HPEPs. Four databases (PubMed, ERIC, ProQuest, and Cochrane) were searched for primary research studies published in English from 2011 to 2020. No study design restrictions were applied. Data analysis involved a descriptive qualitative and quantitative summary according to the SToL identified, the context of use, and in which discipline.

Results: Four studies met the inclusion criteria, where the communities of practice (CoP) theory was the only identified SToL. CoP was described as a group of people who share similar characteristics and collaborate towards a common goal, therefore enhancing mutual learning and fostering the development of a shared identity. Three of the studies implemented CoP theory with a focus on teaching and learning, and one with a focus on HPEP curricula design. The identified studies used CoP theory in nursing (n=2) and other multi-disciplinary (n=2) programs.

Conclusions: This review illustrated the successful use of CoP to foster PI formation among students in different HPEPs. However, the limited number of HPEPs that apply and report the use of other SToLs suggests a potential disconnect between SToLs and PI formation in educational practices. Future research should focus on the applicability and usefulness of other theories of learning to develop students' PI in HPEPs.

A systematic review of the assessment tools for examining the quality of learning environment in health professions education

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Introduction: Recently, growing attention has been observed by the accrediting bodies of health professions education programs (HPEPs) to the quality of the learning environment (LE) based on its importance in determining students' academic engagement and overall learning experience. However, students' perception of their LE is variable and depends on several factors, including the country's priorities, institutional vision and mission, cultural background, and program implementation and evaluation.

Objectives: To identify the tools and instruments used to comprehensively assess the quality of LE in undergraduate HPEPs and to examine their psychometric properties.

Methods: A systematic review search of four databases (PubMed, ERIC, Cochrane, and ProQuest) was conducted to identify primary research studies using two key concepts: LE and HPEPs. Studies included if it was published in English from 2000 to 2021. No study design restrictions were applied. Study selection was performed by two independent investigators and the inter-rater agreement was measured. A data extraction sheet was created to summarise studies according to the identified instrument, the context of use, discipline, validity and reliability assessments, strengths and limitations, and overall study biases.

Results: The most widely used instrument in evaluating undergraduate LE across different health professions is the Dundee Ready Education Environment Measure (DREEM). DREEM lacks a theoretical framework and adequate validity evidence and demonstrates cultural bias. The review revealed another newly developed instrument, namely the Health Education Learning Environment Survey (HELES). HELES items were guided by Moos's LE framework. Although the validity and reliability of HELES showed adequate psychometrics, further evaluation of its applicability in international contexts is warranted.

Conclusions: HPEPs around the globe should focus on examining the psychometric properties and applicability of HELES as an assessment tool for LE in their educational contexts. More research should be conducted to evaluate and

report the validity and utilisation of the LE assessment tools, to ultimately enhance students' learning outcomes, in terms of knowledge, self-efficacy and attitudes.

Blended intensive program: Professionals mentoring students to discover their career opportunities worldwide

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Introduction: The degrees in Pharmacy, Biotechnology, Nutrition and Dietetics offer a wide range of career prospects. Although, when the students end their degrees, they feel disoriented to face career decisions. Besides, in a global world, the job market is increasingly demanding professionals with international experience, and digital, intercultural communication, teamwork and leadership skills.

Objectives: To help our students to make decisions about their professional future and prepare them to be more employable.

Methods: In 2019 we organised an exchange trip to the University of Antwerp in Belgium. During this trip students from Biotechnology and Pharmacy could visit various institutions where they could develop their future careers and the experience was very positive. Unfortunately, in 2020, the pandemic limited the chances of travelling abroad and therefore, we designed a virtual exchange program in collaboration with the University of Turin (Italy) and Coventry University (UK) where students with degrees in Pharmacy, Biotechnology, Nutrition and Dietetics could learn about the different career opportunities of their degrees from the interaction with relevant professionals in the different sectors. In 2022 we organised the second edition of this virtual program, but since the situation derived from Covid19 had improved considerably, we designed a blended intensive program (BIP) combining a virtual exchange program with a trip to Turin (Italy) to visit institutions where the students could work in the future. Through the virtual exchange program, students distributed in small teams had the opportunity to conduct online interviews with four or five professional experts in a specific career prospect. Later, with the information gathered from the interviews, the different

teams presented an oral communication at an International Online Congress about a specific career prospect. Apart from the oral communications, the Congress also included an inspirational talk, some lectures, round tables and a workshop on how to make a good CV, optimise the LinkedIn profile and succeed in a job interview.

Results and Conclusions: In the 1st edition of the virtual program (2021), more than 400 people from 40 countries and 60 Universities were registered at the International Congress. More than 80% of the students agreed that this program allowed them to improve their intercultural skills, made them more employable, increased their motivation to work abroad and met professionals that could help or inspire them in their future careers. About 90% considered the project to be useful for their professional future. In 2022, the virtual program involved a total of 76 students from the three Universities participating, 33 professors and 86 professionals from more than 60 institutions and more than 11 countries. The trip to Turin will broaden their knowledge about their different professional opportunities worldwide, since students will have the opportunity to experience first-hand what the day-to-day life of a professional is like in different types of institutions such as a hospital, a community pharmacy, a research institute, a pharma-biotech company, and a food industry, among others.

Virtual exchange and blended mobility: Innovative teaching methodologies to foster internationalisation at the faculty of pharmacy of university ceu-san pablo (Spain)

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Introduction: Internationalisation is one of the teaching pillars of the Faculty of Pharmacy of University CEU-San Pablo (CEU-USP). The Faculty of Pharmacy exchanges more than 100 students per year through the Erasmus program or special International Bilingual Programs in collaboration with the University of Chicago and Boston University. In a global context, employers demand professionals with intercultural skills and international experience. However, in 2020 COVID-19 pandemic restricted students' international mobilities. In

this context, CEU-USP started to promote virtual exchange programs, such as the collaborative online international learning (COIL) programs, as an alternative to face-to-face mobilities. The COIL programs were further complemented with blended intensive programs (BIP).

Objectives: To increase the internationalisation opportunities and the intercultural and team working skills of the students and professors at the Faculty of Pharmacy of CEU-USP through COIL and BIP programs.

Methods: In COIL programs students from different universities and countries work online in teams to carry out a project. COIL programs usually include activities such as (i) introductory sessions, where students get to know each other through ice-breaking activities; (ii) students' teamwork, supervised by professors, on a specific project (case study, challenge, etc.), (iii) students' oral presentations or written reports on their projects, (iv) evaluation of the students and (v) satisfaction surveys to receive the feedback of all COIL participants. All these activities are carried out using collaborative and communication online tools. In BIP programs the online projects are also complemented with onsite activities thanks to the short-term mobilities of some students to one of the participant Universities.

Results: In the 2020-2021 and 2021-2022 academic years, eight COIL and three BIP programs have been carried out in the Faculty of Pharmacy of CEU-USP. These programs have involved 102 professors and 569 students, from ten degrees; and 18 universities from 13 countries and enabled the students to improve their intercultural, communication and team-working skills. These projects have included not only health-related degrees (Pharmacy, Biotechnology, Nutrition and Dietetics or Optics and Optometry, among others) but also non-health-related ones (such as Marketing or Business Administration); providing transversal learning to the students.

Conclusions: COIL and BIP programs have been successfully implemented at the Faculty of Pharmacy of CEU-USP. These programs are innovative teaching methodologies that have allowed to increase in the internationalisation opportunities and intercultural skills of the students, which made them more employable and increased their motivation to work abroad.

Digital delivery of clinical assessment and consultations skills for community pharmacists in England

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Introduction: Advanced clinical services are increasingly being delivered by community pharmacists in England, to provide more convenient treatment closer to patients' homes and integrate community pharmacies into local urgent care services. The NHS Community Pharmacist Consultation Service requires pharmacists to perform clinical consultations and examinations to assess patients' needs, provide care, and safety netting advice and, where appropriate, either close the consultation or refer to other care settings. Since the skills to deliver the service varied widely across the workforce, the Royal Pharmaceutical Society in partnership with the Royal College of General Practitioners (RPS/RCGP) was commissioned by Health Education England to deliver clinical consultation and assessment skills training to community pharmacists across England.

Traditionally, this type of training has been delivered in person, consisting of an e-learning course and a face-to-face workshop (developed by the Centre for Pharmacy Postgraduate Education) delivered by multi-professional teams including general practitioners, advanced nurse practitioners and pharmacists. Due to COVID-19, the workshop was redesigned into an interactive two-part online course.

Objectives: To determine the validity and acceptability of using digitally delivered clinical consultations and assessments skills training to increase the confidence of community pharmacists in managing patients referred via advanced clinical services in England.

Methods: The in-person workshop was re-developed into two small (up to 27 learners) online group learning sessions held one week apart. Session one (2.25 hours): plenary style didactic teaching, and small group learning including synchronous viewing of skills demonstration videos, a case study, and expert-facilitated discussions. Between sessions one and two: practice skills with a family member or friend (video-recorded). Session two (2.25 hours): small group learning including expert-led peer discussion of videos, case studies, further didactic teaching, and sharing of both facilitator and learner experiences of challenging situations. Each session was Chaired by a pharmacist facilitator, with three clinical facilitators (one GP and two advanced primary care practitioners – nurses, pharmacists, and paramedics). Immediate post-session feedback surveys were emailed to learners followed by a three-month post-session follow-up.

Results: Between October 2020 and March 2022, 8422 pharmacists were trained. A total of 2206 learners (26%) completed the post-session online feedback form. Before training, learners reported feeling somewhat confident (39%) or confident (33%) in managing referrals requiring clinical examinations. After training, 95% of respondents reported feeling more confident in taking patients' clinical history, 91% in identifying red flags in consultations, and 90% were more confident in using clinical examination skills, including interpreting and applying clinical assessment test results and findings to aid clinical diagnosis and decisions. About 89% of respondents reported feeling more confident using all other skills developed during the RPS/RCGP course. About 98% of respondents would recommend the course to colleagues.

Exactly 152 learners completed the three-month post-session survey and reported feeling confident (53%) or very confident (26%) in managing referrals requiring clinical examinations.

Conclusions: Digital delivery of small-group, expert-led training can increase the confidence of community pharmacists in managing patient consultations requiring clinical assessment and consultation skills. Further research should be undertaken to test skills competence regarding confidence levels.

Revalidation requirements for pharmacists in Spain: Suggestions of the official pharmacists' chamber of Burgos (Spain)

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Introduction: Pharmacists' revalidation will be shortly implemented in Spain because of the ever-growing need to assure that these health professionals continuously renew their competencies, keeping up to date regarding all recent advances that help improve their carrier responsibilities. The General Pharmaceutical Council of Spain recently drew up a national guidelines document for pharmacists' revalidation, based on the appraisal of job, teaching and tutor activities, publications and conference presentations associated with research, health management tasks, as well as specialised training and refresher courses, among other achievements. After a thorough review of the document, the pharmacists' revalidation team of the official pharmacists' chamber of Burgos (COF-Burgos) observed an imbalance regarding the scores given to attendances at long-term non-accredited courses, short courses, and lectures.

Objectives: To improve the evaluation scoring framework related to the courses taken by the re-validation applicants.

Methods: The COF-Burgos revalidation team held meetings to discuss the national guidelines document for pharmacists' re-certification, review other re-licensure scores, and eventually reached a consensus regarding scoring improvements within the courses taken section.

Results: The COF-Burgos pharmacists' re-validation team considered that attendance at a 60-hour non-accredited course should not be given the same score as attendance at a two-hour lecture, as it was stated in the re-certification document. Currently, in the hospital, each ten-hour classroom learning scored 0.8 credits, each ten-hour online learning scored 0.4 credits and each ten-hour hybrid learning scored 0.6 credits. Taking hospital learning scores as a basis, the following proposal was made: Regarding attendance at non-accredited courses, the first ten-hour learning should be scored with one credit, adding 0.1 credits to each subsequent two-hour learning, so that the effort and commitment of applicants who take long-term courses would be rewarded despite those courses not being accredited. The knowledge of foreign languages should be also included in the pharmacist's revalidation process, being scored according to the six reference levels of the Common European Framework of Reference for Languages.

Conclusions: Pharmacists' re-validation is part of their continuing professional development, also involving an ethical commitment to its success. Re-certification criteria should be regularly reviewed, studying and considering the opinion and proposals of the pharmacists involved in the process.

Training African women as health agents in Africa

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Introduction: More than 70% of global deaths from malaria, tuberculosis, HIV, and diarrhoea occur in Africa, with women and children being the most affected population. If we add up the mortality in childbirth and the incidence of obstetric fistula and female genital mutilation, we will have the main factors that contribute to inequality, increase poverty, and hinder the development of the African continent.

Objectives: To train African women as health educators to support the health services in their communities in aspects related to Neglected tropical diseases (NTDs) and maternal and child health.

Methods: A bilingual online course (Spanish - French) was organised through the Nivaria Virtual Learning Platform of the Official College of Pharmacists of Santa Cruz de Tenerife. The course was divided into two modules: Infectious Diseases and Maternal and Child Health. About 90% of teachers were pharmacists and the origin of the female students were Senegal (10%), Morocco (20%), Guinea (30%), Côte d'Ivoire (10%), Benin (10%), Mozambique (10%) and Mauritania (10%). Each module contained short videos, supplementary material, and summary infographics with clear messages. At the end of each module, a live online seminar with simultaneous translation (Spanish/French) was held to establish conclusions, and important messages and resolve doubts with the students.

Results: In terms of objective results, it has been possible to evaluate the degree of learning through the final questionnaires of each module (100% of the students passed the course with an average of 9.11 out of ten). The virtual training platform allowed direct communication with the students, highlighting participation in forums and live interaction during the webinars where the students reflected and exposed the situation of these diseases in their environments, making it possible to compare the different scenarios between countries. In these interventions, the high degree of involvement, interest and commitment was appreciated.

Conclusions: This course has enabled African women to be educated health agents to be able to help within their communities with the most common diseases that affect the continent in general. In addition, the development of this course through the online learning platform has shown the possibility to develop new courses where pharmacists can participate as health promoters.

Knowledge and attitudes of Croatian students towards epilepsy: A cross-sectional comparison study

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Introduction: Epilepsy is a chronic neurological disorder characterised by recurrent seizures. It carries a significant burden and adversely affects the quality of life of the patients.

Furthermore, patients with epilepsy face stigmatisation due to poor knowledge and misconceptions about the disorder. Negative attitudes towards the affected could lead to rejection and devaluation by the society which has a negative impact on their mental health and is associated with higher morbidity and mortality. Educating the general population could lead to more positive attitudes towards the patients and have beneficial effects on their psychosocial status. To implement educational measures, it is necessary to determine the current knowledge and attitudes of the population.

Objectives: The study aimed to determine the knowledge and attitudes of students from the University of Split in Croatia towards epilepsy.

Methods: Students from the University of Split were surveyed using an adapted questionnaire from a study by Mewes et al. The study questionnaire consisted of three sections with a total of 26 questions. The first section inquired about students' socio-demographic data, the second tested their knowledge about the condition and the third their attitudes towards epilepsy and affected patients. Biomedical and health students (pharmacy, medicine, dental medicine and nursing) were compared to the rest of the students to determine if their education led to improved knowledge and attitudes. The total attitudes score was calculated based on six attitudes questions with scores ranging from five (signifying negative attitudes) to a maximum of 30. Data were analysed using Chi-square and Mann-Whitney U test.

Results: Five hundred and ninety-five (N=595) students were included, out of which 277 were biomedical and health students. The two groups differed in their knowledge of epilepsy symptoms, with biomedical students having a higher frequency of correct answers to almost all individual items in the knowledge section. However, they did not show good knowledge of first aid measures, as a significantly higher number of biomedicine students prefer to hold the person down during the seizure (62.2%) and put something solid in their mouth (96.6%) - measures considered to be improper. Participants generally showed favourable attitudes towards patients with epilepsy, with no differences between the two groups in total score (median=28.0±3, IQR=27.5±4, $p=0.089$).

Conclusions: The University of Split students generally had good knowledge about epilepsy symptoms, but were less knowledgeable about first-aid measures, with biomedical students performing surprisingly worse in certain first-aid items. Overall, students had positive attitudes towards patients with epilepsy. Educational campaigns could be beneficial to further improve the understanding of the disorder among the general public and it is imperative to close the gaps in health students' knowledge.

Better together: Creating an equity, diversity, and inclusion statement for pharmalliance, an international partnership between three schools of pharmacy

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Introduction: The profession of pharmacy has demonstrated a commitment to equity, diversity, and inclusion (EDI) through professional organisations, including the American Pharmacists Association, American Society of Health System Pharmacists, Pharmaceutical Society of Australia, Pharmacy Guild of Australia, and Royal Pharmaceutical Society. In response to calls from these professional bodies, pharmacy schools around the world are bolstering current EDI efforts and developing new approaches through defining mission statements, strategic plans, recruitment efforts, pharmacy curricula redesign, and more. When designing EDI interventions, institutions that engage in global partnerships must consider not only the EDI needs of their local population but also those of their partners, as well as those of the globalising pharmacy profession. Therefore, PharmAlliance, an international partnership between UNC Eshelman School of Pharmacy (NC, USA), Monash University Faculty of Pharmacy and Pharmaceutical Sciences (VIC, Australia), and UCL School of Pharmacy (UK), took a collaborative approach to create comprehensive EDI community guidelines and commitments.

Objectives: To describe the development of an EDI statement for PharmAlliance, an international partnership between three schools of pharmacy.

Methods: A working committee was created from faculty and staff members from each institution. Committee members were knowledgeable and engaged in EDI efforts at their home institution. Committee members compiled EDI policy documents from each of their institutions for review. The committee then determined EDI-related needs for the PharmAlliance partnership by reviewing the Partnership's mission, vision, leadership structure, and ongoing activities. Finally, the committee drafted an EDI statement, inclusive of guidelines, commitments, and key performance indicators, which was approved by PharmAlliance leadership. The finalised statement was promoted at a live, virtual event and was posted on PharmAlliance.org.

Results: The PharmAlliance EDI statement included a mission and a vision statement, which related to the mission and vision of the overall partnership. The mission statement is "to ensure a culture where diversity of thought, background and perspective is welcomed in our partnership's collective pursuit of innovative ideas and solutions." The vision statement is to "aspire to be worldwide leaders in equity in pharmacy and pharmaceutical sciences education, practice and research through our commitment to diverse and inclusive practices." The statement's community guidelines and commitments addressed the inclusion and recognition of diverse peoples and perspectives in all activities, leadership, and internal grants or promotional programs. Additionally, the guidelines and commitments included accessibility considerations for in-person and virtual events. Importantly, the statement included a commitment to continuous quality improvement for EDI in the Partnership. Each of the commitments was tied to specific key performance indicators (KPIs).

Conclusions: A collaborative approach to creating an EDI statement for a global partnership resulted in a well-received output. The EDI statement and related KPIs will allow the Partnership to continuously and objectively assess performance, disseminate findings, and implement targeted interventions to improve annually.

Embedding DEAI in student pharmacist professional development

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Introduction: Formalised programs on diversity, equity, access, and inclusion (DEAI) are an essential part of the professional development of student pharmacists. The recently integrated sixth pillar intentionally highlights DEAI themes as foundational concepts embedded within the other five pillars.

Objectives: The study aimed to assess the program's impact on pharmacy students' knowledge, comprehension, and application of DEAI themes within Foundations of Professional Development (FPD) on career development and planning, professionalism, leadership, and self-awareness throughout the program.

Methods: The authors developed and implemented a longitudinal program to grow student pharmacist programs focused on DEAI. Students were summatively assessed during the P4 year through questions that explicitly evaluate the role of DEAI inclusive excellence as an integrated pillar in the students' behaviour and intentional inclusion into their professional development as healthcare practitioners.

Questions were embedded in P4 APPE rotations, graduating surveys, and reflection assignments to evaluate the impact of the program on student development. Challenges and opportunities for initiating programs addressing DEAI inclusion in schools and colleges of pharmacy were identified.

Results: DEAI themes have been integrated into FPD at our institution. FPD sequence is based on five interdependent pillars: self-discovery, professionalism, leadership, career development and planning, and contemporary issues in healthcare. A scaffolded thematic integration approach across FPD allows for cohorts to be assessed longitudinally to demonstrate the impact on DEAI awareness and activation as healthcare practitioners.

Conclusions: Assessment is as important as the DEAI content integration to effectively document the growth in students' knowledge, comprehension, and application of themes on career development and planning, professionalism, leadership, and self-awareness. In addition to assessing the efficacy of cultural understanding, cultural consciousness, and cultural safety, the assessment identifies deficits in the curriculum and informs opportunities for pedagogical growth.

Characteristics of successful international partnerships based on the five pillars of global health engagement

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Introduction: Schools and colleges of pharmacy have observed a growing need and desire for expanded

opportunities in global engagement, including student and faculty exchanges. Although the five pillars of global engagement (sustainability, shared leadership, mutually beneficial partnerships, local needs-based care, and host-driven education) have been proposed as guiding principles for partnership development, these have not yet been validated by non-United States international partners. The American Association of Colleges of Pharmacy Global Education Special Interest Group (AACP Global Education SIG) identified a lack of evidence-based resources for colleges that would like to enter into global partnerships and charged the outreach committee with developing guidance.

Objectives: To identify and evaluate important factors for successful global partnerships based on the five pillars of global health engagement.

Methods: This Institutional Review Board-approved, qualitative evaluation study used semi-structured interviews. The outreach committee is comprised of eleven US faculty members who developed an interview guide consisting of 22 questions under five categories: general principles, the overall process, student placements, staff-faculty exchange, and assessment. Each question was mapped to one of the five pillars. The interview guide was piloted with an international partner and modified for clarity and purpose. Participants recruited were international collaborators of committee members, and interviews were continued until thematic saturation was achieved. Interviews were audio-recorded, transcribed verbatim, and analysed through a crystallisation/immersion approach. A codebook was developed from a review of the transcripts and two independent coders reviewed each transcript and discussed any discrepancies. The committee reviewed the codes and transcripts to develop key themes.

Results: Ten interviews were completed with 13 international partners representing ten countries from five World Health Organisation regions: Africa (three), the Americas (three), Europe (one), Eastern Mediterranean (one), and the Western Pacific (two). Four themes were developed: Theme one- Personal connections are critical to partnership development and sustainability. Theme two- Understanding each other's programs and systems is essential for a successful collaborative partnership. Theme three- Mutual benefits can exist without bi-directional exchange and may be different for each partner, and Theme four- Key qualities for partners and learners include open-mindedness, adaptability, global citizenship, and cultural/structural awareness. These themes were then connected to the pillars. Theme one relates to both the need for sustainability and shared leadership. Theme two relates to shared leadership and host-driven education. Theme three relates to mutually beneficial partnerships and local needs-based care. Finally, the theme highlights qualities that support overall collaboration and partnership.

Conclusions: The results indicate that the five pillars are relevant to international partners. However, the human element of relationships, flexibility, and adaptability are key to successful international partnerships. International

partners have valuable insights into partnership development with institutions in the United States. Major insights included the importance of recognising the unique contributions of each partner and the value of global citizenship in pharmacy practice.

Use of a delphi approach to identify skills and qualities essential for international pharmacy practice experiences

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Introduction: As opportunities for and interest in global health opportunities increase among student pharmacists, so too does the need for rigorous support and selection systems. Supporting student pharmacists on international experiences starts during the selection process. The faculty and others who select and prepare students for these transformational experiences need tools to measure non-academic skills, including maturity, adaptability, leadership, communication skills, cultural sensitivity, and the ability to work as part of a team. These skills are thought not only to contribute to student success but also to prevent harm to the student, the local community and the relationship between the local community and the student's home institution.

Objectives: The purpose of this study is to identify and prioritise the social and behavioural skills and constructs which are markers of student pharmacist success in international pharmacy experiences via expert consensus.

Methods: This mixed methods study will take a two-phase approach. In the first phase, focus groups with pharmacy faculty experts will generate constructs. In the second phase, a larger group of experts will be engaged to participate in a Delphi process incorporating the constructs from a literature review and focus group to generate consensus around the most important non-academic factors influencing student success on international rotations. The focus groups will be analysed using content analysis to identify and define important constructs the experts described. The primary outcome of the Delphi process will be non-academic behaviours and skills identified as meeting 80% expert consensus by the final iteration of the questionnaire.

Results: Phase 1 (two focus groups) has been completed. During these focus groups, non-academic qualities and skills identified by both groups of experts included: adaptability, communication skills, cultural sensitivity, problem-solving,

maturity, positive attitude, open-mindedness, personal and professional humility, ability to pre-plan and anticipate problems, and being present and purposeful. Other qualities identified by either focus group included resilience, being community-oriented, working well with children, ability to self-reflect, being responsible, independence, ownership, willingness to accept risk, having strong ethics/morals, and having a strong work ethic. Phase two has begun and will use the generated list to prioritise these skills.

Conclusions: Phase one of this study was able to identify twenty non-academic qualities and skills, some of which have been previously reported as markers of student success in the existing literature and some of which are novel. The authors hope the findings from this study will be useful in guiding pharmacy faculty as they develop screening tools for international placements and preparatory materials to support student growth. These results may be applied to the creation of Situational Judgement Tests for such selection and orientation processes.

Toward student-centred pedagogies in pharmacy education

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Introduction: The pharmacist's role and place in the healthcare system has changed in recent years. A shift in focus is currently evolving, from technical skills and practical production of medicines to being fully fledged members of inter-professional patient-centred teams. As the healthcare systems evolve and become more complex, involving a myriad of different healthcare professionals, the pharmacist must be aware of their role in the system. Learning cannot continue to focus solely on knowledge and skills but should include reflections and highlight the perception of role and pharmacist identity. Research shows that significant learning happens when the student is the centre of the activity while the teacher is acting as a learning process companion, therefore, pharmacy education should develop in alignment with the needs and demands of the future. At the centre for pharmacy at the University of Bergen, FREMFARM was started, a design-based research project involving systematic implementation, analysis, evaluation, and development of student-centred educational interventions.

Objectives: The aim of this study is to present an overview of the active teaching methods used and of their impact on students' learning and engagement.

Methods: Qualitative methods were used to collect the data; pre and post-short questionnaire, observation using an adapted version of the Teaching Dimension Observation Protocol and focus groups. We performed a thematic analysis of the collected data with the help of NVivo12.

Results: Our research findings suggest that the employed active teaching methods improved student engagement, and communication skills, and enhanced critical-thinking abilities. Students reported that activities such as TBL (Team-Based Learning), roleplay, debate, and reflective activities, transformed their way of learning and increased their motivation. The focus groups told us that students retained knowledge best from active teaching methods such as TBL or debate because they were challenged to think for themselves and to discuss, while traditional lectures were quickly forgotten.

Conclusions: Introducing active teaching methods in pharmacy education increases student motivation and promotes more significant learning.

The debate as a pedagogy in clinical pharmacy

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Introduction: The communication skills of practising pharmacists are key in providing information and advice between patients, other healthcare practitioners, and the community.

Objectives: This study aims to explore the implementation of the debate as a pedagogical tool in pharmacy education to improve students' communication skills.

Methods: A pilot intervention for the FREMFARM research project was designed, implemented, and evaluated. The sample consisted of 7th-semester pharmacy students, who on average were 24 years old. A total of 100% of the students took the course for the first time.

Qualitative methods were used to collect the data; pre- and post-short questionnaire, observation using an adapted version of the Teaching Dimension Observation Protocol and post-activity focus groups. A thematic analysis of the collected data was performed with the help of NVivo12.

Results: Results show that almost 80% of the students agree that the debate helped them to structure their thinking and to simplify their language to communicate complex concepts. Students also expressed that preparing for the debate helped them to organise their thoughts and to gather information

from other subjects and make connections with other topics to prepare their arguments. However, 40% of the students found that the effort used to prepare for the debate activity was too large regarding the gains. Some students reported a transformation in their learning and a change in their position and perspective after the debate.

Conclusions: The debate as a teaching tool has many potential benefits to improve students' communication skills and learning in comparison to traditional learning activities. Therefore, the pilot was considered successful and would be upscaled and implemented in pharmacy education next semester.

Supporting equity, diversity, and inclusion in academic pharmacy: Utilisation of an institute model to provide training and action-planning for faculty

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Introduction: A gap in Equity, Diversity, and Inclusion (EDI) strategic planning in colleges and schools of pharmacy has been identified. There is a need for faculty development and improved integration of EDI into pharmacy curricula to prepare student pharmacists to improve equitable health outcomes for patients.

Objectives: The objective of this research was to determine the perceived effectiveness and participant satisfaction related to an EDI Institute.

Methods: The American Association of Colleges of Pharmacy (AACP), in collaboration with the University of Mississippi School of Pharmacy, delivered a virtual, two-and-a-half day, EDI Institute in January 2022. The institute model invited academic institutions to send a team of two to ten individuals, including faculty, administrators, staff, and students to learn and develop an action plan for their institution. The Institute was delivered as follows: (i) Large Group Sessions: All Institute participants engaged in programming that delivered content related to knowledge, skills, and attitudes about EDI topics (ii) Mixed Cohort Sessions: Participants were randomly assigned to a cohort of approximately 12 participants from other institutions to learn what others were planning and receive feedback on ideas (iii) Team Time Sessions: Participants met with their institutional team throughout the institute to share what was learned from other sessions and to create an action plan. The large group sessions in the program agenda included a variety of topics including how to be an accomplice, the hidden labour of EDI work, student

perspectives on EDI, and lessons learned from medical schools. To assess the effectiveness of the Institute and the participants' satisfaction, a post-Institute survey containing 26 items was administered to all participants. The survey consisted of various question types, including five-point Likert scale items, open-ended questions, and yes/no responses.

Results: In total, 287 individuals representing 57 institutions across North America attended the Institute. There was a 15% response rate for the post-Institute survey. The average overall effectiveness of the Institute was ranked as 4.47 out of five, with one being not effective and five being extremely effective. The average effectiveness at identifying challenges related to EDI work and identifying strategies related to EDI work were 4.35 and 4.14, respectively. The virtual team-based format rating was 4.23 and the mixed cohort model was 4.40. The average participant satisfaction (1= very dissatisfied and 5= very satisfied) related to content was 4.44, the number of sessions was 4.37, the schedule was 3.88, the relevance was 4.65, and the length of time was 4.40. Participants suggested increasing active learning, having concurrent sessions, and offering more detailed content concerning how to integrate EDI concepts throughout the curriculum and how to recruit and retain diverse students.

Conclusions: The results from the EDI Institute affirm the continuation of an established Institute model to provide education and support action planning for members of the pharmacy academy related to EDI. Future research including a larger cohort of individuals with an increased response rate will continue to track the impact of this faculty development on EDI enhancement in pharmacy schools.

From pharmacy student to pharmacist: Exploring the journey of moral development

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Introduction: It is widely accepted that the role of a pharmacist is becoming more complex and the scope of practice has broadened over the past decade. With restricted access to hospitals and general practice, the COVID-19 pandemic shone a light on the vital role that pharmacists play in maintaining patient care and disease management. Pharmacists have always been at the forefront of delivering safe and effective care across all settings. Recent reforms to the education and training of UK pharmacists will see that from day one on the register, pharmacists are expected to play an active role in the provision of clinical care and consultations including prescribing medicines. These advances make it more important now to have a better understanding of moral development through pharmacy

education and once in practice. Research has shown that healthcare professionals can make better decisions in the interests of their patients when they have advanced levels of moral decision-making.

Objectives: It is hypothesised that as students progress through pharmacy education they will demonstrate maturation in moral development, and this should continue as they progress through their careers. This research intends to measure and evaluate the pattern of moral reasoning of undergraduate pharmacy students at the University of Hertfordshire (UH) as they progress through formal education and practice.

Methods: A ten-year longitudinal study employed the Defining Issues Test 2 (DIT2) to quantitatively measure the changes in the participants' moral development. The DIT2 was completed by participants of a single cohort of students, who started the MPharm programme in 2008 in each year of study at the University of Hertfordshire, once after passing the General Pharmaceutical Council pharmacist registration exam (as Newly Qualified pharmacists) and a final time five years after they qualified (as matured Established Practitioners). Medians and standard deviations were calculated and compared analysed using pairwise comparison with the Wilcoxon signed-rank test.

Results: The statistically significant changes were in N2 scores between Level one (Mdn = 22.07) and Level three (Mdn = 26.80) ($p = 0.025$), this is a positive finding which supports the research that shows that moral development can be taught. To further support these results there was an increase in N2 score between Level one and Level four ($p = 0.011$). Research has also shown that practice-based experience can give rise to maturation in moral development, this research showed a statistically significant difference between Level four (Mdn = 22.62) and NQ Level (Mdn = 40.53). Despite this, surprisingly, there was a marked decrease in p and N2 scores at the Established Practitioner level.

Conclusions: Overall, the research showed a general increase in moral development as the participants progressed through the MPharm programme and in the first year after qualifying. However. With the decrease in moral development indices as an Established Practitioner qualitative research is to investigate factors that may have caused this and then recommend ways to support pharmacists better through education and practice.

Pharmacovigilance teaching-learning: A mixed cross-sectional analysis in Portuguese healthcare students and professionals

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Introduction: Pharmacovigilance stands out for its importance in obtaining existing knowledge about each drug, as well as in patient safety, and should be recognised as a continuous line of study. It constitutes a highly relevant component in the activities of health professionals, with spontaneous notification of suspected adverse drug reactions being its main face. However, pharmacovigilance activities are increasingly diversified and demanding in terms of technical-scientific rigour, and academic training that is adequate to the needs is essential. Professionals must have differentiated training that allows them to perform their pharmacovigilant functions in the simplest, most intuitive, and most rigorous way possible. The under-reporting that persists can be filled through continuous professional development programs, reinforcing theoretical and practical knowledge in the curricular plans of health courses. As a result, more educated professionals will also allow citizens to recognise the importance of pharmacovigilance.

Objectives: Describe and characterise the teaching-learning process of pharmacovigilance in Portugal. To do so, it is necessary to analyse the knowledge, perceptions, and postures of students and healthcare professionals, as well as the main difficulties that had been identified by the professionals regarding spontaneous notification.

Methods: It was used a mixed analysis method, composed of direct and indirect analysis.

A direct analysis was done with the spread of an online questionnaire on social media based on a non-probabilistic technique, referred to as snowball, and also via e-mail to several institutional contacts and the student's nucleus. And by indirect analysis through an explicit revision of the curricular plan in the health degrees by keyword searching in the course plans to understand the syllabus in the area of pharmacovigilance effectively taught to higher education students, with a view to a better understanding of training within the teaching of this higher discipline.

Results: From a total of 650 participants, 403 (62%) were students and 247 (38%) were professionals. About 84.4% of

the students and 54.7% of the professionals affirmed they had never done an adverse drug reaction spontaneous notification. Only 24.6% of the students and 17.8% of professionals referred to the existence of specific course contents reserved for pharmacovigilance in their degrees. Most students and professionals who answered the questionnaire showed interest in the integration of pharmacovigilance in the academic curriculum of the healthcare courses and the ongoing training plans of the health professionals. In addition, the majority agreed that pharmacovigilance adds value to their practical application in a professional context and claims to feel more motivated to report a suspected adverse reaction if taught. Analysing 93-course plans, only three referred to pharmacovigilance curricular units as mandatory, and 39 did not address any key term.

Conclusions: Since few institutions are teaching programmatic content regarding pharmacovigilance in the different healthcare courses and given the questionnaire results, it's evident the need for a wider reflection regarding further training and constant update of the practising professionals as well as in the diverse health institutions, investing in the creation of an academic curriculum that integrates pharmacovigilance in healthcare courses.

Differences in pharmacy students' ability to detect, resolve and prevent drug-related problems after theoretical and practical courses during the final year of the graduate program

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Introduction: One of the most important tasks of a pharmacist in practice is to provide pharmaceutical care. Detection, resolution and prevention of drug-related problems (DRPs) represent one of the keystones of pharmaceutical care. To effectively manage DRPs, pharmacists should have a sufficient level of knowledge about DRPs. As pharmacy students receive approval for independent work with their diploma, it was required to determine the level of their knowledge about DRPs at the end of the final year of study.

Objectives: To detect the influence of theoretical courses and Professional training on the level of pharmacy students' knowledge about DRPs during the last year of the pharmacy study program at the University of Split.

Methods: Respondents included in this study were fifth-year pharmacy students from the University of Split enrolled in the

pharmacy study program in the academic year 2020/2021. The survey was based on a previously published and validated questionnaire and contained 40 claims about nine clinical cases. Each of the clinical cases was designed to assess the pharmacist's knowledge of detecting, resolving, and preventing DRPs. The final year of the pharmacy study program at the University of Split is divided into two parts – the first five months which contains clinically oriented theoretical subjects (Clinical Pharmacy, Pharmaceutical care and self-medication, Clinical pharmacology and Pharmacotherapy), and the second part, which provides students practical knowledge (Professional training in community pharmacy during the last six months). Therefore, to detect changes in students' knowledge level about DRPs during the academic year, students were asked to complete the questionnaire at three different time points - at the beginning of the year (September 2020), after theoretical lectures (February 2021), and after Professional training in a duration of six months (September 2021). The total DRPs score was calculated by summing the responses in the questionnaire and data are expressed as mean \pm SD. The data were analysed by statistical tests and the results were considered statistically significant at $p < 0.05$.

Results: Twenty-three ($n=23$) students were included in this survey, of which 87.5% were women. The response rate in this survey was 95.83%. At the beginning of the year, the total DRP score knowledge was 31.6 ± 6.8 . After each educational intervention, in the form of a theoretical or practical course, the pharmacy students of the final year expressed a statistically significant increase in the average value of the total score of DRPs ($p < 0.001$). The total DRP score after theoretical classes was 47.3 ± 5.2 , and at the end of the final year was 53.0 ± 5.4 , which represents an increase of +67.7% in total DRP score during the academic year.

Conclusions: The curricula of the final year of the study program significantly improve pharmacy students' knowledge about DRPs and provide them with the appropriate knowledge needed in their future work practice.

Design and optimisation of novel MEK inhibitors for the management of neoplastic disease using the TAK-733 scaffold as a lead molecule

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Introduction: The mitogen-activated protein kinase signalling pathway is dysregulated in numerous human malignancies. Mutations exert their oncogenic activity through downstream proteins such as the MEK1/2 protein kinases. MEK inhibitors have been approved for clinical use in the treatment of BRAF-

mutated melanoma, and are undergoing clinical trials for the treatment of other cancers including non-small cell lung cancer, colorectal cancer and thyroid carcinoma.

TAK-733 is a selective, orally administrable, allosteric MEK1 inhibitor that has had a demonstrable anti-neoplastic effect. This study aimed to develop a series of novel MEK inhibitors by using the MEK1 kinase inhibitor TAK-733 scaffold as the lead molecule.

Objectives: The MEK1 kinase inhibitor TAK-733 has been co-crystallised with its cognate receptor in pdb crystallographic deposition 3PP1. Analogues of this molecule were sought in this study through Virtual Screening and *de novo* drug design.

Methods: In the first phase of the study, a virtual screening approach was adopted. Pdb crystallographic deposition 3PP1 was read into LigandScout and the TAK-733 pharmacophore was generated. A second MEK1 kinase inhibitor G799, co-crystallised in pdb crystallographic deposition 4U803, was recruited and its pharmacophoric structure was also elucidated in LigandScout®. The two pharmacophores were subsequently superimposed and merged into a unique consensus pharmacophore. The consensus pharmacophore was used to query the ZINCPharmer database where filters ensuring compliance with the "rule of three" for lead-likeness were implemented. A protocol describing the energetically unsatisfied space at the core of MEK1 was generated in SYBYL-X. The identified hit molecules were docked into a modelled protocol and ranked in order of affinity.

In the second phase of the study, a *de novo* design approach was adopted. A 2D topology map, describing TAK-733 in complex with MEK1, was generated in Poseview and used to identify the moieties critical to the binding. Seed structures were consequently modelled in SYBYL-X by selecting the moieties not critical to binding and designating these as sites suitable for molecular growth. The apo MEK1 ligand binding pocket (LBP) was mapped using LigBuilder. The modelled seed structures were docked into the MEK1 LBP and novel moieties were attached computationally using the GROW algorithm of LigBuilder. The resultant structures were filtered for Lipinski Rule compliance. Ligand binding affinity (pKd) was calculated using X-Score.

Results: A total of 1121 Lipinski Rule-compliant molecules were identified from ZINCPharmer. The total scores of the identified molecules ranged from 3.49 to 6.60. A total of 80 Lipinski Rule-compliant molecules were generated in the second phase of the study. Sixty-two of the generated molecules had a ligand binding affinity greater than the lead molecule. The ligand binding affinity of the final 62 molecules ranged from 6.68 to 9.27.

Conclusions: ZINC94790843 was identified as the optimal molecule obtained through virtual screening since it combined a high ligand binding affinity with a favourable logP (3.12). Consequently, it had the potential for bioactivity while having a higher propensity to oral bioavailability. The same selection criteria were applied to the molecules obtained

through *de novo* design. These structures will be further validated.

***In silico* design and validation of novel cyclin-dependent kinase (CDK) receptor inhibitors, using the palbociclib scaffold as a lead for the management of breast cancer**

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Introduction: Palbociclib has been shown to disrupt tumour proliferation in locally advanced and metastatic breast cancer by inhibiting activity propagated by the homologous enzymes Cyclin-Dependent Kinase receptors four and six (CDK4/6). Despite the therapeutic and prognostic effectiveness of Palbociclib, research shows that prolonged periods of exposure to Palbociclib predisposes to resistance.

Objectives: The aim of this study was to manipulate the Palbociclib scaffold to probe the CDK6 receptor and identify and design high-affinity lead-like modulators with the potential to become viable antagonists and alternatives to resistant tumours.

Methods: PDB crystallographic deposition 5L2I describing the holo- Palbociclib-CDK6 receptor complex resolved to 2.75Å was used as a template for this study. Two strategies were adopted in this research study: Virtual Screening (VS), and *de novo* drug design.

Two molecules were recruited for the virtual screening process. These were the lead structure palbociclib, and the analogous abemaciclib described in pdb crystallographic deposition 5L2S. LigandScout was used to sequentially generate pharmacophores for each of these molecules, and after their superimposition, their critical binding moieties were fused to yield one average consensus pharmacophore. The consensus pharmacophore was designated as a query structure and read into the online database ZincPharmer to search for spatially and electronically similar structures. Rigorous acceptance criteria were placed on the retrieved hits. Specifically, these had to conform to the "Rule of 3" for Lead-Likeness. These criteria were imposed to collect hit structures small enough to undergo optimisation and remain Lipinski rule compliant. The hit structures were ranked according to affinity and physicochemical parameters. In this study, the affinity for a modelled protomol was calculated. The protomol was modelled in Sybyl-X and represented the breadth of the energetically unsatisfied space at the core of the CDK6 receptor.

Results: The palbociclib scaffold guided the *de novo* design phase of the study. A 2-D topology map describing the most important interactions forged between Palbociclib and the amino acids lining the Ligand Binding Pocket (LBP) of CDK6 was modelled in Discovery Studio. This guided subsequent seed fragment modelling, in which molecular areas not critical to binding were identified as suitable for alteration. *De novo* design was carried out in LigBuilder. The POCKET module was used to create a 3-D map of the CDK6 receptor, and the GROW and LINK algorithms were used to facilitate *de novo* growth at molecular sites pre-designated as special hydrogen atoms (H.spc) on the modelled seed fragments. The novel structures were grouped according to pharmacophoric similarity and ranked in order of affinity using the PROCESS module in LigBuilder. The physicochemical parameters of these molecules were subsequently filtered for Lipinski rule compliance.

Conclusions: Virtual screening yielded a total of 824 Rule of three compliant hits while the *de novo* approach yielded a total of 22 Lipinski rule-compliant molecules. The binding affinity, (pKd), ranged from 5.56 to 9.97. The optimal structures in terms of affinity derived from each seed structure were identified and selected for further optimisation.

Students' attitude toward CPD and preparedness to become life-long learners scale (SPLLL): A multinational study

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Introduction: Due to the heterogeneity in the presence, structure, and content of continuing professional development (CPD) programs in pharmacy education, the current state and preparedness of pharmacy students for lifelong learning (LLL) remain vague.

Objectives: The purpose was to develop a tool that assesses pharmacy students' competence in CPD and preparedness to become lifelong learners.

Methods: This study was undertaken in two stages between October 2018 till August 2019. In the first, a Delphi study was carried out involving seven experts in LLL and pharmacy education to establish content validity. A consensus was reached after three rounds then the tool was subjected to a pilot study and later administered to 512 last year students from seven pharmacy schools in different countries in the Middle East, Asia, and Africa. The data was later explored for factors using a varimax rotation, Chronbach alpha, and item-to-total correlations to measure the scale's construct validity, internal consistency (reliability), and uni-dimensionality, respectively.

Results: A tool with 51 items has resulted from the study. Kaiser-Meyer-Olkin test and Bartlett's test of sphericity revealed inter-correlations between variables and the absence of redundancy. Seven factors were identified: Intrinsic motivation factors; Awareness of common CPD activities; Application of CPD cycle components; SDL skills; Awareness about LLL and CPD-associated techniques; participation in common CPD activities; and CPD-associated abilities. The resulting scale appears homogeneous and valid.

Conclusions: The preparedness for the LLL scale was developed as a valid homogeneous tool for assessing pharmacy students' preparedness for CPD and LLL. Further evaluation for comparison is mandatory.

Anti-dyslipidemia effect of decoction of mango leaves cultivar manalagi *Mangifera indica* L. var. *Manalagi*

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Introduction: Dyslipidemia is characterised by changes in plasma lipid levels. Mango leaves cultivar manalagi *Mangifera indica* L. var. *Manalagi* was suspected to have anti-dyslipidemic activity in its leaves.

Objectives: The purpose of this study was to determine the anti-dyslipidemic of manalagi mango leaf decoction *Mangifera indica* L. var. *Manalagi* in a high-fat diet and propyl thiouracil for 28 days.

Methods: This method of this study was carried out preventively using 30 male Wistar rats divided into six groups; a negative control group, a positive control group, a simvastatin group, three-treatment manalagi mango leaf decoction group.

Results: The first dose group had an affected total cholesterol level and Low-Density Lipoprotein level, the second dose group had defects in their triglyceride level and the fourth dose group had defects in their High-Density Lipoprotein level.

Conclusions: The manalagi mango leaf decoction has the potential as an anti-dyslipidemic.

Anti-hyperglycemic effect of African leaves of *Vernonia amygdalina* Del. on kombucha in mice

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Introduction: The African leaf *Vernonia amygdalina* Del. is a bitter leaf widely used as traditional medicine for various diseases including diabetes.

Objectives: The aim of this study was to determine the effect of *Vernonia amygdalina* Del. on kombucha as anti-hyperglycemic.

Methods: This study was conducted *in vivo* with the glucose tolerance test method. A total of 27 mice were grouped randomly into nine groups consisting of a negative control group, a positive control group, a sitagliptin group, three treatment group A which received leaf water extract, African three treatment group B which received African leaf kombucha. All treatments except the negative control received oral glucose solution 30 minutes after receiving the drug. The parameters measured were blood glucose levels every 30 minutes for two hours.

Results: The results showed the average profile percentage of decrease in blood glucose level in all test groups compared with the positive control of African extract and African leaf kombucha showed significantly different results.

Conclusions: The water extract and kombucha of African leaves have potential activity as anti-hyperglycemia.

The impact of an international experience on the career development of student pharmacists

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Introduction: There is growing evidence supporting the benefits international experiences have on developing knowledge, skills, and attitudes (KSAs) in student pharmacists. These KSAs include improved communication, cultural awareness, adaptability, self-efficacy, and the desire to be a better practitioner upon returning home. While it is becoming more recognised that these are valuable experiences as a student, it is not yet clear how these experiences affect one's career and professional development after graduation. Provided that nearly 70% of US pharmacy schools offer an international rotation with more than six per cent of the graduating class nationally completing such an experience, knowing the answer to this question can not only aid Universities' continued support of these experiences but can also help preceptors understand the broader impact they have on our students. Making this connection will be of use to schools that engage in international rotations and the growing number of students that participate in them.

Objectives: To assess the impact of an international APPE on career pathways.

Methods: To evaluate this objective, a 19-question Qualtrics™ survey was sent via email to all students (494) who participated in an international rotation within the past five years from six US-based universities. Surveys were sent beginning in August 2021 and closed in November 2021. Reminder emails were every three weeks until the study closed. The survey asked questions to gather background demographics, current position(s), and international APPE location, along with questions about knowledge, skills, and attitudes gained and open-ended questions probing what changes if any were made in their career journeys based on the international experience. Each university's institutional IRB approved this study.

Results: A total of 316 (64%) alumni responded to the survey across the institutions. Country locations for the international rotations included: Africa (24%), Asia (18%), Europe/United Kingdom (31%), South/Central America (11%), or other (16%). The majority of respondents (78%) completed some type of

post-graduate education/training and 58% were currently working in a health system pharmacy. Most (65%) described their international APPE as either “*more impactful*” or “*somewhat more impactful*” than their other rotations in regards to applicable or still used KSAs in their current work environment. The most common influence international rotations had on career pathways included; type of practice (23%), patient population served (13%), community service/volunteerism (9%), and location/setting of practice (8%). Only 8% of respondents reported that international rotations had no impact on their careers. The most common knowledge gained during an international rotation that is used in one’s career was cultural awareness while the most common skills gained were communication and interprofessional collaboration. Respondents shared that the most common attitudes gained were appreciation of what they had and have done.

Conclusions: Data analysis suggests international rotations impacted the knowledge, skills and attitudes participants use in their current positions. Survey respondents also reported that their international experiences were more impactful compared with other rotations with regard to KSAs still used in practice today. This data showcases that international rotations leave a lasting impact on the participating students.

Creation of a Spanish language track program for purdue university student pharmacists

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Introduction: According to the 2019 U.S. Census, 71.1% of Hispanics speak a language other than English at home and 28.4% say they are not fluent in English. As patient advocates, pharmacists should have a basic understanding of both the Spanish language and culture. While Purdue University offers a Spanish for the Professions minor, this was not enough to prepare students for caring for Spanish-speaking populations in a healthcare setting.

Objectives: The purpose of creating the Spanish Language Track Program was to supplement the minor curriculum with cultural immersion and healthcare-related activities to better equip students to work in Spanish-speaking communities.

Methods: A committee of Center for Health Equity and Innovation (CHEI) student representatives were chosen to lead the Spanish track planning process. An initial *Qualtrics* survey was distributed to student pharmacists to gauge their interest in participating in a Spanish track program. Student representatives conducted a web search looking at other

universities with similar pharmacy-focused Spanish programs. Student representatives also researched and met with various commercial medical Spanish program companies to find supplemental learning opportunities. CHEI leadership held an information session with prospective students. The session introduced the requirements of the program and allowed an opportunity for students to provide initial feedback about the program’s structure. A meeting was held with faculty and academic advisors to address program requirements and promotion.

Results: Out of the 36 students who completed the survey, 26 indicated “*yes*”, they would be interested in participating and eight students indicated they would “*maybe*” be interested. The program requires students to complete seven immersion experience points. These points can be gained through activities like studying abroad in a Spanish-speaking country, completing Spanish summer internships or participating in virtual health equity discussions or case presentations in Spanish with students from Colombia. Student pharmacists also participate in two four-week Spanish immersion Advanced Pharmacy Practice Experiences (APPEs): an ambulatory care APPE through Eskenazi Health that serves vulnerable and underserved Spanish-speaking populations and an elective adult medicine APPE in Medellin, Colombia. Other requirements for the program include completing the Spanish for the Professions minor as well as the online CanopyLearn Medical Spanish course that supplements the curriculum.

The program is currently in the pilot phase with student pharmacists who had already started to pursue the Spanish for the Professions Minor. As of fall 2022, there were fourteen students in the College of Pharmacy pursuing this degree. Eight students have completed CanopyLearn. Two virtual health equity discussions and six case discussions have been held with students in Colombia. Four student pharmacists are currently completing the two Spanish immersion APPEs this year.

Conclusions: The promotion of both language learning and cultural immersion will allow student pharmacists to provide more inclusive, well-rounded care to their patients. The Spanish Language Track Program will prepare students with the knowledge to build trust and form relationships with their Spanish-speaking patients.

Developing a risk management course for forensic professionals

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Introduction: Forensic science provides continued impartial, robust and reproducible analysis of data and laboratory results through a rigorous scientific approach which is subsequently presented to judiciary systems. Appropriate risk management is one of the pillars of good quality systems supporting forensic scientists in their daily work.

Objectives: To develop and deliver a training course targeting ISO31000:2018 focusing on risk management strategies specifically targeting forensic science.

Methods: The core team of development was led by pharmacists with experience in pharmaceutical regulatory sciences and risk management. A meeting with the quality manager of the forensic science laboratory was set to explore the gaps in knowledge that were required to be addressed regarding risk management and forensic science. The course learning objectives, outcomes, description of the content, method of delivery, choice of tutors and duration were designed and validated by an expert panel (n=4) consisting of the quality manager of the forensic science laboratory, a scientist, an academic pharmacist with a speciality in risk management and a pharmacist with experience in good quality management systems. The course was designed over a total of 14 hours face to face with an additional five hours of independent learning through reading material provided. The course was evaluated using an anonymous online questionnaire.

Results: The expert panel agreed that the designed course content met the set objectives and outcomes identified. All members agreed that the course should be delivered in classroom mode using an interactive approach consisting of quizzes and practical examples. The quality manager of the forensic science laboratory noted that the course duration is compatible with the working schedule of forensic professionals. It was suggested to run a total of three repeat sessions to target all the 60 forensic professionals in the laboratory. The expert panel strongly agreed that the tutors were well-versed in the area of training allowing for a discussion and sharing of ideas between tutors and participants. Out of a total of 60 forensic professionals, 58 completed an online anonymous evaluation. All participants (n=58) strongly agreed that the course met their expectations and that it was relevant to their area of practice. All respondents (n=58) strongly agreed that the tutors were knowledgeable about risk management. The majority of respondents (n=55) strongly agreed that the course was well delivered and that the course participants were prompted to

interact and share their work experiences. Three participants put forward suggestions for less independent learning hours. All respondents (n=58) strongly agreed that the tutors reinforced theoretical aspects regarding the ISO standard with practical aspects.

Conclusions: The developed course provided an academic platform bringing together different professionals with a scientific background led by pharmacists to share expertise and challenges in risk management. The course which focused on forensic aspects was well received and highlighted the need to further undertake interprofessional courses on scientific processes such as the provision of audits, and good quality management systems led by pharmacists.

A systematic review of contemporary competency-based education for pharmacy practitioners and students

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Introduction: Following the increasing use of competency-based education (CBE), the International Pharmaceutical Federation (FIP) created the first global competency framework (GbCF) for pharmacists in 2012. However, adopting CBE is complex and involves various features and stages of development.

Objectives: This systematic review examines the research in pharmacy education to identify the features of CBE used around the globe, providing information on the current picture of CBE in pharmacy. This information can then be used as an evidence base to guide future developments in CBE.

Methods: Scopus, Web of Science, Medline, Embase and ERIC electronic databases were searched to identify relevant literature. All studies associated with the CBE or training of pharmacy practitioners and related undergraduate students were included. Studies were limited to those published in English from 2010-2021. Two authors performed the screening and selection of studies and a 3rd author was utilised to resolve any discrepancies. The review follows PRISMA guidelines and is registered with PROSPERO under CRD42022296424. The findings are synthesised and presented descriptively.

Results: Twenty-eight studies were included in the review, all of which originate from high-income countries, spanning a range of educational levels and research designs. A total of 41

features were identified and categorised into six overarching themes; design, teaching and learning, feedback and assessment, faculty, resources, and internal and external factors. A collective understanding of the concept of competency, in combination with a shared vision between education, regulation, and practice, underpins the successful application of the CBE approach.

Conclusions: This review summarises common features of CBE across the globe which can be used to guide further developments in pharmacy education. Mutual consensus on the design and delivery of CBE features ensures that the intended learning outcomes are in alignment with the learner's experience, and congruent with the realities of pharmacy practice. However, further research is warranted for the application of features of CBE in lower-income countries.

Views and perceptions of pharmacy students about online learning and teaching in the Covid-19 era

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Introduction: Online teaching (OT) has evolved into a new pedagogical approach in pharmacy education. The COVID-19 outbreak forced universities worldwide to initiate OT. Therefore, OT replaced the "traditional" classroom environment. Luckily, the University of Nicosia (UNIC) was well prepared, so pharmacy students (PSs) were switched to OT without any delay.

Objectives: The purpose of this study was to explore the perceptions of PSs about OT and learning during lockdown periods using a quantitative-based questionnaire (included 28 questions).

Methods: After ethical approval, a pilot study was conducted with 8 students who were enrolled in one of the 8 teaching semesters. The completion of the questionnaire was done anonymously and voluntarily and it included multiple choice and Likert scale questions (a five points scale from "strongly agree" to "strongly disagree").

Results: In total, 205 students (151 females and 51 males) completed the questionnaire (response rate of 51%). Interestingly, for 159 students (77.6%), it was their first time participating in OT. Almost half of them (n=87, 47.5%) strongly agreed/agreed that they felt comfortable participating in discussions during OT and surprisingly 21.4%

(n=44) mentioned that it is more likely to obtain a degree through online teaching. Additionally, 48.3% (n=99) reported that they are more engaged to pass an online module compared to a face-to-face one. Despite the clear advantages of OT, face-to-face lectures are still the predominant teaching method (n = 93, 45.4%).

Conclusions: The COVID-19 pandemic has accelerated the transition to the digital era in teaching. This study identified that students felt comfortable with OT despite being their first using it. The study was limited by the number of participants and the data collection period set (October 2020-March 2021). As technology gains ground day by day, implementing online tools ought to be embraced by pharmacy programs worldwide.

Impact of social distancing and quarantine on students' well-being and mental health during Covid-19

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Introduction: After the huge expansion of the COVID-19 pandemic most universities worldwide including the University of Nicosia (UNIC) were closed due to the lockdowns, so education for almost two years was conducted online. Due to this situation, online teaching replaced the "traditional" classroom environment. In Cyprus, the first case of SARS-COV-2 was detected on 9 March 2020. Recent assessments of college students worldwide showed an increase in levels of anxiety and depression and unbearable psychological pressure. Therefore, apart from the life-threatening aspects of the pandemic, it seemed essential to understand her immeasurable effects on psychological health.

Objectives: The purpose of this study was to explore the psychological effects on Greek and Cypriot individuals who studied BPharm in the 4th year of their studies at UNIC during the COVID-19 pandemic.

Methods: This study used a quantitative questionnaire (20 questions in total including demographic information) that developed after an extensive literature search of the published data. The type of questions included varied from open-ended to Likert scale ones. Ethical approval was taken before the data collection. Data collection was conducted

electronically using the University's platform (Moodle). Moreover, the participation was on voluntary basis and anonymous. A pilot study was performed for the validity and reliability of the questions with no further changes before data collection.

Results: In total, 81 BPharm students responded with the majority being females (n=54/81, 66.67%). Students responded that their relationship with their friends was changed, due to the limitations of the quarantine measure. Almost half of the sample (n=38, 46.9%), strongly agreed/agreed with the statement while 29.54% (n=24) strongly disagreed/disagreed with the statement. Interestingly, the majority of the sample (n=61, 75.3%) also strongly agreed/agreed that they lost their real communication with their classmates due to quarantine restrictions and "social distancing". Additionally, when students were asked if the use of masks hides their feelings 69.13% (n=56) strongly agreed/agreed with the statement while it was encouraging that students mentioned that the use of masks did not mask affect their relationships with family and friends as most of the strongly disagreed/disagreed with it. Positively, more than half strongly agreed/agreed that the use of technology was an antidote to quarantine boredom (n=52, 64.2%).

Conclusions: As far as we are concerned, this is the first study conducted in a Greek-speaking BPharm programme, which identified the perception of pharmacy students about their well-being during social distancing. The majority of students were optimistic about the government's measures to tackle the pandemic. Through the questionnaire, it was identified a rise in social isolation, and emotional instability as well as a change in social relations among UNIC pharmacy students.

Social concern about anxiolytic abuse as a strategy to improve student learning of pharmacology

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Introduction: It has been estimated that ten per cent of the Spanish population takes benzodiazepines because of their anxiolytic and hypnotic effects. This figure raises social concerns and may become a Public Health issue.

Objectives: To promote students' interest in acquiring knowledge of the pharmacology of drugs used in anxiety and mood disorders. As secondary objectives, we aimed to raise awareness about the rational and safe use of medicines and to enhance proactive attitude in future pharmacists.

Methods: Data about the consumption of benzodiazepines were presented to the student at the beginning of the lesson. Documentaries and news in media were also available for the students in the online learning platform. Clinical pharmacotherapy cases including anti-depressants, anxiolytics and hypnotics were also solved by the students. At the end of the lesson, an anonymous questionnaire to understand benzodiazepine use was presented to the student and as a voluntary activity, they were encouraged to ask their acquaintances about this question. At the end of the semester, a second questionnaire (Likert scale) was performed to identify if the activities improved students learning.

Results: A total of 17 people answered the questionnaire and their ages were: 29.4% (16-24-year-old); 5.8% (25-40-year-old); 11.76% (40-49-year-old); 41.17% (50-64-year-old) and 11.76% (older than 65). Out of the sampled size, 64.7% were under treatment for anxiety with benzodiazepines, 52.94% had been under treatment for more than a year and only one patient had less than a four-week-treatment. Only one patient (5.8%) received information during the prescription of treatment.

A total of 56 students answered the Likert questionnaire about teaching methodology. Exactly 66.7% strongly agreed and 24.6% agreed with the affirmation "Teaching methodology helped me understand the effects of drugs", 87.7% strongly agreed "I am more interested in learning about drugs used by my acquaintances", 50.9% strongly agreed "I remember more the medicines in practical cases" whereas 78.9% agreed "I remember more medicines taken by my acquaintances". Only 1.8% of students did not know the pharmacological treatment of their family and friends. About 77.2% and 67.9% were very interested in learning about medicines, and mental health and addiction issues, respectively. Only 24.6% and 17.5% were very interested in drug research and development and molecular pharmacology, respectively.

Conclusions: Practical activities, especially those that raised social concerns about medicine use and abuse, arouse students' interest in pharmacology.

A support programme for effective student learning in a problem-based pharmacy curriculum at a South African university

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Introduction: Higher education institutions have a responsibility to produce skilled and socially committed graduates who are critical, independent professionals to meet the societal needs of the country. However, there are concerns regarding South Africa's school leavers being under-prepared for higher education, leading to attrition and low throughput rates, with graduates not adequately prepared for the world of practice. The problem-based learning (PBL) BPharm programme at Sefako Makgatho Health Sciences University (SMU) in South Africa, is complying with modern educational principles, key professional competencies, and good pharmacy education practice. The need was identified to understand factors affecting academic success and/or failure, focusing on "at-risk" students within this diverse and historically disadvantaged university setting. The goal was to provide a locally adapted student support structure to facilitate positive student outcomes, leading to the recruitment of pharmacy graduates who are 'fit for purpose'.

Objectives: To develop a structured student support programme for effective learning in the PBL BPharm programme at SMU.

Methods: The study used a mixed-methods, two-phased, explanatory and sequential design. Phase one: Quantitative strand (dominant) followed by a qualitative strand. The academic performance of two cohorts of BPharm students (n=112) was tracked retrospectively from the first year of study to the first attempt at the regulatory board pre-registration examination (2008-2017). The relationship between selection processes, academic performance and the pre-registration professional examination was investigated. Contributing factors were explored in in-depth interviews. Quantitative and qualitative data sets were analysed separately and integrated for overall interpretation in Phase two. A review of adult learning and support models served as the theoretical underpinning for the development of a student support programme.

Results: The overall BPharm pass rate was high (93.0%) irrespective of the number of years taken to graduate, with 64.3% of students graduating in the minimum time of four years. Integrated findings showed that success depends on cognitive and non-cognitive skills, with "at-risk" students identifying multifaceted factors affecting academic performance and a need for referral for assistance and/or support. A structured responsive student support model was proposed based on the framework of input, process, output

and outcomes. Findings illustrated the necessity for a dedicated student support officer, with structured and comprehensive, context-specific interventions, tailored to address the unique needs of students and to collaborate with other referral units within the university.

Conclusions: Results showed that the selection and induction processes can result in good throughput and graduation rates. Monitoring and evaluation of the selection process, the programme and students' performance during undergraduate and pre-registration assessments are vital for quality assurance, accountability and that graduates are 'fit for purpose'. Individual student counselling and the support programme contributed to students' positive academic outcomes. Student needs require coordinated efforts by both staff and students themselves. A structured, comprehensive student support unit within the school and in collaboration with referral units, is essential from the first year. The structured support model makes a valuable contribution to pharmacy education at SMU and other higher education institutions in South Africa.

Determination of smoking habits and nicotine addiction status of pharmacy students

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Introduction: The prevalence of smoking among young people in developed and developing countries has been identified as an important public health problem. Every year, a certain percentage of young people become addicted to cigarettes. This situation, which starts with trying in the first place, turns into addiction due to separation from the family, growing up, education, and job stress.

Objectives: In this study, it was aimed to determine the prevalence of smoking and the factors affecting smoking among a faculty of pharmacy students, and to evaluate the psychological dependence on smoking.

Methods: A questionnaire consisting of three sections and 33 questions was created in line with the literature review and expert opinions. The first part includes demographic questions (19 questions), the second part includes Fagerström Test for Nicotine Dependence (FTND) questions (8 questions), and the third part includes the Test for the Assessment of Psychological Dependence of Smoking (TAPDS) questions (8 questions). The questionnaire was sent to the students in an online questionnaire (Google Forms) over the students' class Whatsapp groups. Students voluntarily participated in the survey. Students were scored according to

their FTND and TAPDS answers, and their addiction levels were recorded as data.

Results: Two hundred thirty-four (48.3%) of 484 students studying at the Faculty of Pharmacy participated in the study. The students' median age (SD) is 22.2 +1.75 years, and 69.7% are female students. Family members of 54.3% of the students were smokers. When the smoking status of the students is examined, 52.6% (n=123) have never used it, 23.1% have only tried (n=54), 4.7% (n=11) have used it before and quit, 5.6% (n=13) used it occasionally, and 14.1% (n=33) used it regularly every day. The reasons for starting/trying/using smoking were curiosity (n=57, 51.4%), being influenced by friends (n=29, 26.1%), related to a significant problem (n=20, 18%), family history of smoking (n=3, 2.7%) and wannabe (n=2, 1.8%), respectively. FTND was administered to 46 people who used cigarettes occasionally or daily. According to the test results, the addiction degrees of students were too low (n=22, 47.8%), low (n=10, 21.7%), moderate (n=3, 6.5%), high (n=4, 8.7%); and very high (n=7, 15.2%), respectively. According to TAPDS, 18 (39.2%) of the students were mildly addicted, 25 (54.3%) moderately addicted, and 3 (6.5%) severely addicted.

Conclusions: Although the rate of smoking in pharmacy students was not high, psychological and physical dependence rates were found to be higher in smokers. It is more important for students who will practice professions in the field of health to be aware of smoking and the diseases caused by smoking, both for their health and for being role models in society. Therefore, the necessary public opinion should be created about smoking, which causes both material and moral losses, and efforts should be made to reduce its use among young people.

Strengthening student professional engagement during Covid-19 pandemic

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Introduction: In March 2020, the University pivoted quickly to remote learning and all healthcare facilities prohibited pharmacy students from in-person clinical rotation as frontline healthcare providers worked to manage the public health crisis. To contribute to the management of this public health crisis, the School of Pharmacy's students and clinical faculty engaged in activities to specifically address COVID-19. These activities reinforced the commitment and responsibilities that students will have as pharmacists and their socialisation into the profession.

Objectives: To describe the activities School of Pharmacy students and clinical faculty engaged in to mitigate the COVID-19 pandemic.

Methods: Beginning in April 2020, the Dean of the School met with the student body to discuss the pandemic situation and the pivotal role that student pharmacists can play in addressing the workforce requirements and the needs of the community related to the COVID-19 pandemic. The School faculty identified a strategy for certifying students as immunisers earlier than normal in the curriculum to provide the workforce needed for routine vaccinations as well as COVID-19 vaccination that was subsequently developed. To address misinformation regarding the virus, treatment and vaccinations, students were provided with up-to-date information and opportunities to educate the University and the community at large. When testing became available, the School of Pharmacy obtained the CLIA waiver needed to lead testing efforts on campus. The number of people impacted by our activities along with qualitative feedback from students regarding their participation were collected.

Results: Over 15,000 COVID-19 and flu vaccinations were administered by student pharmacists and faculty since September 2020. Out of this number, 8,000 vaccinations were given in eight days of mass vaccination clinic coordinated by the School of Pharmacy in partnership with Safeway Pharmacy, Inc. in April and May 2021 for the greater Baltimore area. Of particular importance, the first day of the clinic was when the Pfizer vaccine was approved for use in 15-year-old children and older. Other activities included campus and community-based education sessions on the virus, vaccinations and treatment, the production of hand sanitisers in the School's pharmaceuticals lab when they were not available commercially, and participation in the filming of the U.S. Public Broadcasting Service (PBS) documentary "Vaccination from the Misinformation Virus" which aired for the first time in July 2021 and has now been aired at numerous PBS stations throughout the U.S. Student feedback indicates their participation has reinforced the important role of pharmacists in addressing a public health crisis and as contributing members of the healthcare team.

Conclusions: The School of Pharmacy acted quickly in response to an unanticipated pandemic and lessons learned can be used to guide how the School can contribute to future public health emergencies that benefit not only the public but the students' professionalisation as well. The ability to act quickly and be nimble were key to the School's success.

Impact of virtual learning on pharmacy education: Assessment of examination scores before, during, and after the Covid-19 pandemic

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Introduction: Social and physical restrictions implemented during the COVID-19 pandemic necessitated the need for remote virtual learning in higher educational settings worldwide. In March 2019, Washington State University College of Pharmacy and Pharmaceutical Sciences in the United States switched to virtual learning. Virtual instruction continued until the Fall of 2021 when most courses transitioned back to in-person learning. The required course "Health Care Systems" serves as a model for data analysis.

Objectives: Quantifying the impact of virtual learning on student assessments will help in the efficacious development of virtual learning content, delivery, and planning for pharmacy educators.

Methods: Exam scoring data from the Health Care Systems course taught from 2017 to 2021 were evaluated and assessed to determine the impact of virtual learning. The data were stratified into groups as pre-pandemic (in-person 2017-2019), intra-pandemic (virtual 2020), and post-pandemic (in-person 2021). Data were analysed by t-tests, unpaired, homoscedastic, and statistical significance defined as $p < 0.05$.

Results: Virtual learning intra-pandemic students performed significantly worse on overall exam averages as compared to the pre-pandemic group ($p < 0.001$). Upon return to in-person learning in 2021, the post-pandemic in-person group did not have a significant change in overall exam average as compared to the intra-pandemic virtual group. When reviewing pre-pandemic and post-pandemic in-person exam averages, post-pandemic students performed significantly worse as compared to the pre-pandemic group ($p < 0.001$).

Conclusions: Virtual learning resulted in a significant decline in exam scores. Exam averages were not significantly different for intra-pandemic versus post-pandemic groups however were significantly different when comparing pre-pandemic and post-pandemic averages. These data indicate that not only does virtual learning result in reduced student performance, but there may be a longer-lasting impact from the sudden migration to virtual learning requiring further thought, preparation, and collaboration for pharmacy educators.

Leveraging technology to advance patient care in the developing world: A new community platform for pharmacy workforce education

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Introduction: In developing countries, patients often rely on pharmacies as the first point of access to healthcare services. Local pharmacy staff perform an array of critical functions in the continuum of care, yet they tend to be undertrained and undervalued.

Objectives: The vision of the Vennue Foundation is to change the course of human health through pharmacy workforce training and mobilisation. To help address the acute shortage of qualified pharmacists in the developing world, Vennue built an innovative, technology-enabled health workforce education model that is equipping pharmacy staff with the training and resources necessary for the provision of high-quality, patient-centred care.

This digital platform empowers pharmacists and pharmacy staff with the necessary knowledge and skills to advance patient care and improve health outcomes. The Vennue Digital Hub also provides a community to foster professional growth and development, bringing together practitioners from around the world to connect meaningfully through shared learning and practice enhancements.

Methods: Vennue's proprietary curriculum for pharmacy workforce strengthening is offered through a hybrid learning model.

-Classroom instruction: Utilising a trainer-of-trainees approach, Vennue hires and qualifies locally registered pharmacists to deliver the curriculum in their home countries through a series of interactive, bilingual training sessions (in-person and via Zoom).

-The Vennue Digital Hub: In January 2021, Vennue launched a cloud-based education platform to complement its in-country programs and to enable universal access to the curriculum -- for any health worker, anywhere, on any device (hub.vennue.org).

Key topics range from "good dispensing practice" to "antibiotic stewardship", "medication safety during pregnancy", and "chronic disease management". Each training module includes targeted learning objectives, case studies and role-play activities. Pre/post-tests measure changes in knowledge for each topic. Members must meet pre-defined criteria and demonstrate competencies in each topic to proceed through the curriculum to full certification.

Results: From January 2021 to June 2022, the Vennue Digital Hub demonstrated the following results:

- 992 online learners enrolled as new Hub Members from 15 countries around the world

- 764 health workers completed certificates in the "Fundamentals of Quality Pharmacy Care", comprised of six modules

- 54% average gain in knowledge of pharmacy best practices and patient-centred care

- Improvements in pharmacy worker confidence and job satisfaction

- Improvements in patient safety with the adoption of Standard Operating Procedures (SOPs)

- Better patient consultation skills, leading to greater adherence to medication therapies, and implying better health outcomes.

Conclusions: The Vennue Digital Hub is an effective solution to help provide flexible, locally-relevant pharmacy workforce training. It offers pharmacists and pharmacy staff continuous, uninterrupted access to learning resources and community connection, even in the face of challenges such as infectious disease outbreaks, conflict, or natural disasters.

The platform can be leveraged to cost-effectively scale education programs and to accelerate progress toward achievement of UN Sustainable Development Goal 3.c., which calls for new approaches to "develop, train, and retain the health workforce in developing countries."

In summary, pharmacy workers tend to be the most trusted health advisors. Digital solutions can help empower pharmacy staff as essential members of the patient-centred care team.

Developing a patient safety culture training curriculum for healthcare professionals

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Introduction: Establishing and maintaining a good safety culture is an indispensable prerequisite for the adoption of any safety initiatives in health care. There is a lack of patient safety culture training materials for regulatory or health professional authorities to apply across a diversity of healthcare settings.

Objectives: Our project is aimed to develop a patient safety culture curriculum to support a multi-disciplinary provincial regulatory authority in Manitoba, Canada, in advocating

patient safety culture and leading province-wide patient safety initiatives.

Methods: We adopted the first three steps of Kern's six-step approach to curriculum development by defining the goals and objectives of a patient safety culture curriculum for healthcare professionals. A structured search in MEDLINE, EMBASE, and a grey literature search, with support from a faculty liaison librarian, was performed to find relevant guiding documents from patient safety organisations, including those in the United Kingdom (UK), Canada, United States (U.S.), Australia, and New Zealand. We identified websites of regulatory authorities and policy institutes with a mission on patient safety, and then located relevant documents on these sites through a targeted Google search. Materials were synthesised by extracting overlapping competencies relevant to patient safety culture.

Results: Patient safety guiding documents from the UK (National Health Service), Canada (Canadian Patient Safety Institute), the U.S. (Institute for Healthcare Improvement), and the World Health Organisation (WHO) were identified. A curriculum with five core competencies and 22 learning objectives, ranging from Organisational Culture, Just Culture, Safety Improvement and Evaluation, to Information Sharing and Transparency, and Safety Leadership, was developed. We adopted Bloom's taxonomy and segregated the learning outcome domains into knowledge, skills, and attitude in the resulting Patient Safety Culture Training Curriculum for Healthcare Professionals.

Conclusions: Our curriculum, which was presented to key stakeholders of patient safety in Manitoba, Canada, serves as a primer for subsequent application, implementation, evaluation and feedback (i.e., completing the last three steps of Kern's six-step approach). Patient safety culture education calls for interprofessional collaboration, further concerted efforts and innovations from all global jurisdictions.

How the pandemic is influencing the delivery of practical training for pharmacists – a look at the masterclass series by the Ghana college of pharmacists

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Introduction: Pharmacists, in the discharge of their duties, make major interventions and develop innovative ways of providing health services. Without communicating these improved ways of healthcare delivery, other healthcare

professionals and patients do not benefit. Writing skills are very important in sharing knowledge and findings. While professional development activities have had to move online because of the pandemic, making the delivery of practical skills very challenging, it has provided an opportunity to widen access to learning, regardless of geographical boundaries. The Ghana College of Pharmacists is utilising this opportunity to improve the research and reporting skills of pharmacists in Ghana through its 'Masterclass Series'.

Objectives: The goal of this training was to provide opportunities for practitioners not only to learn about writing and publishing but also to utilise the acquired skills in improving upon their practice. To this end, we designed the sessions to be informative, interactive and highly engaging. The sessions also allow for hands-on practice, thus building the confidence in participants to practice new concepts learned.

Methods: A programme was structured into 10 sessions with one session per month. Each session was designed to have the following structure and pilot tested on facilitators for the various sessions:

- 20 – 30-minute presentation of concepts being shared
- 30 - 45 minutes break-out for a hands-on session using a case study or practice questions
- 30 minutes plenary to share results.

The structure was rolled out for the pharmacists who enrolled on the programme. After each session, participants were asked to evaluate using the following questions on the Likert scale – strongly agree, agree, neutral, disagree, strongly disagree:

- Facilitators communicated clearly and were easy to understand.
- Facilitators presented the course material in a clear and understanding manner.
- The course was organised in a manner that helped me understand the underlying concept.
- I find the course content relevant to my practice.
- I found the structure of the session beneficial for learning.

Participants were further asked whether or not they would recommend the Masterclass to others.

Results: The live sessions have been accessed by a total of over three hundred pharmacists so far. During the sessions, pharmacists participated actively in the sessions and engaged facilitators. Responses to the questions show that 95%-100% of participants agreed or strongly agreed with the sentiments expressed in the questions. 100% of respondents indicated that they would recommend the Masterclass series to others.

The remaining sessions of the training are expected to provide similar outcomes.

There were challenges with internet connectivity for some pharmacists who had enrolled. These pharmacists were unable to benefit from the training.

Conclusions: The structure of the training is effective in communicating essential principles for practical learning allowing participants the opportunity to practice what has been discussed. This highly accessible and hands-on structure can be adapted for other practical training in times when it is difficult or impossible to have in-person training sessions.

Conducting and evaluating a conceptual training programme for pharmacists as vaccinators in Ghana

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Introduction: Pharmacists in Ghana have not traditionally been part of vaccination teams. There is also a growing case of missed immunisations, particularly in urban centres. The location of community pharmacies in urban centres makes them a good resource to help bridge the gap. For pharmacists to be incorporated into vaccination teams, it is necessary to have comprehensive training that covers all concepts as well as practice training as required by law and policy in Ghana.

Objectives: The goals of this training were to equip pharmacists with the competencies to fill gaps in urban immunisation, increase access to vaccines among the general population and provide support for other healthcare professionals in the provision of vaccination services. This conceptual training will be followed by practical training for demonstrating vaccination skills.

Methods: Instructional modules were designed based on the

- American Pharmacists Association Pharmacy-based Immunisation Delivery Certificate Training Program;
- COVID-19 Immunisation training for Pharmacists in Ghana; and
- the Field Guide for Ghana's Immunisation Program.

The modules were rolled out in six two-hour virtual sessions from 9th to 14th May 2022. Pre- and post-tests were conducted to assess learning gained during the sessions. After each session, participants were asked to evaluate the training using the following questions on the Likert scale (strongly agree, agree, neutral, disagree, strongly disagree):

- Facilitator communicated clearly and was easy to understand.
- Facilitator presented course material in a clear and understanding manner.
- The course was organised in a manner that helped me understand the underlying concepts.
- I found the structure of the session beneficial for learning.

Results: A total of 155 pharmacists were trained during the rollout. The average score for the pre-tests ranged from five to seven depending on the module and the average score for the post-tests ranged between 8 and 8.5. This score shows a considerable increase in knowledge gain. Responses to the evaluation questionnaire show that 98%-100% of participants agreed or strongly agreed with the sentiments expressed in the questions.

There were challenges with internet connectivity for some pharmacists who had enrolled. These pharmacists were unable to benefit from the training.

Conclusions: The conceptual training for pharmacist vaccinators using the developed modules is effective in increasing the knowledge of pharmacists in immunisation.

Expanding the utilisation of the doctorate of pharmacy degree in varying healthcare fields through a preceptor showcase for rising APPE students

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Introduction: Public health, missionary, sales oh my! Gaining the prestigious title of Doctor of Pharmacy should have rising advanced pharmacy practice experience (APPE) students scratching their heads about how they may best utilise this degree; instead, some students still believe that their career choices remain limited to only the community and hospital pharmacy settings. Where these settings still provide the largest number of employment opportunities and are the backbone of our profession, for new graduates, the degree and skill set of pharmacists have been expanding and can be utilised across multiple and diverse employment fields.

Objectives: The aim of this study was to increase awareness of non-traditional career opportunities for student pharmacists by evaluating the effectiveness of attending a preceptor showcase for career and rotation information and insight.

Methods: A survey tool for second-year student pharmacists who attended a preceptor showcase was developed and delivered electronically after the event for feedback and quality improvement. There was a 51.2% response rate to the five-point Likert scale used. Data collected were subjected to Exploratory factor analysis (EFA) via Qualtrics.

Results: Results of the survey indicated that 21.1% of participants believed that they had a vast knowledge of pharmacy career options although 89.4% indicated that they could most likely work in a community or hospital setting. Furthermore, 73.6% of participants left wanting to learn more about pharmacy career options while 81.8% gained new knowledge that helped shape their career choice from the showcase. The showcase experience was significantly ($p = 0.0201$) associated with shaping career choices.

Conclusions: Increasing pharmacy presence in a variety of healthcare fields may start with providing opportunities for students to learn about career options from preceptors and Pharmacists working directly in those areas before they start the APPE rotation year.

Implementation of an interprofessional health and wellness festival at the school of pharmacy and health professions

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Introduction: The incorporation of an interprofessional Health and Wellness Festival in healthcare curricula provides a great opportunity for students to have hands-on experiences with interprofessional education, health promotion, and community health; an important role of healthcare professionals.

Objectives: Students enrolled in the Doctor of Pharmacy (PharmD) and Doctor of Physical Therapy (DPT) programs worked in interprofessional teams to educate each other about their scopes of practice and typical interventions regarding people affected by specific health conditions. They also developed activities that relate to their professions to educate the community about chronic healthcare conditions and illnesses.

Methods: Between years 2017 and 2022, second-year PharmD and DPT students were randomly assigned to work in interprofessional teams to create educational activities to

promote health and wellness and educate community members on eight healthcare-related topics. They are diabetic neuropathy, falls in the elderly, lower back pain, obesity, osteoporosis, ischemic stroke, osteoarthritis, and asthma in adults. The activities consisted of one poster presentation, one interactive activity, and one educational handout created by each team. Before the event, students participated in a mandatory orientation session, followed by a small-scale interprofessional meeting to discuss their scopes of practice and share the relatedness of their ideas. Students worked independently but under the supervision of a faculty member to ensure the accuracy of the information presented. Representatives from local, regional, and national healthcare stakeholders and members of the community were among the attendees. The poster presentations and interactive activities were evaluated by using a grading rubric and an electronic unidentified student post-assessment survey. In spring 2022, students from the Physician Assistant (PA) program joined in the event.

Results: Over a period of five years, approximately 450 students from three healthcare profession programs participated in an interprofessional health fair and presented over fifty poster presentations to patients and members of the community. Results from the post-assessment survey showed that 100% of the students strongly agreed and agreed that interprofessional education in different healthcare professions is necessary and that being able to work as an interprofessional team member is an important skill in their profession. They also strongly agreed and agreed that their profession encourages teamwork between healthcare professionals. The majority of them strongly agreed or agreed that the information that they learned will impact their healthcare practice.

Conclusions: This activity engaged health profession students in a hands-on experience that allowed them to witness firsthand the importance of interprofessional education and team collaboration in the promotion and delivery of optimal patient healthcare.

Knowledge, attitudes and practices of final year bachelor of pharmacy students towards antimicrobial resistance and antimicrobial stewardship

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Introduction: Antimicrobial resistance (AMR) has become an issue of global public health concern. AMR is a complex global health problem with extensive health, economic and societal implications. AMR has been a growing challenge to the effective prevention and treatment of an ever-increasing

range of infections caused by bacteria, parasites, viruses and fungi for many decades. The development of AMR is a natural phenomenon in microorganisms and is accelerated by the selective pressure exerted by the use and misuse of antimicrobial agents in human health as well as in veterinary, agriculture and environmental sectors. Multiple studies have recognised the role of education and training of healthcare professionals including pharmacists in antibiotic use and stewardship as a component of the antimicrobial resistance control strategy. There is limited research on the undergraduate training of future pharmacists and their knowledge about antibiotic resistance and stewardship.

Objectives: This study aimed to determine the knowledge, attitudes and practices of final-year Bachelor of Pharmacy students about AMR and antimicrobial stewardship (AMS).

Methods: A cross-sectional electronic survey was conducted among final-year pharmacy students in six universities in Nigeria. The questionnaire was divided into three parts: socio-demographic data, antimicrobial resistance and antimicrobial stewardship. Data analysis involved descriptive statistics and the results were expressed in frequency and percentages with Microsoft Excel and GraphPad Prism while inferential statistics using the chi-square test ($p \leq 0.05$ was considered significant). Respondents were grouped into two categories based on knowledge score; respondents scoring above the mean (23.9, equivalent to answering 75% of the questions correctly) were assigned to the category "high knowledge" and those scoring less than the mean were assigned the category "low to moderate knowledge". Ethical approval with approval number ADM/DCST/HREC/APP/4224 was obtained from the Health Research and Ethics Committee (HREC) of Lagos University Teaching Hospital, LUTH, Idi-Araba, Lagos, Nigeria. Participants read through the informed consent form and were required to indicate their consent before gaining access to the survey.

Results: A total of 322 respondents completed the online survey. Most (98.1%) of the respondents were aware of the problem of antibiotic resistance in the world. A majority (99.1%) of the respondents agreed that the inappropriate use of antibiotics can lead to ineffective treatment. About 60% of respondents showed good knowledge of the use of antibiotics and antibiotic resistance with significant differences between the universities ($p < 0.0001$). More than 90% of respondents would like more focus on training on antibiotics, antimicrobial resistance and antimicrobial stewardship.

Conclusions: Final year undergraduate pharmacy students showed an adequate level of knowledge, appropriate attitudes and practice towards antimicrobial resistance and stewardship. However, more efforts should be made to integrate practical concepts of antimicrobial stewardship into the undergraduate pharmacy curricula to promote the rational use of antibiotics by future healthcare providers and prevent antibiotic resistance.

An analysis of mentoring needs of UK pharmacists

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Introduction: Mentoring is recognised as a valuable tool in facilitating personal growth and development for both mentors and mentees. It also promotes social-emotional well-being and increases performance within organisations. Mentoring is a core feature of education and training programmes, and career models within several healthcare professions, nevertheless, a mentoring culture is not yet fully embedded within the pharmacy and there is a lack of literature about its usage and benefits.

Within the UK, pharmacy students, foundation trainees, and pharmacists can access mentoring support from experienced pharmacist mentors to support their practice and the development of essential skills aligned with the Royal Pharmaceutical Society (RPS) professional development frameworks. The RPS programme has been well received however the development needs of mentees are not well understood.

Objectives: To investigate and analyse the development needs of pharmacist mentees at different stages of their careers.

Methods: Data about pharmacy students, foundation trainees, and pharmacist mentees registered on the RPS mentoring platform since its implementation (from 1 September 2019 to 31 May 2022) was collated and analysed within Microsoft Excel and SPSS v27. Descriptive analysis was conducted to identify development needs at different career stages.

Results: Over a period of 2.5 years, 1155 mentees registered for mentoring support through the RPS mentoring platform, the majority of which have been in practice for between 11 to 20 years (n=245, 21%), and the smallest group were those planning to return to practice after a career break (n=34, 3%). Not more than 48% of mentees sought support with three or more skills or areas of practice. Students, foundation trainees and pharmacists who had been in practice for up to ten years were most in need of careers support (n=479, 79%), including job applications and transitioning to a new setting and role. Pharmacists who had been practising for over ten years were mainly requesting support with management and leadership skills from mentors (n=138, 36%), such as managing change, managing people, and project management. Collaborative working and communication, and research and evaluation skills were areas where mentoring support was least required across all career stages.

Conclusions: The findings of this study demonstrate that UK pharmacy students, foundation trainees, and pharmacists seek support with diverse aspects of practice from mentors at different stages of their careers. Those at an earlier stage in their career appear to pursue general support associated with career progression, however as pharmacists become more experienced, they search for focused support to improve and advance their skills in defined areas which appear to be associated with more senior and specialist roles. This is perhaps associated with pharmacist post-graduate pathways which encourage individuals to develop competencies within distinct disciplines and settings. Several studies have demonstrated the benefits of structured mentoring programmes in developing expertise and growing confidence in professional capabilities. Future research could explore how the study themes link to national and international educational pathways to further improve mentoring models to benefit the profession.

A case study evaluation of the uw-madison comparative health systems global pharmacy fellowship program

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Introduction: The University of Wisconsin-Madison Comparative Health Systems Global Pharmacy Fellowship program aims to connect early-career pharmacists from around the world and prepare them to be part of future global partnerships for improved health.

Objectives: The overall purpose of this project was to conduct a case study evaluation of the UW-Madison Comparative Health Systems Global Pharmacy Fellowship program, a collaboration between UW-Madison and the University of the Western Cape Schools of Pharmacy, to learn about the impacts of the program, the factors that contributed to its success, what could have been done differently, and how to effectively implement fellowship programs in the future.

Methods: The case study evaluation used a purposive sampling procedure based on the judgment of experts to select the key informants that represented various aspects of the fellowship program. The project team designed the key informant interview script to elicit information about their experiences with the fellowship program. A total of twelve key informant interviews were conducted with both UW-

Madison and South African participants in the fellowship program via the online platforms of Zoom and Microsoft teams. The interviews were recorded, and the audio files were transcribed using an online transcription service. The transcriptions were downloaded and entered into MAXQDA, a qualitative survey analysis program. Then thematic content analysis was used to code the interviews.

Results: The thematic content analysis of the key informant interview data revealed the following overarching themes: 1) the overall impacts of the fellowship program; 2) the challenges that participants faced; and 3) the reasons why the fellowship program was successful. Each one of these overarching themes contained several important subthemes. The impact subthemes that emerged were new and deepened relationships, increased awareness of *Clostridioides difficile* the fellowship project topic, increased motivation and inspiration, and increased skills. The challenges subthemes were lack of administrative support on the ground, lack of funding, risk-averse leadership, and building the long-term sustainability of the program. The successful subthemes include the fact that the program was built off established relationships, the strategic setup of the program, the ground-level support the program received in South Africa, the overall leadership support from both the Western Cape's School of Pharmacy and the UW-Madison's School of Pharmacy, and finally the positive attributes of the UW-Madison fellow.

Conclusions: The UW-Madison Comparative Health Systems Global Pharmacy fellowship program has had several important impacts both on the ground in South Africa and on those who have participated in the program. One of the most critical factors to its success was having had good people with good relationships lead and participate in the program. When designing and setting up future global pharmacy fellowship programs leaders need to ensure the right people are in place at all programmatic levels and that they focus on building and maintaining relationships to increase the likelihood of the program's success.

Evaluation of the impact of professional training

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Introduction: Training, as a strategy for education and development of human capital, is the transmission of specific knowledge, and the development of professional skills and attitudes, for higher levels of economic and social efficiency, with a broad occupational profile and integrated into society.

Objectives: To evaluate the impact of professional training and qualification.

Methods: Structured online survey, with closed and open questions at the end of each training. Evaluates relevance to the topic, duration, interest, development, practical utility, methodological integration, accessibility, difficulties, previous experiences and future needs.

Colegio de Farmacéuticos de la Provincia de Buenos Aires, in Argentina, has a specific area dedicated to professional training, so it was necessary to improve accessibility. The design of a virtual platform with synchronous and asynchronous telematic access material, all with evaluation, with different duration, favoured access to pharmacists distributed in the 307,000 km² of the province, required a strategic design of balance between gratuity, cost and quality.

Results: Training activities were developed during the period 04/01/2021 to 03/30/2022: 125; teachers: 155; training hours: 146,381; free: 49%; with costs: 51%, participants: 28,588.

About 75.5% considered practical work to be of interest, 29.1% related to daily practice, 71.4% considered the modular system practical and 73% useful to be able to train from their workplace, 65.6% can manage their time and train. There are 1,659 certified pharmacists.

Conclusions: Virtuality increased the number of speakers, topics and participating colleagues, shortened distances, and increased and promoted training. Today it equals the colleagues, without distinction of the geographical place of exercise or the family situation of the pharmacist or the environment where he/she is in.

Professional identity formation: Using a community entrustable professional activities (EPA)-based introductory pharmacy practice experience (IPPE) assessment

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Introduction: As pharmacy education emphasises the professional practice identity of future pharmacists, the authors evaluated their university's embedded model of immersive co-operative education (co-op)/introductory pharmacy practice experiences (IPPE) as a change agent in the development of professional identity formation (PIF) in pharmacy students. The co-op/IPPE model's tenets of preparation, activity and reflection allows students to

complete 1320 IPPE hours immersed in pharmacy practice settings.

Methods: A retrospective analysis was conducted, comparing the self-assessments of co-op/IPPE students based on entrustable professional activities (EPAs) with the evaluations provided by preceptors. Questions were categorised based on PIF tenets (thinking(T), feeling(F), acting(A)). Three assessment questions were coded as TFA, 9 as TA, and 4 as A, with two elements deemed unrelated to PIF. Summary statistics and observed trends were identified.

Results: Ninety-seven (90%) students and 68 (63%) preceptors completed evaluations. Out of 15 EPAs in a community practice setting, students aligned with preceptor evaluations related to TFA: professional development, communication and self-awareness. However, differences were revealed related to students thinking they did not meet(DNM) or perform(P) EPAs to the same level as preceptors' evaluations, primarily in the TA coded questions: EPA 2.1 (DNM: 11% vs 0%, $p<0.003$, P: 19% vs 49%, $p<0.001$), EPA 3.1 (P 16% vs 35%, $p<0.009$), 7.1 (DNM 21% vs 4%, $p<0.002$, P 14% vs 35%, $p<0.003$), 10.1 (DNM 31% vs 3%, $p<0.0001$, P 8% vs 31%, $p<0.009$).

Conclusions: An immersive coop/IPPE experience appears to be a strong scaffold for students to develop their professional identity, particularly in the area of feeling(i.e. soft skills). This study's results align with previously published reports that students are more critical evaluators of themselves than their preceptors, which is an opportunity for further IPPE, curricular, and student emotional intelligence development.