CPERC 2020

Canadian Pharmacy Education and Research Conference

Association of Faculties
of Pharmacy of Canada
Association des facultés
de pharmacie du Canada

AFPC CPERC 2020 ABSTRACTS

Oral and Poster Presentations

Association of Faculties of Pharmacy of Canada

Canadian Pharmacy Education and Research Conference 2020

The Association of Faculties of Pharmacy of Canada's (AFPC) 2020 annual Canadian Pharmacy Education and Research Conference (CPERC 2020) was scheduled for May 21-24 in Montreal, Quebec. Regrettably, CPERC 2020 was cancelled in mid-March due to the global COVID-19 pandemic.

The peer-reviewed abstracts accepted for presentation at CPERC 2020 as oral concurrent or poster sessions are published in this special supplement of the *Canadian Pharmacists Journal*. The primary author has provided permission for publication of their abstract.

The abstracts are grouped by oral or poster sessions, under the following categories: Pharmacy Education, Pharmacy Practice and Pharmaceutical Science.

AFPC wishes to acknowledge the support of *CPJ* and the Canadian Pharmacists Association in helping to promote and disseminate pharmacy education initiatives, educational scholarship, pharmaceutical science and pharmacy practice research.

CITATION in author's CV for presentation at AFPC CPERC 2020 conference:

POSTERS:
Authors' Last names, Initials. (2020, May 21-24). *Title of poster* [Conference poster presentation abstract]. Association of Faculties of Pharmacy of Canada Canadian Pharmacy Education and Research Conference, Montreal, QC. http://afpc.info/content/conference-program (Conference cancelled).

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OP01

Interprofessional case management: Pharmacy and nursing students learning together

Brett Barrett[1], _Jennifer Mohaupt[2]_, _Andrea Miller[2]_

[1]School of Pharmacy, University of Waterloo; [2]Conestoga College, School of Nursing

Goals: Interprofessional education (IPE) is a central strategy used to ensure pharmacy graduates have the skills necessary to excel in collaborative team environments. Although defined by the World Health Organization as education that "occurs when students from two or more professions learn about, from, and with each other", many Canadian pharmacy schools struggle to provide a robust IPE curriculum that entirely meets this description.

Description: In order to address this gap, the University of Waterloo School of Pharmacy and Conestoga College School of Nursing developed a 12-week co-taught elective where RPN-BScN and PharmD students would explore interprofessional collaboration competencies and apply those to practice-based scenarios. The major competencies of role clarification, interprofessional communication, collaborative leadership, team functioning, client-centred care, and patient safety and quality care were threaded through course readings, lecture, and team-based activities. Using formative, realistic patient scenarios, interprofessional student teams applied these concepts to their delivery of care. Through the successes and challenges encountered in these scenarios, students were able to reflect on their personal and team behaviour and identify opportunities for professional growth.

Relevance to Pharmacy Education: The purpose of this presentation is to describe this novel elective, its activities and evaluations, and the lessons learned from it.

ORAL PRESENTATIONS
OP02

International partnership on experiential education: A Toronto experience

Certina Ho[1], Marvin James[1], Francine Phillips-Sheldon[1]

[1]Leslie Dan Faculty of Pharmacy, University of Toronto

Goals: Developing cultural competence and having an appreciation of global health, policies, and regulations are fundamental for healthcare professionals to perform collaboratively in an inter-professional team. The University of Toronto Advanced Pharmacy Practice Experience (APPE) international elective rotations expose students to the various health systems that shape pharmacy practice around the world. These rotations provide a unique perspective on how pharmacists are well positioned to contribute globally to patient care through research, project management, teaching and learning, policy development, and the delivery of drug/medical information. The objective of this session is to share our experience in international partnership on experiential education, from planning, facilitating, and supporting our APPE students in international elective rotations, to hosting incoming exchange students for having their experiential learning at the Leslie Dan Faculty of Pharmacy (LDFP).

Description: During this presentation, we will share our guiding principles for arranging and monitoring APPE international elective rotations. In particular, we will discuss how we leverage our existing exchange agreements with international partners and facilitate hosting of their incoming pharmacy students at the LDFP. In the 2020/2021 APPE academic year, we have secured eight international partner sites, offering a total of 17 unique APPE rotations to our students. We will explain how to approach and develop these international partnerships in achieving a mutually beneficial experiential exchange program for our pharmacy students and also students from other institutions.

Relevance to Pharmacy Education: This presentation is highly relevant to pharmacy education as cultural competence and global health literacy are typically taught in a traditional, didactic model in the curriculum. We hope our insights and illustrations of how global health education and initiatives can be delivered in experiential learning and cross-cultural settings may encourage others to consider applying these strategies and expand their APPE program internationally. With an increased interest and uptake of international elective rotations by pharmacy students, this presentation will explain how to optimize experiential learning opportunities beyond Canada.

A purposeful pause: Creating a culture of change that promotes Indigenous knowledge, education, and scholarship achievement in the College of Pharmacy

Dana Turcotte[1], Sarah Olson[1], Migizii Agamik[1], Jenna Esteban Villarba[1]

[1]College of Pharmacy, University of Manitoba

Goals: Health disparities between Indigenous and non-Indigenous populations in Canada continue to be profound. To address this human rights issue, we must first address issues at the root of inequity. By challenging the healthcare educational system to confront systemic racism at the trainee level, we will improve cultural safety and competency of graduating practitioners. The University of Manitoba College of Pharmacy has taken a comprehensive approach to evaluating knowledge and cultural competency of undergraduate pharmacy students, the process and results of which will be described in this session.

Description: Thoughtful consideration of current practices, challenges, and initiatives were needed prior to intervention to ensure successful and appropriate integration of Indigenous health content into pharmacy curriculum. A comprehensive evaluation of the current state of knowledge amongst our students was an essential step, allowing for purposeful implementation of curricular enhancements to address areas of deficiency.

Through a highly collaborative and consultative development process, the College of Pharmacy created an Indigenous Knowledge Assessment Survey, which was subsequently administered to students in years 1 to 3 of the program. The survey served not only as a valuable assessment tool, but also as an educational resource for students, as all answers were provided to students in real time upon question completion. Results from this assessment are currently being used to guide the development of curricular initiatives within our program.

Relevance to Pharmacy Education: As we begin the process of implementing an equitable PharmD program, it is vital to address the lack of emphasis on Indigenous health and advocate for the prioritization of Indigenous awareness, accountability, and meaningful engagement. In order to accomplish this through the development of purposeful curricular change, we must first understand the current knowledge, attitudes and beliefs of our students.

Pharmacy schools are poised to contribute to the amelioration of systemic racism in healthcare. Level of knowledge, beliefs and attitudes of students will likely differ across Canada, therefore it is important that each region examines the current state of knowledge of their own students – specific to their region's unique sociology and culture - in order to implement meaningful curricular changes.

ORAL PRESENTATIONS
OP04

"Good job!" Feedback training for simulation lab instructors

Debbie Kwan[1], _Naomi Steenhof[1]_

[1]_Leslie Dan Faculty of Pharmacy, University of Toronto_

Background: In pharmacy education, where a very specific set of knowledge, skills, and abilities are being taught and assessed, feedback is an essential element for students on their path to professionalization. Feedback is particularly important and widely used in professional practice skills labs; however, students report that they receive poor quality feedback and their claims are backed by numerous studies.

In professional practice labs, our pharmacist clinical instructors (CIs) are selected based on clinical proficiency as opposed to teaching skills. Nevertheless, if CIs are not able to translate their clinical knowledge and observations in a form that is useful and meaningful for students, then it will be difficult to support student growth.

Goals: To describe an intervention rooted in a cognitive constructivist paradigm which successfully improved the quality of CI's written feedback.

Description: The Medication Therapy Management lab is a required course for third-year University of Toronto PharmD students and is facilitated by forty-five pharmacist CIs. Prior to the course start, CIs participate in one 3-hour orientation session. The session was re-organized to include experiential training on providing effective feedback. All CIs observed a role play involving a student-patient interaction and provided written feedback using the course rubric. CIs then conferred with each other in small groups to discuss their ratings and comments, and to reconcile or justify any differences. This activity was followed by a didactic session on best practices in feedback and writing comments.

A post-session survey indicated 100% of participants either strongly agreed or agreed that the session helped them prepare for their role. Specific comments included that CIs felt the feedback activity helped to align their expectations with other CIs and helped them gain a better understanding of the expectations of each component of the rubric. Respondents also reported an improved understanding of the types of comments that were useful to foster student development. Suggestions for improvement included increasing opportunities to practice. Anecdotally, students have reported improved satisfaction regarding the quality of CI's feedback.

Relevance to pharmacy education: A simple intervention incorporated into a workshop can improve the quality of feedback provided to pharmacy students.

OP05

Assessment of practice readiness: Measures and processes in the entry-to-practice Doctor of Pharmacy programs in Canada

George Pachev[1], Gilles Leclerc[2], Sarah Moroz[3], Aleksandra Mejia[4], Isabelle Lafleur[2]

[1]_Faculty of Pharmaceutical Sciences, University of British Columbia;_ [2]_Faculté de pharmacie, Université de Montréal;_ [3]_School of Pharmacy, University of Waterloo;_ [4]_Leslie Dan Faculty of Pharmacy, University of Toronto_

Background: The Canadian Council for Accreditation of Pharmacy Programs (CCAPP) has more than doubled, compared to the BSc (Pharm) programs, the required number of weeks of experiential education for the entry to practice (E2P) Doctor of Pharmacy (PharmD) programs. In addition, Faculties are required to generate evidence to support that students demonstrate practice readiness prior to starting culminating practice experiences. In response to these requirements, some schools implementing PharmD curricula have introduced specific tools and processes designed to assess students' practice readiness.

Goals: The goal of the presentation (session) is to describe the different approaches and specific measures used by Faculties of Pharmacy across Canada to assess practice readiness.

Description: The session builds on presentations and discussions of general approaches to practice readiness from the 2019 CPERC/AFPC annual meeting. This session will focus on specific tools and the processes of their development (e.g., blueprinting, standard-setting) and use (e.g., review of results, remediation, promotion) as introduced in the context of the respective curricula to assess practice readiness. Schools participating include University of Montreal, University of Toronto, University of Waterloo and the University of British Columbia.

Relevance to pharmacy education: This presentation will benefit the whole pharmacy education community by illustrating various approaches to measuring and assessing practice readiness.

OP06

Learning analytics: Promises and concerns

Gilles Leclerc[1,2]

[1]_Faculté de pharmacie, Université de Montréal;_ [2]_College of Pharmacy, Dalhousie University_

Goals: To raise awareness on the ethical issues of learning analytics in higher education.

Description: Analyzing educational data to better understand the process and experience of learning has been commonly referred to as learning analytics. Learning analytics goal is to study student experience, behaviors and performances in order to eventually improve student academic success and progression rates. Such laudable objective has led to an increase interest during the past decade toward learning analytics within higher education institutions. During this period, collection and storage of large amount of data on students' characteristics, experiences and performances was enabled by a massive computerization of academic systems in higher education institutions, paving the way to the emergence of learning analytics.

But, although its goal is legitimate, important issues and challenges with learning analytics were raised. Among these, ethical concerns related to student consent as well as data privacy and security were identified. Presented as a case study, this presentation will address important ethical issues faced by the Faculty of pharmacy of Université de Montreal while designing a study overlooking the predictive value of admission data. The nature of these concerns and our obligations to that matter will be discussed.

Relevance to Pharmacy Education: Addressing learning analytics concerns and challenges at this point in time where Faculties of pharmacy across Canada are building their capacity in program evaluation and educational research appears as a responsible act.

ORAL PRESENTATIONS
OP07

The implementation and benefits of a faculty policy and procedure for extracurricular community outreach activities in pharmacy

Gilly Lau[1], _Paulo Tchen[1]_

[1]_Faculty of Pharmaceutical Sciences, University of British Columbia_

Goals: To discuss the implementation and benefits of a Faculty policy and procedure for student pharmacists participating in voluntary student-led extracurricular community outreach activities.

Description: The delivery of community outreach activities (i.e., health and medication-related education, pharmacy advocacy, and health promotion topics) by pharmacy students to the public have been long-standing in the Faculty of Pharmaceutical Sciences (FoPS) at the University of British Columbia (UBC). Despite the intended benefits to the public, the FoPS remained concerned about the accuracy of information conveyed by unsupervised pharmacy students. As such, a policy on community outreach was created in 2016 to ensure that all students participating in any community outreach activity must first submit a proposal to the FoPS with details of the activity that they intend to deliver. In the FoPS' review of student outreach proposals, feedback is provided to students on their content and a risk assessment is conducted to determine the level of support needed and if pharmacist supervision is required. If supervision is necessary, the FoPS will arrange for a licensed pharmacist to support the activity.

In the 2018-2019 academic year, pharmacy students at UBC delivered 85 outreach events with 115 students participating; an estimated 2000 people were reached through educational, advocacy, and health topics. This increase over the previous year demonstrates a need for a policy to provide students with support for their growing interest in outreach.

Relevance to Pharmacy Education: Implementation of a policy on community outreach activities has benefited pharmacy education in the following ways. Through Faculty involvement and support, students receive feedback on outreach content and delivery. Where supervision is required for an outreach activity, students benefit from the knowledge, experience, guidance, and mentorship of a pharmacist. The public benefits from receiving education, advocacy, and health promotion content that has been reviewed and approved by the FoPS. For pharmacists, this structured process creates an opportunity to engage with pharmacy students and the community.

Learning to give the best of you, instead of what's left of you: An active learning activity on healthcare provider burnout for pharmacy students

Heidi Fernandes[1], Cynthia Richard[1], Kaitlin Bynkoski[1], Becky Ewan[1], Sherilyn Houle[1]

[1]School of Pharmacy, University of Waterloo

Goals: 1) Outline the motivation and creation of a check-in activity for pharmacy students to develop the knowledge and skills to identify and address burnout. 2) Share findings gained from the learning activity related to activity implementation, student feedback, and curricular implications.

Description: Burnout is a form of extreme professional exhaustion prevalent in many caring professions. Pharmacy learners may be at a higher risk for burnout due to personality factors such as high self-expectations and "Type A" personalities. The condition also has practice implications, such as higher medical error rates and malpractice risk. To equip students with the knowledge and skills to identify and address pharmacist burnout, an active learning activity was implemented in the Winter 2020 offering of Professional Practice for 3rd year students at the University of Waterloo. An online video introduced students to burnout, including its origins, signs and symptoms, and prevention. Students then had the opportunity to meet one-on-one with a School of Pharmacy faculty or staff member to reflect on a series of questions that encompassed the concepts of burnout across several domains relevant to pharmacy students. Following the activity, students were surveyed online to gather feedback on the activity and its impact. Preliminary results will be available for presentation at the conference.

Relevance to Pharmacy Education: Addressing student wellness and burnout aligns with both the current context of pharmacy practice as well as recommendations from a University of Waterloo Advisory Committee on Student Mental Health to incorporate concepts of wellness into course materials. As the best way to combat burnout is through prevention and early recognition, training students on this before entering practice is expected to be most beneficial. This activity represents the first learning activity implemented at the School of Pharmacy targeting burnout with an embedded research component to evaluate its impact and effectiveness.

OP09

Employing an integrated approach to determining student progress in the entry-to-practice Doctor of Pharmacy program at UBC

Ingrid Price[1], Sandra Jarvis-Selinger[1], Jennifer Chatterton[1], Kerry Wilbur[1], Ginette Vallée[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Goals: This session will: 1. provide an overview of the student progress process and policy that is used at UBC; 2. discuss the benefits of employing this process, lessons learned and areas for growth.

Description: The Faculty of Pharmaceutical Sciences at UBC implemented an entry-to-practice doctor of Pharmacy program in September 2015. This new program involved the creation and implementation of a programmatic approach to assessment that is integrated across the various learning experiences students participate in throughout their program. In order to support this programmatic approach to assessment and make decisions regarding student progress across learning experiences, a Student Progress Committee was created. The Committee is guided by a student progress policy that supports unbiased and procedurally fair decision-making that is in the best interest of the student. The Student Progress Committee meets at appropriate times throughout the year to make decisions regarding student progress that take into consideration academic performance, professionalism and any mitigating factors that may have affected student performance. Each year, the student progress committee reflects on cases discussed and collaborates with the associated faculty members to improve processes for future years.

Relevance to Pharmacy Education: This process has proven valuable in ensuring that decisions made regarding student progress are valid, unbiased and in the best interest of the student.

Needs assessment for an academic electronic health record (aEHR)

Marie Rocchi[1], *Janet Cooper*[2], *Lisa Bishop*[3]

[1]*Leslie Dan Faculty of Pharmacy, University of Toronto;* [2]*Association of Faculties of Pharmacy of Canada;* [3]*School of Pharmacy, Memorial University*

Goals: In 2018-19 AFPC conducted an initial needs assessment for an academic electronic health record (aEHR) for pharmacy, medical and nursing students. Further exploration of needs and capacity is currently underway. This session will provide an overview of the needs assessment results, potential options, recommendations and AFPC's next steps.

Description: Funded by Canada Health Infoway, AFPC collaborated with the Canadian Association of Schools of Nursing and the Association of Faculties of Medicine of Canada to assess the need for an aEHR. The report concluded that a national aEHR solution should be considered an essential educational tool for increasing knowledge about health information technology in nursing, medicine, pharmacy and interprofessional programs. It also recommended that the concept of a national aEHR solution be further pursued by AFPC, CASN, AFMC and Infoway.

Four options were assessed; buying access to an aEHR through an open source vendor was considered the first choice for a national aEHR solution. This option is available in the form of a prototype in British Columbia, developed by BC Campus, in collaboration with the UBC faculty of pharmacy. The potential to develop the BC prototype into a national aEHR platform is being explored. Presentations were made to selected pharmacy faculty members and a follow-up survey assessed its value and potential use. Eighty-two percent agreed or strongly agreed that a Canadian aEHR would be of value for their faculty (n=22). Next steps include developing a technical and business plan.

Relevance to Pharmacy Education: The availability of an affordable, pan-Canadian aEHR product could enhance learning, enabling students to work on a digital platform that simulates real-world experiences. An aEHR could replace paper-based approaches to simulate the use of an electronic medical record (EMR) or EHR in pharmacy programs. The tool could be utilized to provide foundational learning and skills development before students enter their experiential rotations.

ORAL PRESENTATIONS
OP11

An academic electronic medical record for pharmacy education

Richard Ng[1], Jason Min[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Goals: 1. Describe the development of the Academic EMR prototype 2. Discuss key findings of pharmacy student perceptions of the Academic EMR.

Description: Despite the widespread renewal of pharmacy education to entry-to-practice PharmD programs, the integration of key practice-driven technologies, including electronic medical records (EMRs), remain elusive in teaching and learning. In parallel, the use of complex and sophisticated systems continues to grow as our scope evolves, resulting in a growing disparity of student preparedness for future practice. Despite EMRs being a standard component of most institutional, interprofessional, and primary care practices, there is a paucity of shared knowledge related to the integration of EMRs in the academic setting. Previous attempts to integrate EMRs in pharmacy schools have been met by privacy and security issues, unjustifiable costs, and cumbersome utilization. This presentation will describe the development of the BC Academic EMR (aEMR) project, provide an interactive walkthrough of the prototype, and share the results of student usability testing and feedback.

Usability testing consisted of a 2-part, mixed methods study requiring students to complete a series of tasks in the aEMR prototype. These tasks included data retrieval and data entry to best simulate how pharmacists interact with an EMR. Student accuracy, speed, and "mouse clicks" were monitored and compared against benchmark scores. Students also ranked the aEMR on a standard usability scale and provided comments on what areas of the pharmacy program could benefit from the use of an aEMR.

Relevance to Pharmacy Education: The critical importance of EMR training and use in pharmacy education is highlighted by the AFPC Pharmacy Informatics Entry-to-Practice Competencies for Pharmacists in 2013, the inclusion of informatics in the 2018 Canadian Council for Accreditation of Pharmacy Programs standards, and the ongoing evolution of pharmacy practice leveraging EMR technologies. The use of an aEMR product in pharmacy education has great potential to enable and scale learning in many aspects of the curriculum including case-based learning, skills lab, and interprofessional learning.

OP12

Developing a novel interprofessional collaborative practicum

Jason Min[1], _Serena Quan_[1], _Larry Leung_[1]

[1]_Faculty of Pharmaceutical Sciences, University of British Columbia_

Goals: 1. Describe the development of the IPC practicum activities, learning objectives, and site information; 2. Describe the unique findings in onboarding, supporting, and collaborating with the non-pharmacist sites; 3. Share student and preceptor opinions relevant for future implementation.

Description: Interprofessional Education (IPE) is a critically important aspect of pharmacy programs and is a prominent component of pharmacy practice and accreditation standards. Despite the various creative attempts to provide students with meaningful IPE, challenges persist including: simulating an authentic patient environment, the disproportionate time and administrative burdens to coordinate IPE, and difficulties replicating the depth and complexities of interpersonal relationships in typical work settings.

To address these challenges, a novel interprofessional collaboration (IPC) experiential education practicum was developed as part of the elective practicum offerings for fourth year pharmacy students. The IPC practicum is a 4-week, non-direct patient care practicum where pharmacy students were paired with a non-pharmacist preceptor. Prior to the pilot offering, four new sites and preceptors were developed and onboarded representing medicine, nursing, chiropractic, and naturopathic doctors. Required learning activities were developed to maximize student immersion into the site and best support student safety and learning. Activities included the completion of an interprofessional-focused project, shadowing and participating in patient care within regulatory limits, and contributing to online peer discussions. Surveys, focus-groups, and online student discussion transcripts provided primarily qualitative data on student and preceptor opinions of the pilot.

This presentation will describe the development of the IPC practicum, share unique aspects of onboarding and supporting non-pharmacist sites and preceptors, and discuss surprising findings related to student support, isolation, advocacy, and leadership.

Relevance to Pharmacy Education: The growing importance of IPE in pharmacy education is underscored by the prominent reference in practice and accreditation standards. To address the complex issue of providing authentic and meaningful interprofessional experiences, this project created a novel practicum with non-pharmacist sites that has the potential to be replicated, scaled, and utilized across other programs.

OP13

Use of virtual interactive cases (VIC) in a 3rd year pharmacy skills lab for discharge medication reconciliation

Karen Cameron[1], _Naomi Steenhof_[1,2], _Cindy Natsheh_[1,2], _Erin Cicinelli_[1,2], _Gordon Tait_[2], _Miranda so_[1,2], _Henry Halapy_[1,3]

[1]_Leslie Dan Faculty of Pharmacy, University of Toronto;_ [2]_University Health Network, Toronto;_ [3]_Unity Health, Toronto_

Goals: This session is designed to show case the utility of Virtual Interactive Case (VIC) software in supporting a discharge medication reconciliation lab for third-year students.

Description: The VIC software is an innovative, interactive tool for creating simulated patient charts and patient and team encounters. VIC software was previously, successfully introduced into the second-year pharmacy skills lab to assist with information gathering skills.

Discharge medication reconciliation is an advanced skill that pharmacy students need to demonstrate in their experiential patient care rotations. Six VIC cases were developed for the third-year discharge medication reconciliation lab in the fall term of 2019. The cases were tested for appropriate difficulty level and clarity. In order to prepare students for the lab, a practice case with answer key was posted. Students completed a written feedback survey immediately post-lab.

Two hundred and twenty-five out of 241 students enrolled in the course participated in the lab. Two hundred and twenty students (98%) successfully used the VIC case to identify the correct discharge medication list and pass the lab. A post-lab questionnaire was completed by 203 (90%) of the participating students. The majority of students (64%) felt the allotted 20 minutes to review the case and identify the discharge medication list was not enough time. Most students (79%) agreed that the lab was a good experience and 64% agreed that the lab helped to prepare them for their hospital APPE rotations. No logistical concerns were noted by the course instructor in the running of the lab.

Relevance to Pharmacy Education: This experience highlights the successful use of VIC in a pharmacy skills lab to replace a patient chart and mimic patient and team encounters for teaching discharge medication reconciliation. These findings are applicable to other skills-based courses where patient charts and encounters are required.

ORAL PRESENTATIONS
OP14

Training for collaborative care: What are team expectations of pharmacy students?

Kerry Wilbur[1,2], _Tila Pelletier_[1,3]

[1]_Faculty of Pharmaceutical Sciences, University of British Columbia_, [2]_School of Health Professions Education, Maastricht University,_ [3]_Vancouver Coastal Health_

Background: Interprofessional education (IPE) is increasingly emphasized in health professional training as campuses throughout Canada are incorporating activities in their curriculum whereby students from two or more disciplines learn about, from, and with each other. However, high fidelity simulation and development of shared-care competencies are limited due in part to lack of representation from all consulting personnel. We know little about how fellow health professionals view our pharmacy students' collaborator roles in actual patient care settings.

Goals: As part of a larger study exploring multisource feedback in pharmacy workplace-based education, mixed-discipline members of an inpatient internal medicine team in a teaching hospital were interviewed.

Description: Dietitians (n=3), nurses (n=2), occupational therapists (n=2), physicians (n=4), and one social worker offered their expectations of learner competencies in collaboration. These respondents considered the performance of a student from their own profession as well as others training with their team, including pharmacy students. Interview audio-recordings were transcribed verbatim, verified, and subjected to content analysis by two independent researchers.

Team members generally held pharmacy students' contributions to care in high regard, but many admitted to little actual interaction with them. Collaborative students were accessible for drug information questions, even if they were often "on a computer". Physicians reported most consistent direct observation during bedside rounds where students were expected to actively contribute to decision-making and not simply serve as a passive resource. Interestingly, other professionals used this proximity to prescribers as an information bridge; team members, especially nurses, valued students who shared findings and rationale for patient care with them. In multidisciplinary discharge rounds, students helped facilitate safe patient transition from the unit by confirming medication regimens and treatment plans. Conversely, participants also expected students to recognize their roles and proactively consult in-person to inform their drug recommendations and monitoring. All professionals highlighted the important, but often overlooked, first step to effective collaboration - for students to introduce themselves.

Relevance to Pharmacy Education: Team members underscored how decisions they make for patient care is impacted by information possessed and shared by pharmacy students. However, workplace-based supervisors could further structure intentional interactions with other professionals to promote positive collaboration.

Interprofessional education in the PharmD program: Perspectives and lessons learned from UBC

Larry L. Leung[1], *Jason Min*[1]

[1]*Faculty of Pharmaceutical Sciences, University of British Columbia*

Goals: 1. Discuss key learning lessons in the development and implementation of the Interprofessional Education (IPE) program structure, integration strategies, and specific IPE activities. 2. Share faculty and student feedback of their experiences with the IPE program.

Description: The Faculty of Pharmaceutical Sciences' Entry-to-Practice PharmD Interprofessional Education (IPE) Program at the University of British Columbia has been developed and implemented over the past 6 years, offering many key lessons learned. This presentation will focus on the sharing of these perspectives in regards to the program structure, integration strategies, activity details, and student feedback.

IPE is a curricular theme at the Faculty, under the portfolio of the Office of Experiential Education and is led by IPE Leads. Our vision for IPE is to become leaders in a competency-based program that is integrated and collaborative, to support students in becoming effective interprofessional collaborators in patient care. IPE is spiraled in all four years of the program and involves an integrative approach with other health disciplines in developing the knowledge, skills, attitudes, and values required for collaboration. Students participate in IPE during regularly scheduled lecture- or lab- time, program enrichment activity days, and on experiential practicums.

The presenters will share their perspectives and process in building IPE, by discussing the following three program components and key examples: 1. program structure: curricular theme, IPE Leads, advisory committee; 2. integration strategies: embedded, non-embedded, and optional activities; and 3. activity details: shared integrated curricula, case-based learning.

Relevance to Pharmacy Education: Interprofessional Education is a key component of health programs across Canada, as knowledge, skills, behaviours, and attitudes developed through IPE will enable students to become interprofessional collaborative ready in the delivery of patient-centered care. This presentation will share the lessons learned from the perspective of IPE Leads at the Faculty of Pharmaceutical Sciences, UBC, that may serve as practical examples for faculties across Canada.

OP16

Popular student activities to support Indigenous health content

Larry L. Leung[1], Jason Min[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Goals: 1. Discuss key learning lessons in the development and implementation of student activities to support Indigenous health content. 2. Share student activity details, including individual design, set-up, assessment and student feedback.

Description: In response to the Truth and Reconciliation Commission of Canada Calls to Action and the United Nations Declaration on the Rights of Indigenous Peoples, pharmacy programs are striving to meet our responsibilities to increase Indigenous health learning opportunities. Development and delivery of meaningful activities that honour Indigenous ways of knowing and learning in a classroom setting can be challenging. Large student class sizes and lecture halls or classrooms not conducive to group discussions, present opportunities to innovate new pedagogical approaches to support student engagement with the content. This presentation will focus on the sharing of well-received examples of student activities co-developed with Indigenous community partners and experts that have been implemented in the Faculty of Pharmaceutical Sciences' Entry-to-Practice PharmD (E2P-PharmD) program.

In the E2P-PharmD program, students participate in mandatory Indigenous cultural safety and allyship content and have the option to further expand learning through an elective offering on Indigenous health. The presenters will share the following four examples of student activities that have been implemented in mandatory or elective course content: Indigenous book club, journal club, videoconference with rural and remote partners, and educational trips. The presenters will share the process, activity details, lessons learned, and student feedback from these activities. In this interactive session, participants will be encouraged to share ideas and ask questions throughout.

Relevance to Pharmacy Education: As pharmacy schools across Canada continue to integrate Indigenous health, cultural safety and allyship curricula, educators must decide on different modalities for presenting content and engaging student learners. This presentation will share student activities to support Indigenous health content and lessons learned as an example of different pedagogical approaches to engage students and support learning of Indigenous health content.

Lessons learned from implementation of an online social learning platform in pharmacy experiential education

Maria Zhang[1,2], _Karen Cameron_[1], _Sameera Toenjes_[1]

[1]_Leslie Dan Faculty of Pharmacy, University of Toronto,_ [2]_Centre for Addiction and Mental Health_

Goals: This session aims to support pharmacy educators across Canada in building upon lessons learned from the implementation of an online social learning platform in experiential education at the Leslie Dan Faculty of Pharmacy.

Description: With its ample flexibility, online peer assisted learning has been cited as a model with potential to drastically improve engagement amongst learners in higher education. Concurrently, data on isolation in pharmacy experiential education describes the need for support for students due to feelings of increased isolation when they in leave the classroom. Therefore, providing a social, online platform for interactive learning may increase student engagement while decreasing feelings of isolation. As part of their second-year experiential rotation, 240 pharmacy students submitted short audio or video reflections using a free, mobile application designed for social learning (FlipGrid). A quality improvement project was undertaken to explore the functionality of FlipGrid, its uptake by students, and its utility in supporting and measuring interactivity amongst students and faculty. This presentation will focus on the results from a two-part analysis: quantitative data and transcripts of the submissions extracted from FlipGrid and the results of an online survey distributed to students at the end of their rotation, which assessed their acceptance and utility of the platform.

Relevance to Pharmacy Education: Learners and educators are facing similar challenges across Canada – thoughtful utilization of technology, enhanced engagement between and with learners, and bridging classroom education with the real world. This session aims to generate ample discussion on these topics.

Creation of a practice-based network to support emergent pharmacy practice in Quebec Family Medicine Groups

Marie-Claude Vanier[1], Nicolas Dugré[1], Léonie Rouleau[1], Lyne Lalonde[1], Line Guénette[1], Anne Maheu[1]

[1]Faculté de pharmacie, Université de Montréal

Goals: 1. Describe creation of a practice-based network to support emergent pharmacy practice in family medicine groups. 2. showcase ways PharmD students can be involved in such projects.

Description: In 2015, Quebec Ministry of Health recognized pharmacists as one of the core professions to include in Quebec Family Medicine Groups (FMG). As a result, a large number of pharmacists recently engaged in this new practice and could potentially benefit from a practice-based network. A faculty-led project was initiated in 2018 to create and evaluate such a community.

A working group of nine pharmacists working in FMG was created in January 2018, as well as a committee of partners from key pharmacy organizations. Network first year activities allowed to identify 277 pharmacists working in FMGs, survey their practice and needs and publish a directory. The second year focused on creating practice tools in response to needs identified in the survey, such as, bi-monthly newsletters, mentorship program, knowledge transfer short evidence-based communications, starter kit and tools to promote the FMG pharmacist role. The third year will look at impact of network activities on its members.

Clerkship opportunities were offered to PharmD students. Two teams of five 4th year students worked with research team as part of their integration course requiring a 6 weeks team project. First team (spring 2018) worked on identification and survey of FMG pharmacists and creation of a directory. Second team (spring 2019) developed a starter kit including 10 steps to facilitate integration into an FMG and links to relevant documents. As part of a four-week optional clerkship, two 3rd year Pharm D students worked on two different presentations to describe and promote role of FMG pharmacists, a one-pager describing the role of FMG pharmacist and key references and websites.

Relevance to Pharmacy Education: This project is an explicit example of a multi-faceted successful participatory action research project, ingrained in the pharmacy practice community, with a great potential to support high quality pharmaceutical care in a new practice setting, and providing enriching experiences to undergraduate pharmacy students.

OP19

Humanizing patient case scenarios using the humanities

Marion Pearson[1], Tony Seet[1], Elizabeth Liu[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Goals: 1. To share health humanities resources and approaches to incorporating humanities elements into patient case scenarios. 2. To describe benefits and challenges of integrating humanities into a pharmacy curriculum. 3. To demonstrate a scholarly approach to an educational innovation.

Description: To deepen students' understanding of patients' illness experience, humanities elements were embedded in case scenarios deployed in PY1 skills labs. Original paintings were added to a lower back pain case scenario and an autobiographical essay was added to a glaucoma case scenario, with associated questions incorporated into facilitators' guides for the case discussions. Most students felt these embellishments were valuable, contributing to their understanding of the patients' concerns and their ability to empathize. A few students had strong negative reactions, finding the embellishments unengaging, artificial, and/or a poor alternative to interacting with actual patients. Students marginally preferred the essay to the paintings, and suggested other media, including poetry, music and video for future cases. Pharmacist facilitators indicated that students were reasonably engaged in discussions of the embellishments and that session flow was unaffected.

Relevance to Pharmacy Education: Hippocrates said, "It's more important to know what sort of person has a disease than to know what sort of disease a person has." However, patient case scenarios used in clinical learning activities typically focus on biomedical details and do not provide a holistic picture of the individual. Further, didactic curricula provide little contact with actual patients and students rarely have personal experience of the conditions and therapies they are learning about. Nevertheless, students are expected to demonstrate empathy and to provide pharmaceutical care responsive to patients' individual needs. Integration of the humanities into the pharmacy curriculum is a potential strategy to bridge these gaps.

OP20

Understanding how failure is productive

Naomi Steenhof[1,2], *Maria Mylopoulos*[2]*, Zubin Austin*[1]*, Nicole N Woods*[2]

[1]*Leslie Dan Faculty of Pharmacy University of Toronto,* [2]*The Wilson Centre*

Goals: To introduce participants to this controversy and describe an instructional design technique, productive failure (PF), which may prepare novice students to construct new knowledge in the future.

Description: John Dewey stated that "the origin of thinking is some perplexity, confusion, or doubt." In pharmacy education, uncertainty is not only present during initial learning, but continues as learners figure out how to solve clinical dilemmas. Many educators tend to use direct instruction (DI) methodologies which give learners the answer quickly, perhaps before they have begun to understand the problem. This tendency might short-circuit opportunities to think about the conceptual aspects of the problem. Counterintuitively, the process of struggling in the form of cognitive incongruity may be a critical trigger for facilitating the development of reasoning skills.

PF is an instructional approach that requires learners to struggle as they attempt to generate solutions to complex problems before receiving instruction. PF has been shown to prepare students for later learning of new, related knowledge. But why do instructional design strategies like PF work? Does the act of generating solutions build conceptual understanding? This study compared the effectiveness of PF with DI on a preparation for future learning assessment, immediately after learning and after a one-week delay.

Year one pharmacy students (N=42) were randomly assigned to a PF or DI learning condition. The problem of estimating renal function based on serum creatinine was described to participants in the PF learning condition, who were then asked to invent a solution. Participants in the DI condition learned about the same problem and were given as the Cockcroft-Gault formula. Immediately thereafter and also after a one-week delay, all participants completed a series of tests designed to assess acquisition, application, and preparation for future learning. Participants in the PF condition outperformed those in the DI condition, both on the immediate assessment, and after a one-week delay.

Relevance to Pharmacy Education: These results emphasize the crucial role of struggle and generation in learning. When preparing novice students to learn new knowledge in the future, generating solutions to problems prior to instruction may be more effective than direct instruction.

Helping pharmacy students use social media platforms professionally: The Pharmacy Digital Tattoo Project

Patricia Gerber[1], Alexandra Kuskowski[2,3], Kathleen Scheaffer[4], Lucas Wright[5], Salma Abumeeiz[6], Laura Atiyeh[1], Emily Fornwald[7], Ursula Ellis[8], Eseohe Ojo[1]

[1]UBC Faculty of Pharmaceutical Sciences; [2]UBC Chapman Learning Commons; [3]Irving K. Barber Learning Centre; [4]University of Toronto; [5]UBC Centre for Teaching, Learning, and Technology; [6]UBC School of Information; [7]UBC Education Library; [8]UBC Woodward Library

Background: Online communication tools and platforms for peer and professional connections are widely adopted by pharmacy students. Programs and professional standards, guidelines, and codes, emphasize the importance of using social media professionally. However, there are limited pedagogical tools and strategies to highlight the importance of making informed decisions about aligning digital identities with the expectations for pharmacists. This project was aimed at addressing that gap. Faculty, staff, librarians, and students collaborated to develop, implement, and evaluate a digital identity workshop for pharmacy students.

Goals: In this presentation we will share our innovation, experiences, and strategies to help support other health programs' efforts to enhance student development of professionalism in online platforms.

Description: We developed authentic case studies with companion questions and resources for use in a workshop focused on digital identity for 224 first-year PharmD students. A facilitator guide was also developed. The workshop engaged participants in discussions regarding privacy risks, exercising ownership over data distribution, the impact of ethically questionable behaviour on patient care, and the reputation of health professionals. The case studies, activities, and resources aimed to support students' confidence in aligning their *emerging* professional identities with their *existing* digital identity. Pre- and post-workshop assessments were deployed to measure students' ability to navigate this terrain.

Relevance to Pharmacy Education: This collaborative project involved wide consultation with pharmacists and pharmacy faculty from within and outside UBC. All materials were made publicly available using a Creative Commons CC-BY license for use by other faculties/schools of pharmacy in their efforts to enhance student professionalism, in particular, as it pertains to their presence in social media platforms.

A review of PharmD admissions processes: Current practices and considerations for improvements

Robert Renaud[1], Isabelle Lafleur[2], Gilles Leclerc[2], Anne Marie Whelan[3], Kerry Alcorn[4], Yvonne Shevchuk[4], Sarah Moroz[5], Jamie Kellar[6], Andrea Cameron[6], Ken Cor[7], Marion Pearson[8]

[1]College of Pharmacy-University of Manitoba, [2]Faculté of Pharmacie-Université de Montréal, [3]College of Pharmacy-Dalhousie University, [4]College of Pharmacy and Nutrition-University of Saskatchewan, [5]School of Pharmacy-University of Waterloo, [6]Leslie Dan Faculty of Pharmacy-University of Toronto, [7]Faculty of Pharmacy and Pharmaceutical Sciences-University of Alberta, [8]Faculty of Pharmaceutical Sciences-University of British Columbia

Background: Identifying the characteristics of applicants who will subsequently succeed in a PharmD program and after graduation, is an inherent challenge of the admissions process. Over the last decade, many Faculties of Pharmacy have increasingly explored the effectiveness of various predictors of students' success in their respective PharmD programs.

Goals: The goal of this presentation is to summarize the current admissions process in eight Canadian Faculties of Pharmacy and to explore possible evidence-based improvements.

Description: This presentation will include three parts. First, a brief summary of the admissions process in eight pharmacy programs across Canada. Second, a highlight of admission factors that best predict success in the PharmD programs. Finally, recommendations for future consideration.

Relevance to Pharmacy Education: The main objective of the admissions process is to help maximize the percentage of accepted students who will subsequently succeed in the PharmD program. Admitting students who are more likely to have difficulty in the program can lead to various negative effects for both the program (e.g., significant amount of professor-directed remediation) and student (e.g., decreased self-efficacy). This presentation promises to stimulate discussion around best practices in the admissions process.

Using automatic item generation methodology to create multiple-choice questions appropriate for entry to pharmacy practice assessment

Tara Leslie[1], Mark Gierl[2],

[1]_Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta;_ [2]_Faculty of Education, Department of Educational Psychology, University of Alberta_

Goals: Computer-based testing (CBT) using multiple-choice questions (MCQs) is an efficient method of assessing higher-order knowledge of a large body of content for numerous examination candidates in multiple locations. However, summative assessments, such as those required prior to pharmacy licensing, require a large item bank of quality test items to avoid item over-exposure. Automatic item generation (AIG) uses models and computer technology to create a large item bank efficiently and cost-effectively. This presentation will demonstrate the AIG process and discuss the substantial benefits this methodology can provide.

Description: AIG methodology was employed to generate 15,000 MCQs related to assessment and management of nausea and/or vomiting (N/V); a topic highly relevant to pharmacy practice and appropriate for the PEBC MCQ exam. The AIG multistep process involved:
   1) developing a cognitive model – a visual illustration of the knowledge required to assess a patient with N/V and provide an appropriate recommendation
   2) creating an item model – an MCQ scaffold with strategically placed variables and an algorithm to populate variables with cognitive model elements
   3) systematic distractor generation – a process to ensure plausible distractors populate item options
   4) automatic generation – application of computer technology to generate items based on algorithms informed by the item model.

A sample of the generated N/V items satisfy content-related validity requirements and stand as high quality when critiqued against established guidelines.

Relevance to Pharmacy Education: AIG methodology is a promising strategy to improve efficiency, access, and cost-effectiveness of summative MCQ examinations. This exciting advancement is being operationalized in other health care disciplines, such as medicine, and its utility in pharmacy is compelling. An overview of how AIG methods created high-quality items related to assessment and management of N/V will provide foundational knowledge on this multi-step process and an awareness of the probable approach to future summative pharmacy assessments.

OP24

Clinical decision-making: What can we learn from indecisive students?

Theresa Charrois[1]

[1]*Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta*

Background: Clinical decision-making (CDM), a necessary skill for pharmacists, is dependent on many internal, external, and contextual factors. These factors need to be considered when investigating hesitancy and uncertainty in CDM by pharmacy students as we prepare them for future practice. This session will describe a study, from a social constructivist paradigm and using a case study approach, that investigates the hesitancy of CDM in pharmacy students at the University of Alberta.

Goals: The primary objective of the session will be to discuss how the results of the investigation of CDM hesitancy of pharmacy students can be used to develop educational activities to assist students in overcoming hesitancy and uncertainty.

Description: Students selected through a purposeful sampling method were invited to participate. Students engaged in a simulated interaction with a standardized patient with a scenario that was meant to lead to uncertainty with no true right or wrong answer. Post-interaction, the researcher used stimulated recall with a video-recording of the interaction to investigate when uncertainty that occurred during the interaction. In addition, participants completed a written reflection one-week post-interview. Data analysis was done initially using inclusive coding, followed by pattern identification, and the discovery of inter-relationship of themes and across participants.

Currently seven participants have completed the study. CDM in students was influenced by experiences both in the undergraduate program and in their employment. Students described having to be 'comfortable' before making a decision, and their comfort level was influenced by mentorship, negative experiences with physicians, fear of risk, and the acuity of the situation. Student participants did describe needing to defer to other decision-makers when they felt uncomfortable with an obvious solution and also noted the disconnect between what they learned and practiced in their formal education versus what they saw happening in real practice. Initial planning for educational activities to target these identified areas are ongoing.

Relevance to Pharmacy Education: By helping students learn to overcome hesitancy in CDM, they will be more prepared upon graduation for their ever-expanding roles and scope of practice.

OP25

Integrating public's views, experiences, and expectations of community pharmacy services into pharmacy education

Theresa Schindel[1], Christine Hughes[1], Tatiana Makhinova[1], Jason Daniels[2]

[1]*Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta;* [2]*University of Alberta, Community University Partnership, Faculty of Extension*

Goals: Research points to low public awareness and utilization of expanded community pharmacy services. The goals of this oral presentation are to (1) present research on the public's views, experiences, and expectations of community pharmacy services in a context of changing pharmacy practice and expanded scope of practice and (2) explore how research on public's perspectives can be integrated into pharmacy education.

Description: A total of 15 focus group interviews were held with 74 members of the public, representing patients and non-patients, in 11 locations in and around Edmonton, Alberta. Participants were recruited through posters in public places, social media, and membership with community organizations. Data were recorded and transcribed verbatim, anonymized, and analyzed using an inductive constant comparison technique. The study design followed the Qualitative Description methodology. The study was approved by the University of Alberta Research Ethics Board. Participants viewed community pharmacy services as accessible, changing, and collaborative. Participants were most familiar with traditional pharmacy services related to products and prescription services. Experiences with extended services, such as prescribing and immunizations, were acknowledged by some participants. However, other participants were not aware of pharmacists' extended roles or services. Expectations for having pharmacists more involved in their care, spending more time with them, sharing information, and teamwork were linked to participants' awareness of community pharmacy services, prior experiences, and health care needs. Participants also expected an environment that is professional, welcoming, and private.

Relevance to Pharmacy Education: Understanding how the public views community pharmacy services as well as their experiences and expectations can inform the development and delivery of pharmacy education. Findings relevant to the practice context can be integrated into instructional material for classroom and simulated environments for laboratory settings. Students' understanding of community pharmacy services from the public's perspective will further support their experiential learning and entry to practice.

PE01

An evaluation of physical assessment teaching in entry-to-practice PharmD programs in faculties of pharmacy across Canada

Aileen Mira[1], Tony Seet[1], Jane Xia[1], Serena Quan[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Background: The Association of Faculties of Pharmacy of Canada (AFPC) recommends that Entry-to-Practice (E2P) PharmD Programs should emphasize skills that enhance the pharmacist's role to optimize patient outcomes. In order to achieve this and to accommodate the pharmacists' expanding scope of practice, it is necessary for the training of E2P PharmD pharmacists to include developing more advanced physical assessment skills.

Objectives: To survey the current physical assessment curriculum among Canadian pharmacy schools with the intent of sharing resources and experiences to further develop physical assessment teaching.

Methods: An environmental scan was completed to identify the Canadian pharmacy schools and faculty members involved in physical assessment teaching. Next, a literature search was conducted to gather information on physical assessment teaching in E2P PharmD programs in North America. A twelve-question survey was created and sent to the appropriate faculty members of each Canadian pharmacy school to gather information about their physical assessment key courses, teaching modalities, and assessment.

Results: Nine of the ten Canadian pharmacy schools responded to the physical assessment survey (response rate = 90%; 8 complete and 1 partial response). Eight of the nine schools (89%) teach physical assessment in both lectures and skills lab. Most schools teach physical assessment in year 2 and/or 3. Vital signs measurement, dermatological, psychiatric, respiratory, and pain assessment are the most commonly taught physical assessment topics, and these skills are assessed mainly via written tests and/or practical examination of technique. The majority of physical assessment teaching is done by pharmacists, but some programs also utilize nurses, nurse practitioners and physicians.

Conclusions: This survey of physical assessment teaching in Canadian pharmacy schools is important as there is limited published Canadian data. As the physical assessment teaching needs of each pharmacy program are likely to be similar, it would be advantageous for Canadian schools to combine their resources and experiences to better address this growing need.

Mapping course assessments to AFPC Educational Outcomes to enhance teaching and assessments

Aleksandra Bjelajac Mejia[1], _Lachmi Singh[1]_, _Jacqueline Flank[1]_

[1]Leslie Dan Faculty of Pharmacy, University of Toronto

Background: The PharmD Program, LDFP, is designed to meet the Association of Faculties of Pharmacy of Canada (AFPC) Educational Outcomes (EOs) for First Professional Degree Programs. These EOs set our curricular priorities and provide the basis for curriculum design. EOs are underpinned by key and enabling competencies (KECs).

Objectives: We set out to verify whether course assessments, in the Preparation for Advanced Pharmacy Practice Experience (APPE) course, measure the achievement of KECs. The study main objectives were to determine if course assessments map to AFPC EOs including the level (Introductory, Reinforces, Producing Proficiency) of achievement and if students met all expected educational outcomes as a measure of practice readiness.

Methods: Study researchers mapped all course assessments to the KECs. Competencies were considered achieved if at least one KEC was mapped. Where no KECs were mapped, assessments were evaluated to determine if EOs were addressed overall. Primary and secondary roles were determined based on the number of KECs mapped. Discrepancies were decided by consensus. De-identified student marks were analyzed.

Results: The study found that Care Provider, Collaborator and Communicator were predominant in the assessment map. With the exception of Leader-Manager (LM) LM1, LM3, and LM4, all key competencies mapped to at least one assessment. Professional (PR) and (LM) roles were challenging to map, as they were not explicitly assessed. Thirty-eight of 233 students did not pass 1 of 6 assessments. Four of these students did not pass 2 of 6 assessments. All students passed the course with average grades for assessments ranging from B to A+. We identified a trend towards improvement in grades and less failed assessments with completion of more assessments (1-5).

Conclusions: At a course level, mapping assessments to AFPC EOs is an essential step to demonstrate direct evidence of achievement of the intended learning outcomes. It is important to create multiple opportunities within a course for students to demonstrate achievement of competencies, and ensure that every student demonstrates practice readiness.

Taking stock: Mapping all course assessments in years 1-4 of an entry-to-practice PharmD program to contribute to curricular renewal.

Aleksandra Bjelajac Mejia[1], Wendy Chen[1], Lachmi Singh[1], Gajan Sivakumaran[1]

[1] Leslie Dan Faculty of Pharmacy, University of Toronto

Objectives: The PharmD program, consists of lectures, workshops, small groups, laboratory-based and simulated practice activities, and experiential courses. Students experience formative and summative assessments throughout the curriculum (e.g., exams, quizzes, laboratory simulations, written assignments, and workshops). Taking a comprehensive look across the program, we set out to map course assessments in Years 1-4 to evaluate the assessment complement. Our objective was to determine the types and frequency of assessments for all courses in the program to inform curricular review and renewal.

Methods: From course outlines, we collected a mix of qualitative and quantitative data about assessment methods and schedules for all courses offered across all four years of the program during the 2018-2019 academic year. We consulted the Faculty calendar, course annual reports, students and instructors in the case of missing data. Data were organized into separate spreadsheets and graphs based on year/term of study and type of assessment.

Results: Overall, the weekly frequency of assessments was steady throughout each term of years one and two of the curriculum. In the first two years, laboratory and workshops constituted the majority of the assessment types. The total number of assessments increased each term, with the highest frequency in the Year 2 winter term. In Year 3, students have elective and selective course choices leading to varied assessment types. In these courses, there are more written assignments as compared to previous years. Data from experiential courses in first, second and fourth years were considered separately due to their unique practice-based assessment and variable scheduling.

Conclusions: This descriptive analysis revealed important assessment trends across the program, namely a high volume and frequency of assessments in the PharmD program. Further, this study revealed that perhaps there is a need for more varied assessment types in Years 1 and 2. This study will support evidence-informed decision-making in our planned curricular review and renewal.

PE04

Implementing an education focused lunch and learn with students on academic teaching rotations and faculty within an E2P Doctor of Pharmacy program

Ali Reza A Ladak[1], _Aileen V. Mira_[1], _Tony T. Seet_[1], _Jane Xia_[1]

[1]_Faculty of Pharmaceutical Sciences, University of British Columbia_

Background: Integration Activity (IA) instructors at the UBC Faculty of Pharmaceutical Sciences teach the practice skills lab, tutorial, and case-based learning component of the curriculum. In addition to teaching, the IA team also precepts fourth year entry-to-practice PharmD students and BC Pharmacy Residents taking an academic teaching rotation (ATR). Within the ATR, a lunch and learn activity was revised to focus on pedagogy and create a community of practice (CoP).

Objectives: To describe the implementation and evaluation of a pharmacy education focused lunch and learn activity.

Methods: While some lunch and learn sessions were arranged in prior iterations of the ATR: presentations primarily focused on clinical topics. Revised lunch and learn sessions were regularly scheduled and students were given an opportunity to observe one session before being asked to present. At the end of term, a 5-question follow-up survey was administered to attendees to gather both quantitative and qualitative data on the sessions' strengths and opportunities.

Results: In the 2019 academic year, thirty-two presentations were conducted over nineteen separate sessions. Presentation topics included: curriculum design, providing feedback, growth mindset, student evaluations of teaching, gamification, academic integrity, etc. All respondents (n=15) agreed that lunch and learn activities were an effective learning tool. Survey participants stated that the session benefits included providing students an opportunity to improve their presentation skills, providing a forum to discuss new ideas in teaching and learning, fostering a community of practice, and developing student interest for a career in academia. Opportunities include adjusting the schedule to permit increased faculty attendance.

Conclusions: The purpose of this activity was to help students and faculty reflect and improve their teaching practice in a scholarly manner. Future iterations will focus leveraging these sessions to grow a vibrant community of practice including the IA team and other faculty.

PE05

Industrial pharmacy residency program: Survey of residents 2016-2019

Andrea Cameron[1], Ida Kircanski[1], Tiana Tilli[1], Certina Ho[1]

[1]_Leslie Dan Faculty of Pharmacy, University of Toronto_

Objectives: The University of Toronto Industrial Pharmacy Residency Program, initiated over 30 years ago, is the only such program in Canada. Collaborating with ten pharmaceutical companies, the program provides a 12-month paid experience for recently graduated pharmacists. A survey was conducted to gather recent past residents' perspectives as part of ongoing quality assurance efforts.

Methods: Survey questions were developed by the Residency Coordinator, a recent past industrial resident, and a recent past institutional resident, based on their experiences with residency programs. Some questions were adapted from a past survey of industrial residents and from consultation with the Dean and faculty members who serve as residency liaisons. Domains of questions included: Support, Skill Development, Career Path, and Overall Experience. Questions primarily utilized a 5-point Likert scale, with additional free-text comments. The survey was disseminated via e-mail on February 3, 2019, to residents from 2016-2018, and, with minor revisions, on November 27, 2019 to residents from 2018-2019. Excel was used to analyze quantitative data, while thematic analysis was used for free-text responses. The survey was exempted from ethics review as it was related to quality assurance of the program.

Results: Survey response rate was 19 of 50 residents (38%). In terms of support, 89% of respondents agreed or strongly agreed their company supervisor provided support/guidance, while 47% of respondents agreed or strongly agreed their faculty liaison was a valuable resource. With respect to skill development, 95%, 89%, and 89% of respondents agreed or strongly agreed they developed project management, oral presentation, and knowledge translation skills respectively, while 74% and 72% agreed or strongly agreed they developed critical appraisal and research skills respectively. Themes highlighted residency benefits in terms of career advancement and networking, and opportunities for program improvement regarding structure and standardization.

Conclusions: The survey of recent past industrial pharmacy residents confirmed the perceived value of the program related to skill and career development. Results will enable program administrators to adjust certain aspects for improved quality.

Deprescribing guidelines: Usefulness of an interactive mobile application

Barbara Farrell[1], Roland Grad[2], Emily Reeve[3], Pam Howell[1], Tammie Quast[1]

[1]Bruyère Research Institute, Ottawa, Canada; [2]McGill University, Montreal, Canada; [3]University of South Australia, Adelaide

Background: Evidence-based deprescribing guidelines and accompanying decision-support tools can be used by health care providers (HCP) to help decide when and how to reduce medications. New guideline adoption takes time; innovative methods for knowledge mobilization are needed. A new channel was developed on the IAM Medical Guidelines (iAM) app to raise awareness and enhance 'point-of-care' access to Deprescribing Guideline algorithms and published guideline content.

Objectives_:_ Examine app reach and adoption; from the user perspective, determine self-reported clinical relevance, cognitive impact, use and expected patient health benefits of the information provided.

Methods: App analytics to determine downloads and pageviews; linked to pageviews in the app, users were invited to complete a brief survey - the IAM Questionnaire (IAM-v2014 for Clinicians), providing descriptive data on cognitive impact, relevance to practice, application to patient care, anticipated benefits of the information and demographics. There were no participant inclusion or exclusion criteria.

Results: The Deprescribing Channel was downloaded 3,256 times during the study period (March 2 – November 30, 2019); total pageviews were highest for the proton pump inhibitor guideline. Thirty-seven surveys were completed (15 physicians, 13 pharmacists, 2 nurses and 7 others) by 34 users. Respondents reported that they learned something new (22), were motivated to learn more (22) or confirmed their actions were correct (19) as a result of the information in the app. Thirty-two respondents indicated the information was partially or totally relevant for at least one of their patients.

Conclusions: The utilization of an app as a medium for deprescribing guideline uptake is a novel approach intended to make it easier for HCPs to access guidelines at the point-of-care. Use of the IAM Questionnaire helps developers understand the value of the guidelines and the medium being used for delivery. Options for enhancing survey completion will be discussed.

PE07

Experiential learning in undergraduate pharmacy curriculum: A case study of co-operative experience of pharmacy students

Certina Ho[1]

[1]*Leslie Dan Faculty of Pharmacy, University of Toronto*

Objectives: To explore the co-operative (co-op) experience of undergraduate pharmacy students at the University of Waterloo School of Pharmacy with a focus on its influence on the students' professional and personal development.

Methods: A qualitative research methodology using semi-structured interviews and focus groups was conducted over a four-month period. We applied the Kolb's four-stage experiential learning cycle: (1) experience; (2) reflection on experience; (3) theory and abstract concepts; and (4) practice and testing of concepts as the theoretical framework for this study. Thematic analysis was performed to the interview and focus group data.

Results: We conducted semi-structured interviews with 19 pharmacy students from the first graduating class in the co-op program and 12 co-op employers; as well as two focus groups with 12 faculty members at the school. The impact of experiential learning on the professional and personal development of undergraduate pharmacy students during their co-op experiences was multi-dimensional. While students believed that they gained self-confidence and achieved self-discovery and career-related discovery after their co-op placements, their professional and personal development could be driven by their own motivation and personality. Co-op employers and co-op sites played a vital role in influencing students' individual development. Despite the unstructured nature of co-op, it was evident that co-op offered students the opportunity to explore the diversity of the pharmacy profession.

Conclusions: Our findings suggested that students should take ownership of their learning; and faculty should support students' learning by facilitating teaching moments at school to reinforce and re-align the knowledge and skills acquired in class and those gained through real-world practice. We propose a model of co-op experience integrated in the four stages of Kolb's experiential learning cycle. A hybrid of both structured and unstructured experiential learning for pharmacy students is likely the preferred curricular model.

Non direct patient care advanced pharmacy practice experience: An essential component of experiential learning

Certina Ho[1], Marvin James[1], Francine Phillips-Sheldon[1], Grace Pong[1]

[1]_Leslie Dan Faculty of Pharmacy, University of Toronto_

Objectives: The University of Toronto Leslie Dan Faculty of Pharmacy Advanced Pharmacy Practice Experience (APPE) program has been offering students with non-direct patient care (NDPC) elective rotations since 2015. These rotations provide a unique perspective on how pharmacists are positioned to contribute to patient care through Administration/Management/Leadership, Clinical Trials/Investigational Pharmacy Services, Drug/Medical Information, Drug Use Evaluation/Review, Education, International/Global Health Initiatives, Projects, and Research. The objective of this project is to share our experience in recruitment and engagement of APPE NDPC experiential sites and preceptors, as well as supporting and monitoring our students in these elective rotations.

Methods: We developed guiding principles for recruiting, scheduling, and providing academic support to students and preceptors who are engaged in APPE NDPC elective rotations.

Results: We expanded our APPE program with a 22% increase in NDPC rotations from 292 rotations in 2015/2016 to 356 rotations in the 2019/2020 academic year. Between 2015 and 2020, a total of 1113 students and 337 preceptors were engaged in 1720 APPE NDPC rotations, of which 95% took place in Ontario, 2% in other provinces of Canada, and 3% internationally. Most of these rotations offered students with the opportunity to lead and manage projects, research, and educational initiatives, as well as being involved in pharmacy management and administration. Exposing and engaging students in NDPC experiential experiences contributed to the development of their communication, inter-professional collaboration, and project management skills.

Conclusions: Experiential learning makes up more than 25% of our four-year PharmD curriculum. Our experience in developing and expanding our APPE NDPC rotations over the past five years may encourage others to consider applying these principles and expand their APPE program beyond the traditional institutional and community practice settings. With an increased interest and uptake of APPE NDPC elective rotations by pharmacy students, we were able to optimize experiential learning outside of the direct patient care realm.

PE09

Student-created videos for inter-disciplinary teaching and learning

Courtney Quiring[1]

[1]College of Pharmacy and Nutrition, University of Saskatchewan

Objectives: Inter-professional education begins with understanding the roles of others, but rarely do we venture beyond broad responsibilities of team members. Further, inter-professional educational activities are challenging to coordinate; class size differences, physical distance, time restraints, and different assessment philosophies can discourage inter-professional activities from becoming a reality. This project combines four disciplines (nursing (300), pharmacy (83), nutrition (27), and pharmacy technicians (~10)) from two institutions across the province of Saskatchewan in order for the students to teach each other pre-determined learning objectives about their own profession through video.

Methods: The overarching theme of the project is intravenous patient care, and the learning objectives were identified upon consultation with faculty as gaps in knowledge either within their respective program or in practice. Students were grouped and instructed to teach, through video, a simple learning objective relevant to their own profession's role. Students were assessed as a group and individually. They were given the rubric with which the video would be graded. Once all submissions were received, they were categorized and embedded into Top Hat, where students could see other videos and individually answer multiple choice questions related to each learning objective for all disciplines.

Results: There were a total of 22 learning objectives (10 nursing, 5 pharmacy, 6 nutrition, 1 pharmacy technician) taught through student-created videos. All groups were able to complete their videos despite the disruption of COVID-19 with an extended due date for the project. Due to timing and technological constraints pharmacy technicians were unable to participate in the Top Hat portion. Each participating program assessed the students differently. The average score on the nursing videos (group assessment) was 98% and the average score from nursing multiple-choice questions (individual assessment) was 93%. Evaluation beyond unprompted emailed comments and end of year assessments of the project was abandoned in consideration of the student's time and energy. However, it is important to note that both students and instructor reported a positive effect of these videos on mental health during a particularly distressing time.

Conclusions: The timing and organization of this project is timely as we inevitably move to online practices to support teaching and learning. Further development of this project will include more robust assessment and evaluation, and exploration of software to use for more efficient processes. While the creativity demonstrated by students was not unexpected, the level of skill and the impact of it was. Students are in general more fluent in and comfortable with technology than instructors, and projects that take advantage of this fact and therefore lessen the pressure on the instructor should be explored.

SoTL capacity-building at UBC: An internal ethics vetting guide

Simon Albon[1], Franklin Hu[1]

[1]University of British Columbia, Faculty of Pharmaceutical Sciences

Objectives: As the Scholarship of Teaching and Learning (SoTL) gains traction and legitimacy in academic pharmacy at UBC, ensuring ethical research practices where human subjects are involved is imperative. Although Canada's Tri-council Policy Statement outlines ethical conduct of research involving humans, at UBC, the Behavioural Research Ethics Board (BREB) is responsible for safeguarding the conduct of SoTL research through formal ethics application and review. However, due to the low-risk nature of much SoTL research, the BREB does not require formal ethics review for all projects, and despite the availability of guidance notes, there remains uncertainty and confusion about whether a formal BREB application and review is warranted. To address this issue, an ethics vetting guide was created to help pharmacy educators better understand the criteria and necessity for formal BREB review.

Methods: The guide was developed over the 2019W Term 1 academic session by identifying and reviewing relevant ethics guidance documents available at UBC along with associated scholarly literature. With input from UBC's Office of Research Ethics (ORE), Centre for Teaching Learning and Technology, Centre for Health Education Scholarship and pharmacy educators the final document was created through an iterative process of drafting and redrafting.

Results: Creating the ethics vetting guide was surprisingly challenging. The end product includes: 1) a four-step decision-making process delineating the need for formal ethics application and review; 2) a descriptive framework and Tri-council definitions outlining the difference between research and quality assurance/improvement studies as a crucial step in the decision-making process; 3) a review of key principles required for the ethical conduct of SoTL research, and; 4) an appendix of examples showing how the guide can be applied. A lack of understanding about what constitutes SoTL research confounded the development process.

Conclusions: This ethics vetting guide is anticipated to streamline and clarify the SoTL research process for pharmacy educators at UBC and may support SoTL capacity-building amongst emerging pharmacy education scholars nationally.

PE11

Student perceptions and use of videos and podcasts for a first-year pharmacy communication course

François P Turgeon[1]

[1]Chargé de cours, Faculté de Pharmacie, Université de Montréal

Objectives: To evaluate the student's perception of different self-learning methods and identify how students use them during their first-year course of communication in pharmacy.

Methods: Student's perception was compiled by an 8 questions survey voluntarily filled by them at the end of the session. The information about how the students listen to the video classes was extracted from the YouTube statistics of the channel.

Results: 41.7% of the students answered the survey. Regarding the learning quality, 93.7% of them considered the self-learning lessons to be similar or better than a class in person, and 66.3% find them to be more practical. Students find the self-learning class user friendly, with 3.8% reporting difficulties using the podcast and none reporting difficulties watching the videos. When asked what type of self-learning class the student preferred, the video was preferred over the podcast.

A majority of the video classes were viewed on the computer (93.4% of the total) and the moments with the highest views were the days before the application of those concepts in skills laboratory. It is also highly possible that some students didn't listen to the videos, but the statistics about that are unclear. Lastly, 4.1% of the videos were viewed with the subtitles on.

Conclusions: Students seem to consider the use of video and podcast as a teaching method as useful as an in-person class, but to be more practical. Video seemed to be preferred over the podcast for a majority of them. While I was presuming that a lot of students would use their mobile device to listen to the videos, they mainly use their personal computer, probably to take notes at the same time.

Students' assessment during skill labs: Spotlight on the rater effect

Gilles Leclerc[1], Marie-Josee Cadieux[1], Alexandre Chadi[1], Isabelle Lafleur[1], Stéphanie Lamoureux[1], Francis Richard[1], François P. Turgeon[1], Nathalie Letarte[1,2], Ema Ferreira[1,3]

[1]_Faculté de pharmacie, Université de Montréal;_ [2]_Centre hospitalier de l'Université de Montréal (CHUM);_ [3]_CHU Ste-Justine_

Objectives: Fairness of skill lab performance assessment has been called into question by students. Differences in raters' leniency/severity levels were put forward as an ongoing argument in support of this claim. This study intends to confirm or deny the presence of a _rater effect_ in skill labs performance ratings.

Methods: During skill labs, pharmacy students' performances are observed by trained pharmacists. At the end of the semester, student overall performances are rated through a six dimensions global rating scale. The score of this assessment account for 50% of the skill lab final grade. Five years (2015-2019) of ratings were compiled. Mean rating and standard deviation were calculated for each rater. For each course, raters were compared one on one and effect size (Cohen's d) calculated using respective mean ratings and standard deviations. An overall effect size was determined for each course and rater over that period. These measures were translated into number needed to treat statistics and simulations were run to estimate the impact of changing raters on student grades.

Results: A rater effect was observed and ranges from medium (PHA2310=0,54; PHA1311=0,71) to large (PHA3310=0,82). According to the number needed to treat statistics (PHA1311=4,1; PHA2310=5,5; PHA3310=3,4), the likelihood that assigning a student to another rater would have affected the student's score is important (PHA2310=64,8%; PHA1310=69,1%; PHA3310=71,9%). We could estimate that overall performance ratings could be different (higher or lower) for up to 18-29% of students per course. Assigning the lowest performer to the most lenient rater could lead to a 3,75% (PHA1311), 15,5% (PHA2310), 5,7% (PHA3310) increase in grade.

Conclusions: The rater effect appears to affect the overall skill lab performance assessment. Such effect, its causes and impact must be further described in order to make proper and efficient adjustments to the skill lab assessment process.

PE13

Université de Montréal competency framework: From design to implementation

Gilles Leclerc[1], Isabelle Lafleur[1], Isabelle Boisclair[1], Nathalie Letarte[1,2], Ema Ferreira[1,3], Anne-Julie Frenette[1,4], David Williamson[1,4]

[1]Faculté de pharmacie, Université de Montréal; [2]Centre hospitalier de l'Université de Montréal (CHUM); [3]CHU Ste-Justine; [4]Hôpital du Sacré-Coeur de Montréal

Objectives: Following the release of AFPC updated educational outcomes, the Faculty of pharmacy of Université de Montréal reviewed its competency framework and further expanded its focus on the developmental nature of the competencies. The main objectives of this new framework were to standardize the approach in our three programs leading to pharmacy practice (Doctor of Pharmacy, International pharmacist bridging program and Pharmacy Residency) and strengthen competency-based approaches in these programs.

Methods: A taskforce overviewed and updated the previous competency framework. This taskforce took into account major comments addressed by faculty members and preceptors concerning the previous framework. Faculty members, program directors and staff commented the new framework prior to the official presentation to faculty instances and regulatory authorities.

Results: The new framework shows alignment with AFPC educational outcomes, NAPRA professional competencies and provincial regulatory standards. Guidelines for competency development and professional milestones are the main additions to the framework. It also proposes a new method of following and regulating students' success and progression. A workshop at the faculty annual retreat led to the identification of concerns and challenges for the implementation of this new framework. So far, the different programs undertook separated educational initiatives. However, considering the resources available, a need to prioritize those initiatives emerged.

Conclusions: Even though the new framework implantation is upcoming, such a major shift in educational practices requires overcoming resistance to change. Sufficient resources must be available to support simultaneously faculty development and transformation. Evidences supporting the benefits of the competency-based approach towards improvement of student professional development will foster academic leadership and faculty support.

Université de Montréal international pharmacy bridging program: A program evaluation process

Gilles Leclerc[1], <u>Isabelle Boisclair[1]</u>, Isabelle Lafleur[1], Anick Minville[2], Ema Ferreira[1,3]

[1]Faculté de pharmacie, Université de Montréal; [2]Ordre des pharmaciens du Québec; [3]CHU Ste-Justine

Objectives: In Quebec each year, an average of 150 international pharmacy graduates (IPG) become registered pharmacists. Thirty (30) of them complete the bridging program delivered by the Faculty of Pharmacy of Université de Montreal (QeP). In the fall 2019, this program admitted its 9th cohort. The bridging program was audited in 2016. This presentation will outline the program evaluation process, the program action plan, and the actions taken up to now to enforce it.

Methods: A program evaluation committee was created to complete a full review of the program. During this process, faculty members, preceptors, staff, QeP students and graduates and regulatory authorities were consulted. The evaluation committee produced a report that was submitted for internal review. An on-site visit with external auditors was then hosted. Based on the report and on the external auditors' comments, final recommendations were issued by the Educational Quality Improvement Office (Bureau de la Promotion de la Qualité – BPQ) of Université de Montreal.

Results: The BPQ recommendations underlined the program strengths and opportunities. The quality of the program was recognized, however several areas of improvement were reported; mainly: 1) ensuring that the QeP is turned into a competency-based program; 2) reviewing the structure of the program to improve learning and student learning experience. To act upon these recommendations, an internal taskforce was mandated to elaborate an action plan. During this process all important stakeholders were consulted notably through a program retreat in the fall of 2019. Furthermore, a pedagogic consultant was hired with a ministère de l'Éducation et de l'Enseignement supérieur du Québec grant to implement the action plan and to manage the program reform project.

Conclusions: The program evaluation led to a reform process that should be completed by 2021. The reformed program's first admissions are expected for 2022. Faculty members and preceptors will need to be trained further in competency-based teaching and learning approaches as well as on cultural competencies.

Self-care and minor/common ailment education across Canadian pharmacy schools: Curriculum survey findings

Hiba Abdul-Fattah[1], Jeff Taylor[2], Emily Black[3], Nardine Nakhla[1]

[1]School of Pharmacy, University of Waterloo; [2]College of Pharmacy and Nutrition, University of Saskatchewan; [3]College of Pharmacy, Dalhousie University

Objectives: To strengthen our current understanding of the quantity and quality of self-care (including non-prescription medications) and minor/common ailment instruction across Canadian pharmacy schools.

Methods: A national curriculum survey was conducted in 2019. Adapted from a similar survey administered across American pharmacy schools, this survey sought to address the status of instruction in self-care and minor/common ailments across pharmacy programs nationally. The survey was completed by one faculty member at each Canadian pharmacy institution. Participants were identified by their representation on the Association of Faculties of Pharmacy of Canada (AFPC) self-care therapeutics and minor ailments (SCTMA) special interest group (SIG).

Results: We received responses from all 10 pharmacy schools. The hours devoted to self-care education varies considerably, as does course content, areas of integration for self-care topics, and teaching methods. The number of contact hours spent with students on required and elective self-care education focused on non-prescription drug therapy ranges from 13 to 91 hours, and 26 to 32 hours, respectively. Only 5 schools offer one or more required standalone course(s) in non-prescription drug therapy, and only 2 schools offer an elective standalone course. While all schools instruct on natural health products, only 3 schools agree that they do so adequately when the content is integrated in the curriculum. Self-care curricula are overseen by a designated instructor/lead faculty in 6 schools.

Conclusions: Self-care and minor/common ailment education in Canada varies and is integrated in various ways depending on the school and its faculty members, and pharmacist scope per jurisdiction. Our results will help to inform what constitutes an ideal self-care curriculum, including core content and hours, and methods of teaching and integration. The AFPC SCTMA SIG will re-administer the survey in three years to reassess for any changes to self-care education, and will continue discussing strategies for improving teaching in this area, including the development of national teaching and assessment tools.

PE16

Institutional program evaluation: The baccalaureate in biopharmaceutical sciences' adventure

Isabelle Lafleur[1], Ema Ferreira[1,2], Denis Deblois[1]

[1]Faculté de pharmacie, Université de Montréal; [2]CHU Ste-Justine

Objectives: The baccalaureate program in biopharmaceutical sciences at Université de Montréal is unique in Canada in its emphasis on drugs development and clinical trial design. The 3-year program includes a 4-month capstone project in an industry or academic lab setting at the end of the curriculum. Launched in 2009, the program went through its first institutional program evaluation in 2018-2019 in collaboration with the university Educational Quality Improvement Office (Bureau de la promotion de la qualité). The objective is to present the program evaluation process, its conclusions and the action plans developed.

Methods: A committee was created representing professors, preceptors, and other teaching staff as well as current and past students. Surveys were sent to all stakeholders to collect data on their perception. A report was submitted for internal review. An on-site visit took place with two external evaluators. Their assessment as well as the committee report were sent to the institutional program evaluation committee that had the responsibility to make recommendations for the program. An action plan with specific goals was produced as the main outcome of the process.

Results: In the survey, the program met expectations for 90% of students, 92% of preceptors and 95% of graduates. The main conclusions of the institutional program evaluation were that the baccalaureate in biopharmaceutical sciences should: 1) Strengthen it branding in order to promote its distinctive character; 2) Increase retroaction to students following assessment (as requested by 82% of students); 3) Develop a formal accreditation process for capstone project sites including international sites; and 4) Review its course structure to expose students to experiential learning earlier in the curriculum and to include streams during the third year. An action plan has been drawn up to respond to each of the recommendation.

Conclusions: The baccalaureate in biopharmaceutical sciences states are motivated to implement changes to improve the program and to support students. The institutional program evaluation process is essential to enhance learning and improve weaknesses.

PE17

Student pharmacist and pharmacy resident perceptions of a pilot educational activity involving recorded patient consultations in a pharmacist-led primary care clinic

Jamie Yuen[1], Hayley Bessette[1], Anita Kapanen[1], Nic Medgyesi[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Objectives: Our objective was to pilot an educational activity for student pharmacists and post-graduate pharmacy residents (learners) on practicum using audio-video (AV) recording technology in a pharmacist-led primary care clinic. Our goal was to determine learner perceptions regarding this educational activity in a unique setting where they are providing comprehensive medication management for real patients.

Methods: The University of British Columbia (UBC) Pharmacists Clinic (the clinic), is a pharmacist-led primary care clinic located in the Faculty of Pharmaceutical Sciences building at the UBC Vancouver campus. The clinic rooms are equipped with AV technology which allows consultations to be recorded with patient consent. To achieve our goal, we designed an activity that consisted of learners conducting an in-person, one-on-one 60-minute patient consultation, completing a self-assessment form pre and post viewing of their recorded consultation and discussion with the preceptor who supervised the consultation and filled out the same assessment form. An online anonymous survey was completed by the learner to determine their perceptions of the learning activity. Learner self-assessments were compared with preceptor assessment data. In addition, learner perceptions of the activity were identified from the survey results.

Results: Eight learners completed the activity from August 2018 to May 2019. Analysis of learner and preceptor assessment forms revealed that the majority of students underestimated their skills across all assessed categories for both pre and post video review assessments. Self-assessments post-video review better matched the scores given by preceptors. Post-activity survey results revealed that learners became aware of areas requiring improvement which included appropriate questioning, clear and concise language, time management, and non-verbal habits.

Conclusions: This pilot educational activity helped to improve self-awareness of learners' skills during patient consultations in the primary care setting. Learners felt the activity helped identify patient consultation skills requiring improvement.

PE18

Patient journey pedagogy: Developing pharmacy students' empathy and communication skills through interviewing patients and other health care providers

Meng Jane Xia[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Objectives: Many pharmacy students have little personal experience with diseases or health care navigation. It is challenging to teach empathy to students. To address this, a patient journey directed studies was piloted at the University of British Columbia during the summer session of 2019 for Professional Year 2 (PY2) Entry-to-Practice (E2P) PharmD students. The goals are to describe the implementation and assess skills improvement in empathy and communications from an 8-week patient journey focused directed studies project.

Methods: Three PY2 pharmacy students were recruited. At the start of the course, students chose a chronic disease of their interest (e.g., diabetes) and attended a communication workshop regarding how to recruit and conduct interviews. Students were asked to interview a minimum of ten patients with the disease of their interest and at least one non-pharmacist health care professional (HCP) to construct the patient journey. In terms of assignments, students submitted an implementation plan, mid-point reflection essay, and final report. The final report showcased a visual map of a patient journey along with an analysis of students' interviews. Assessment of skills improvement was conducted through an optional end of course survey.

Results: Responses from the student end of course survey (n=3) were analyzed. Students self-reported an increased knowledge about the disease and therapeutics, sharpened pre-existing skills including relationship building, empathy, and communication, and gained new skills such as collaboration and interviewing. Common reflection themes include gaining an appreciation for the challenges patients face when navigating the health care system and frustrations from HCPs when patients do not adhere to treatment plans. Students also reflected wanting more guidance and standardized sample interview questions.

Conclusions: Results from this pilot project suggest that mapping the patient journey through interviewing patients and health care providers can potentially improve students' empathy and communication skills. The next step involves the integration of patient journey pedagogy for all PY2 students during experiential rotations.

PE19

Development and implementation of a quality assurance process for pharmacy experiential education practice sites

Janice Yeung[1], _Shanu Sandhu[1]_

[1] _Faculty of Pharmaceutical Sciences, University of British Columbia_

Objectives: Building on the work completed by the Canadian Experiential Education Project for Pharmacy on the characterization of exceptional experiential education sites and best practices, this project describes the development and implementation of a quality assurance process to facilitate high-quality learning opportunities for students within the Entry-to-Practice Doctor of Pharmacy Program at the University of British Columbia.

Methods: A literature review, an environment scan of Canadian pharmacy programs and a review of the CCAPP Accreditation Standards for Canadian First Professional Degree in Pharmacy Programs were utilized to determine best practices and currently implemented processes. Data was analyzed to identify key themes and relevant indicators and utilized to develop a detailed quality assurance process and site visit checklist for experiential education practice sites. This process was implemented and piloted with select practice sites in the fall of 2019. An evaluation of perceptions and experiences with participating sites was then conducted through follow-up surveys.

Results: Site visits utilizing the new quality assurance process were conducted with 15 experiential education practice sites in 2019. Four of the 15 sites participated in the follow-up survey. All four participants agreed or strongly agreed that the site visit and what it entailed was clearly communicated, was helpful and of value and that the duration of the visit was appropriate. Feedback was also solicited from faculty assessors conducting the visits and utilized to identify further refinements to the process and site visit checklist.

Conclusions: A quality assurance process for pharmacy experiential education practice sites was successfully developed and implemented and well received by participating sites. Implementation will continue in the coming year with the intent that a well-defined quality assurance process will better support and guide practice sites, promote best practices, and assist in identifying exceptional experiential education sites across the province.

Training and development resources for pharmacy practice educators in urban and rural areas across British Columbia

Janice Yeung[1], Gabriella Wong[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Objectives: With Entry-to-Practice PharmD students completing 44 weeks of experiential education, there is a need to ensure adequate practice educator training, development and resources are provided. This project seeks to evaluate current perceptions about the accessibility and use of available resources, identify gaps in training, and develop and implement a strategy to satisfy the learning needs of practice educators across the province.

Methods: A literature review and environmental scan of Canadian pharmacy programs were conducted to determine best practices and current approaches to development and training. University of British Columbia Entry-to-Practice PharmD practice educators were invited to participate in a survey or semi-structured interview to determine their perceptions on available training resources, desired educational formats and potential gaps in training. Data was analyzed to identify key themes and further training and development opportunities desired.

Results: Online resources, in-person events and site visits were common approaches to training and development in pharmacy and health-related programs. Fifty-four of 86 of practice edcuators surveyed and 7 of 9 interviewed were 'somewhat satisfied' or 'very satisfied' with the available resources and development opportunities offered. Preferred educational formats included one-page overviews, self-paced online study resources, short course overview videos, and in-person workshops. Training topics ranked of highest interest were practicum assessment processes, giving/receiving feedback and supporting struggling students. In response to identified training gaps, a roadshow incorporating in-person workshops and small-group site visits was developed and delivered to communities outside of the greater Vancouver area.

Conclusions: Pharmacy practice educators are generally satisfied with the current resources available for training and development, but further opportunities to improve exist. To meet identified training gaps, a roadshow was developed and implemented to better support and engage with practice educators in urban and rural areas across the province. Formal evaluation of these educational sessions will inform the ongoing refinement and improvement of the practice educator training, development and resources provided by our experiential education program.

Profile of the highlights of the centennial of the Faculty of Pharmacy at the University of Montreal

Jean-François Bussières[1,2], Claude Mailhot[1], Huy Ong[1], Lyne Lalonde[1]

[1]Faculté de pharmacie, Université de Montréal; [2]Unité de Recherche en Pratique Pharmaceutique, Département de pharmacie, CHU Sainte-Justine

Objectives: Describe the highlights of the evolution of the Faculty of Pharmacy at the University of Montreal during the 100 years since its foundation.

Methods: This is a descriptive study. As part of the centennial celebrations, a historical timeline of the highlights of the evolution of the pharmacy practice and the evolution of the Faculty of Pharmacy was established to guide the writing of various publications. A selection of events was identified from this timeline.

Results: More than 250 events were selected. The "École de pharmacie de l'Université Laval à Montréal" was founded in 1906. In 1919, the "Université de Montréal" obtained its autonomy as an educational institution and the "École de pharmacie" became attached to this university. The "École de pharmacie" became a "Faculté de pharmacie" in 1942. The flagship training programs included the Bachelor of Pharmacy (1919), the Professional Doctor of Pharmacy (2007), the Bachelor of Biopharmaceutical Sciences (2009), the Qualification program in pharmacy for foreign graduates (2012), the Diploma in hospital pharmacy (1962) which became a Master's degree (1992), and the Master's degrees (1940) and Doctorates (1945) in pharmaceutical sciences. With the financial contribution of pharmacist Jean Coutu, the Faculty planned the construction of a new building and has occupied it since 2005. Over time, 13 deans have taken charge and thousands of students have obtained a diploma from this faculty. The Faculty notably innovated by introducing the concept of clinical pharmacy and clinical internships (1972), the status of clinical professor (1996), the concept of pharmaceutical care chairs (1996), the introduction of pyramidal teaching (1997) and the development of online courses (1997).

Conclusions: The 2019-2020 academic year marks the centennial of the Faculty of Pharmacy at the University of Montreal and several facts bear witness to this story.

A prospective randomized controlled trial evaluating the educational impacts of high-fidelity simulations on fourth year pharmacy students at University of Montreal (SUPERPHARM study)

Jean-Philippe Adam[1], Nathalie Letarte[1], Ema Ferreira[1], John Nam Nguyen[2], Alessandra Stortini[2], Gilles Leclerc[1], Pascale Meunier[1], Philippe Vincent[1]

[1]Faculté de pharmacie, Université de Montréal; [2]Department of Pharmacy, Centre Hospitalier de l'Université de Montréal (CHUM)

Objectives: Pharmacy students may not be exposed sufficiently to acute and stressful clinical situations during their Advanced Pharmacy Practice Experiences. Relying on clinical simulations with standardized patients to provide proper experience on this matter has been proposed but its impact for this purpose in pharmacy education is not yet well defined. The objective of this study was to assess the impact of a single 3-hour simulation session on fourth-year pharmacy students.

Methods: During the final Pharm.D. integration course in May 2019, fourth-year pharmacy students were invited to participated to the study. Participating students were randomized between a 3-hour simulation session (2 scenarios) and a class group case discussion. Both sessions having the same learning objectives but simulation session included debriefing period lead by clinical pharmacists after each scenario. Participating students had to complete four self-assessment questionnaires related to the achievement of Kirkpatrick level 1 and 2A: impact on practice (IP), general self-efficacy (GSE), difficult conversation in interprofessional team (DCIT) and satisfaction and self-confidence in learning (SSCL). GSES and DCIT were used before and after the activity while IP and SSCL were administered after the activity. University of Montreal Ethics Committee approval and student consent was obtained prior randomization.

Results: Among the 180 students, 89 agreed to participate (49%) and were randomized between simulation (n=44) and paper case discussion (n=45). On the SSCL scale, 7 questions out of 13 were significantly ($p < 0.05$) in favor of the simulation group (Kirkpatrick level 1). On those, 80% of questions (4/5) related to satisfaction in learning were significant. No significant difference between the two groups was observed for the IP, GSE and DCIT questionnaires which included 10, 10 and 9 questions respectively (Kirkpatrick level 2A).

Conclusions: Although the students enjoyed this activity, and declared themselves becoming more self-confident, a single 3-hour simulation session did not demonstrate any significant improvement on learning (Kirkpatrick level 2A). To observe such benefits, simulation sessions may have to be introduced earlier in the curriculum and delivered at key moments during the program. Further studies are needed to better understand the impact of simulation session on pharmacy students' learning and development.

Perceptions of pharmacy students involved in preventative health and wellness events at the University of British Columbia

Jillian Reardon[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Objectives: As frontline healthcare providers, pharmacists have an important role to play in public health promotion. The objective of this study was to assess pharmacy student perceptions of involvement in preventative health and wellness events to better inform provision of experiential training.

Methods: Electronic surveys were conducted of University of British Columbia (UBC) pharmacy student volunteers involved in heart and bone health awareness events and influenza immunization clinics held for UBC employees between 2014-2016. Surveys were developed by UBC pharmacy faculty and gathered information on student demographics, perceptions of preparedness for health promotion activities and knowledge and skill development as a result of participation. Analysis was by descriptive statistics.

Results: A total of 105 surveys were sent to pharmacy student volunteers involved in health awareness and immunization events. The majority of participants were senior pharmacy students in their third or fourth years. Survey completion rate was 38.1%. All respondents agreed (66%) or strongly agreed (34%) that they felt prepared to provide preventative health care services under pharmacist supervision. All students perceived an improvement in skill and knowledge development in areas of information gathering, documentation and patient interaction. Many students reported a shift from low to high confidence in abilities and skills as a result of participation. Fifty-seven and 40.5% of students indicated the activity met or exceeded their expectations, respectively. A key theme was desire for further student opportunities to engage in health and wellness promotion.

Conclusions: Senior pharmacy students expressed positive attitudes toward involvement in health promotion activities and experienced a self-perceived increase in knowledge, skills and confidence over a short time period. Early exposure to health promotion activities may accelerate and enhance clinical abilities of pharmacy students while preparing them for emerging pharmacist roles.

PE24

Analysis of the effects of the Patient Protection and Affordable Care Act of 2010 on physician-owned hospitals in California

Jim Pinder[1]

[1]Loma Linda University, Claremont Graduate University

Objectives: Canada and the US have very different healthcare systems. In the US, hospitals can be owned by the government (like Canada), non-profit organizations, or for-profit corporations. A sub-set of for-profit corporations are physician-owned hospitals. Prior to passage of the Patient Protection and Affordable Care Act of 2010 (ACA), it was alleged that physician-owned hospitals (POH) cherry picked patients (avoiding patients with Medi-Cal, the lowest reimbursing insurance) in order to benefit financially. One small provision of the ACA was designed to halt the opening of new POH or expansion of existing POH. The ACA was 100% effective in that it stopped the opening of new POH or expansion of existing POH. Existing POH were allowed to stay operational.

The purpose of this study is to compare POH to other hospitals in California to discern if they have fared differently from 2009-2011, the pre- and post-ACA time periods. POH will be compared to two other groups of hospitals: for-profit hospitals, and all other hospitals. For-profit hospitals are a logical comparison group because their profit motives are the same as POH. All other hospitals are also a suitable comparison group because that is how the ACA was written. It placed limitations on all POH and none of the others.

Methods: Data from California, 2009-2011, includes net income margin and percentage of patients using Medi-Cal insurance (the lowest reimbursing). Using an independent samples t-test, relationships were sought between POH and for-profit hospitals, and POH and all other hospitals.

Results: In 2009, there were no statistical differences between the groups for Medi-Cal insurance or net income margin. In 2010 and 2011, the results are the same: POH accepted a statistically significant lower percentage of patients on Medi-Cal insurance. For net income margin, while the POH profited less than other hospitals groups, it was not statistically significant.

Conclusions: While POH accepted a lower percentage of Medi-Cal patients (supporting the cherry-picking theory), they did not reap the profitability benefits.

Implementation of a pilot peer teaching program in an entry-to-practice PharmD program

Jonathan Grosshuesch[1], _Tony Seet[1]_

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Background: Interactions between Professional Year 1 (PY1) students and volunteer upper level peer teachers (PT's) were an integral part of the PY1 pharmacy skills lab in the Entry-to-Practice (E2P) PharmD program at the University of British Columbia. Due to scheduling conflicts, this program was terminated in 2018W. However, a revised peer teaching pilot program was launched to investigate the feasibility of implementing a peer teaching course.

Objectives: To describe the implementation of a pilot program for a peer teaching elective course for PY3 students.

Methods: A two-term directed studies project was created and offered to PY3 students. Project activities included participation in Faculty-run workshops on teaching, creation of learning materials, being present during open lab practice time, meeting individually with PY1 students, and developing a survey and a course syllabus.

Results: Six PY3 PT's were recruited for the 2019W session. During Term 1, students participated in workshops on how to provide feedback, creating assessments, and dealing with challenging situations. PT's were available during lunchtime in the pharmacy practice lab to answer student questions. Each PT created four medication counselling scenarios and the group collaborated to develop a survey and an elective course syllabus. Three times during Term 2, PT's met individually with 72 PY1 students outside of class time. At each meeting, PY1 students participated in a medication counselling scenario and received constructive feedback. All participants will complete an end-of-term survey to assess their experiences with the program and to provide suggestions for improvements. Benefits to PY1 students include an opportunity for individualized learning. Benefits to PT's include opportunities to enhance teaching, communication, and mentorship skills. Benefits to Faculty include development of educational materials and increased teaching capacity.

Conclusions: Implementation of the pilot peer teaching program provided structured opportunities for PY1 students to receive constructive feedback and informal mentorship from PY3 students. Next steps include analyzing student survey data and revising the elective course proposal based on suggested improvements.

Curriculum mapping of integration activities for the first three years of an entry-to-practice Doctor of Pharmacy program

Jonathan Grosshuesch[1], Aileen Mira[1], Ali Ladak[1], Tony Seet[1]

[1]_Faculty of Pharmaceutical Sciences, University of British Columbia_

Background: The majority of the University of British Columbia Faculty of Pharmaceutical Sciences Entry-to-Practice (E2P) PharmD program is taught as medication management modules, based on a modified body-systems approach. Modules consist of two main components: lectures and integration activities. Integration activities (IA) is a collective term used for pharmacy skills lab, tutorials, and case-based learning where students apply what is taught in lectures. Instructors responsible for teaching IA in Professional Years 1-3 (PY1-3) initiated a project to map medications, therapeutic topics, teaching modalities, and assessments within IA, to identify areas for improvement.

Objectives: To describe the development and preliminary analysis of a curriculum map for integration activities for PY1-3 in an E2P PharmD program.

Methods: Three directed studies students were recruited for a 12-week directed studies project. Information from IA sessions was entered into a Microsoft Excel spreadsheet under the following headings: Delivery Date, Module, Instructional Modality, Drug(s)/Device(s), Disease State(s)/ Topic, Assessment/Assessment Type, and Lecture Topics. The University's learning management system, facilitator guides, and pharmacy practice educators were used as data sources. Each professional year was analyzed separately to identify drugs and module topics that were either under or over-represented.

Results: Analysis of data from PY1 IA identified a need to address more infectious disease and dermatology topics. PY2 IA data identified that certain respiratory and cardiovascular topics were over-represented while topics in neurology were under-represented. Analysis of PY3 data identified that often the same drug within a drug class was used repeatedly, thus limiting students' exposure. Further, opportunities to integrate additional PY1 module topics (eg. dermatology and general OTC) were identified.

Conclusions: The development and initial analysis of an IA curriculum map revealed areas where instructors can improve pharmacy students' knowledge and skills. Next steps include analyzing IA teaching and assessment modalities and designing a plan to systematically spiral topics through PY1-3 IA further.

PE27

Using immersive simulation for pharmacy residents to teach patient assessment in hospital setting

Julie Methot[1], _Marie-Laurence Tremblay_[1]

[1]_Faculté de pharmacie, Université Laval, Faculté de pharmacie, Université Laval_

Background: Immersive simulation is a simulation modality that promotes the learning of real-life whole tasks in a highly authentic clinical environment. This teaching method can be very useful for novices to help them to safely consolidate clinical skills while becoming proficient in the environment in which they will eventually perform. Very few residency programs include simulation-based training specifically designed for pharmacy residents to develop pharmacy care.

Objectives: To describe an innovative simulation-based activity for pharmacy residents at Laval University and present students' appreciation.

Methods: Forty pharmacy residents experienced a three-hour immersive simulation training during which three scenarios were provided. Each scenario was followed by a debriefing period. The main learning objective was to define pharmacist's role in a hospital setting and provide meaningful pharmacy care through a thorough patient assessment. Professional actors played the simulated patients. The simulations were held in a multidisciplinary simulation centre at Laval University. During their training, groups of three students were formed to prepare their patient encounters using patients' records and perform their assessment. Students were asked to discuss their potential treatment plan according to their evaluation. Two simulation instructors facilitated the debriefings and oversaw the functioning of the scenarios. After the training, students completed a survey adapted from Shapiro and colleagues to assess the quality of the learning activity and perception of learning using a scale from 0 to 10. Participants provided implicit informed consent by agreeing to respond to the survey.

Results: Pharmacy residents (100% response rate) were mostly PharmD graduates (85%) with previous experience (80%) with immersive simulation in our facilities during their PharmD program. All survey items showed a very high appreciation (between 8.5 to 9.8) of the quality of the facilities, the authenticity of the scenarios and the effectiveness of the debriefings.

Conclusions: Immersive simulation can be successfully used to teach pharmacy care in hospital practice. Our survey shows that students highly appreciated this learning activity which contributed to develop clinical reasoning skills and patient assessment in pharmacy.

Impact of repeated exposure to simulated patients on pharmacy student development of clinical reasoning skills

Karen Dahri[1], Janice Yeung[1], Fong Chan[1], Kathy Seto[1], Kimberley MacNeil[1,2], Diana Varga[1], Suki Gill[1]

[1]_Faculty of Pharmaceutical Sciences, University of British Columbia;_ [2]_Faculty of Education, University of British Columbia_

Background: Our prior research identified virtual patient (VP) cases as a valuable learning tool for students. However, it is unknown whether multiple cases have an impact on students' development of clinical reasoning skills.

Objectives: To identify whether students change their approach to patient care and self-identify their perceived gaps in clinical reasoning skills with repeated exposure to VP cases.

Methods: Second year students (N=211) were invited to participate in an online survey designed to investigate students' experiences of VP cases, the connections made between VP case experiences and ongoing learning related to developing clinical reasoning skills. Students were surveyed before and after three VP cases that they encountered during their second year. Each survey, with the exception of the last post-case survey, consisted of one open-ended question. Prior to each VP case, students were asked "How will you change the sequence of your approach to completing the VP assessment today, if at all?" and after each VP case, "What more do you have to learn in order to approach similar real-life patient assessments?" Responses were first analyzed using analytic memos to discern emergent patterns from which first level, descriptive codes were generated followed by second level "code mapping" which facilitated refined code categories and identification of central themes. Ethics approval was obtained to conduct the study.

Results: One hundred and seventy pre-case and 242 post-case responses were received. As responses were collected together for all three cases, a response rate was unable to be determined. The most common theme identified in pre-case surveys was the need for a more systematic approach and identification of specific strategies around the patient care process (63). The most common theme identified in post-case surveys was the identification of specific knowledge gaps (84) such as conditions, lab tests and therapeutics.

Conclusions: Students self-identified a need to be more systematic in their approach and attempted to utilize strategies to achieve this goal when working through VP cases.

Exploring factors that influence student engagement in community-engaged learning activities within a pharmacy context (UBC ExCEL-Rx)

Kayla M Fang[1], _Gilly C Lau[1]_, Jamie Y Park[1], Paulo Tchen[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Objectives: To investigate and identify factors that enhance and restrict student engagement in mandatory and voluntary community engaged learning (CEL) activities.

Methods: A phenomenological study utilizing semi-structured interviews was conducted with students participating in mandatory and voluntary community engaged learning. Eligible participants were University of British Columbia (UBC) students in the Entry-to-Practice (E2P) PharmD Program currently enrolled in or having previously taken a mandatory 20-hour Community Service Learning (CSL) course in their second year. Of the 16 pharmacy students expressing interest in participating in interviews, 15 were randomly selected to participate in interviews exploring students' involvement, experiences, motivations, and challenges faced in their mandatory CSL course and/or voluntary CEL activities (e.g., community outreach). Interviews were audio recorded and conducted via phone or in-person interviews. Student responses were analyzed using quantitative and qualitative thematic analysis.

Results: Motivating factors to student engagement differed slightly between mandatory and voluntary CEL opportunities. Primary factors that motivated student engagement in mandatory CEL included imparting a positive impact on the community and gaining a broader perspective and understanding of the diverse populations in their community. Students participating in voluntary CEL indicated improved resume qualifications, advocacy for pharmacy profession, and application of classroom knowledge as motivating factors. Common barriers identified were time commitment, activity scheduling as well as the limited scope of a student's role, in particular with CSL placements.

Conclusions: Findings of this study suggests that both mandatory and voluntary CEL activities are crucial for the personal and professional development of pharmacy students; however, opportunities exist for addressing barriers identified to further enhance student engagement in CEL within a pharmacy program.

Assessing performance and engagement on a computer-based education platform for pharmacy practice

Kelly Grindrod[1], Rosemary Killeen[1], Kate Morris[2]

[1]*School of Pharmacy, University of Waterloo;* [2]*Ontario College of Pharmacists*

Objectives: To identify factors that impact user performance and engagement on a computer-based education platform for pharmacy professionals.

Methods: A computer-based educational platform for Canadian pharmacy professionals was launched in January 2018. A de-identified dataset was downloaded in November of 2019 that contained user demographics and response data for 21 unique modules, including responses to quiz questions and questions about self-reported behaviour. The main outcome measures were user performance (mean quiz score) and engagement (completion rate for attempted modules) to allow for an analysis of participant knowledge with access to the resources. Analysis of Variance (ANOVA) and binomial regression modelling were used to identify the relationship between the outcome measures and demographics and topics, as well as between the outcomes themselves. A machine learning cluster analysis was also performed to identify factors that predict users who will have high or low engagement and performance.

Results: The dataset contained data for 5,290 users, which included 3,579 (68%) pharmacists, 595 (11%) registered pharmacy technicians, 711 (13%) pharmacy students, and 405 (8%) pharmacy technician students. Of the pharmacists included, 2434 (68%) received their entry-to-practice training in Canada. Four clusters were identified separately for pharmacists and technicians. The clusters with the higher performance and engagement tended to have more users working in community pharmacies while the lower performing clusters tended have more internationally trained users. According to the binomial regression modelling, pharmacists performed better than technicians and students while students were the most engaged (p<0.0001). Further, internationally trained pharmacists had slightly lower scores but similar engagement compared to domestically trained pharmacists (p<0.0001). Users had a higher performance on modules related to scope of practice than on clinical topics, and were most engaged in topics directly impacting daily practice such as influenza vaccinations and new/emerging topics such as cannabis.

Conclusions: In a national computer-based education program, a machine learning approach was useful to identify clusters of users based on their performance (i.e., knowledge) and engagement with the platform while the more traditional regression analysis was useful for examining how different demographic features impacted performance and engagement. Finally, pharmacists were more engaged with topics relevant to daily practice than specialty topics.

PE31

Study travel concerning official practices: Pedagogical approach allowing to build the professional identity of the future pharmacists

Laetitia Morvan[1,2] *, Florent Macé*[1,2] *, Christine Peyron*[2]*, Evelyne Kohli* [1]

[1]*Unité Mixte de Développement Continu Santé - UFR des Sciences de Santé de Dijon - Université de Bourgogne, France;* [2]*Laboratoire d'Economie de Dijon (LEDi) - Université de Bourgogne, France*

Objectives: To explore the interest of a study trip on community pharmacy practices as a pedagogical approach to build the professional identity of future pharmacists.

Methods: The interest of this pedagogical approach was investigated through three study trips realized in Switzerland, the Netherlands and Canada-Quebec by final-year students in 2016, 2017 and 2018 respectively. First, we analyzed the students' involvement in each key step of the construction of the study trip: preparation (search for funding, feasibility study, research on community pharmacy practices, organization of the trip), travel and stay. We then collected the students' reactions to the meetings held. Finally, upon returning from the study trip, we assessed their satisfaction with an anonymous questionnaire.

Results: Evaluation of students' involvement in the construction of the project showed high quality of the exchanges with foreign pharmacists and pharmacy officials as well as dynamism throughout the project. Students' feedback highlighted the discovery or deeper knowledge of innovative practices (netCare® service and Quality Circles in Switzerland, Academic pharmacy in the Netherlands, missions of GMF pharmacists in Quebec) that they would like to implement in their practice in the future. Satisfaction assessment of these study trips showed a very positive feedback from students.

Conclusions: Nowadays, while the pharmaceutical profession is undergoing many changes, we observed that such study trips allow students to learn about and integrate new community pharmacy practices and innovative approaches to the profession. In view of their involvement, productive feedback and the satisfaction generated, these study trips constitute a pedagogical approach that helps students to materialize professional evolutions, encourages them in new missions while allowing the construction of the pharmaceutical professional identity of tomorrow.

PE32

Using a SIMPLE approach to an IPE program gap analysis

Karen Teng[1], Larry Leung[1], Jason Min[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Objectives: Interprofessional Education (IPE) is an important component of National Pharmacy Accreditation Standards and Educational Outcomes. The pedagogical approach of IPE is often multi-modal to address all of the competencies, which makes assessment of an IPE program challenging. One of the key components of an IPE program evaluation is conducting a proper gap analysis to ensure activities and learning objectives map to competencies set by the Canadian Interprofessional Health Collaborative (CIHC) Competency Framework. This study explores the process of implementing a SIMPLE approach to a gap analysis to evaluate the extent in which the IPE in the Entry-to-Practice PharmD Program at the Faculty of Pharmaceutical Sciences (the Faculty), University of British Columbia, is meeting CIHC interprofessional competencies.

Methods: We utilized a **SIMPLE** 5-step approach to the IPE program gap analysis, including: (i) a **S**coping review of literature, (ii) **I**dentifying IPE activities and learning objectives, (iii) **M**apping all IPE learning objectives to the CIHC competency framework, (iv) assessing **P**erformance and (v) translating **LE**ssons learned.

Results: The CIHC Competency Framework has 6 domains consisting of 39 competencies/learning objectives. The IPE program at the Faculty consists of 17 unique IPE activities across three program years, with a total of 102 learning objectives. The current IPE activities met all components of the CIHC competency framework with an overall equitable distribution across the CIHC domains. The distribution of learning objectives across the 6 domains were as follows - Interprofessional Conflict Resolution (22%), Role Clarification (19%), Interprofessional Communication (17%), Team Functioning (16%), Collaborative Leadership (14%) and Patient/client/family/community-centred Care (12%).

Conclusions: The SIMPLE approach allowed us to determine the most frequently mapped competencies (interprofessional communication and role clarification) and the least frequently mapped competencies (interprofessional conflict resolution and collaborative leadership), highlighting both the strengths and areas for improvement in the program. This knowledge allowed the program to modify IPE activities and learning objectives to ensure a more fulsome coverage of all CIHC competency domains.

PE33

Stressors, coping mechanisms and curricular suggestions: A pharmacy student survey

Lynda M. Eccott[1], Angie Dhanda[1], Amy Kwan[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Objectives: To identify current issues that contribute to the stress of our pharmacy students and to learn more about their coping mechanisms and suggestions for curricular improvements to alleviate stress.

Methods: Quantitative and qualitative thematic analysis was done on an 18-question survey that was delivered in class time for years 1-3 pharmacy students, and distributed electronically to year 4 students. Responses were anonymous, but background information (age, gender) was collected for data analysis. A 5-point Likert scale was used to answer questions on: i) the extent that a specific item caused stress; ii) the extent that certain activities alleviated stress; and iii) student's current state of resiliency. Other questions asked about their program (including practice) suggestions for alleviating stress and what the program is currently doing well to help combat their stress.

Results: A total of 651 pharmacy students (Yrs 1 – 4) completed the survey. Strong 'stressors' were identified as those items reaching a 4 or 5 on the Likert scale. Top 3 stressors were: Lack of time to learn material (77%), academic competition (68%) and lack of free time (66%). The most effective coping strategies were spending time with family and friends (70%), planning ahead (58%) and exercising (58%). Personal time alone was deemed to be popular but less effective. Overall, students ranked themselves as being "somewhat" resilient. The most common suggestions for curricular improvement included spacing out assessments, shorter school days and improved instruction. Implemented changes to the program will be shared.

Conclusions: The decline in mental health of university students has been well documented. These survey results are being used to make curricular changes to our program to better support our students so that they can be successful, resilient practitioners.

Embedding an accredited cannabis module within an upper-year therapeutics course

Michael Beazely[1], Vikas Parihar[2], Michael G. DeGroot[3], Rosemary Killeen[1], Sarah de Waal[4], Rita Dhami[1]

[1]School of Pharmacy, University of Waterloo; [2]Department of Anesthesia, Faculty of Health Sciences, McMaster University, 3Centre for Medicinal Cannabis Research, McMaster University; [4]School of Pharmacy, Memorial University

Objectives: To describe the process of embedding a Canadian Council on Continuing Education in Pharmacy (CCCEP)-accredited cannabis module within a therapeutics course and to assess student cannabis knowledge before and after the cannabis module.

Methods: We describe the logistics, planning, and resources required to create cannabis educational content, program accreditation, and mapping of course content cannabis competencies established by the Ontario College of Pharmacists (OCP). An online survey was conducted about the students' knowledge and attitudes about cannabis before and after completion of the module.

Results: 119 Rx2020 University of Waterloo pharmacy students were enrolled in the course, Integrated Patient-Focused Care 8 (neurology and mental health). In order to secure CCCEP-accreditation, the cannabis module content was finalized in early 2019, approximately seven months before content was delivered. The modules were reviewed by external experts, accredited by CCCEP, and mapped to OCP competencies. The content included four self-directed online modules using the tophat.com platform as well as an in-class tutorial/review. Cannabis questions were embedded in the course final exam, with a supplementary exam offered to students that did not meet the required 70% threshold. All students received their completion certificates in January 2020. Students felt much more prepared to care for patients using medicinal/recreational cannabis after completion of the module (76%/73%) compared to before (35%/43%). Student opinions also changed regarding the quality of the medical evidence support the use of cannabis as a medicine: 38% rated the quality of medical evidence as poor prior to the modules, and this number rose to 57% afterwards.

Conclusions: The greatest changes in student survey responses pre- and post-cannabis modules involved knowledge and preparedness to care for patients using recreational or medical cannabis. Interestingly, student responses shifted towards a lower rating of the quality of medical evidence and an increased concern about adverse effects after module completion. With respect to implementation, the modules fit well into the course content. Successful accreditation and implementation would not have been possible without significant support from the School of Pharmacy distance education & continuing professional development team.

PE35

Curriculum, geography and gender: Exploring the barriers and facilitators to selecting northern, rural and remote co-op work terms by pharmacy students

Nastaran Keshmiri[1], Nancy Waite[1], Sherilyn Houle[1], Richard Violette[1]

[1]School of Pharmacy, University of Waterloo

Objectives: There is little literature on what factors influence pharmacists to work in northern/rural/remote (NRR) regions – areas with high health care needs and a shortage of health care providers, including pharmacists. Given that co-op work terms can lead to job opportunities available to students following graduation, it is important to understand the barriers and facilitators, as well as how to modify the curriculum, to encourage more students to apply and choose co-ops in NRR regions.

Methods: Using an exploratory qualitative study design, two focus groups were conducted using a semi-structured question guide; one female and one male. Participants were students from the University of Waterloo School of Pharmacy who had completed at least one co-op work term. Focus groups were audio-recorded then transcribed and analyzed using thematic analysis.

Results: A total of 9 females and 7 males participated in the focus groups. Thirteen students indicated interest in considering a co-op work term in an NRR community, and ten would consider a job there. The results of the thematic analysis yielded five major themes: (i) location challenges; (ii) job description; (iii) curriculum; (iv) unique practice and (v) family considerations. Various subthemes were identified for each theme. Four of the five themes were present for both genders with family considerations only discussed in the female group. Students value unique patient and interprofessional interactions. Therefore, job descriptions for NRR co-ops should include details surrounding the quality of care and the collaborative nature of these placements. Additionally, pharmacy schools and employers can further incentivize students to relocate by arranging housing and/or providing a relocation allowance.

Conclusions: The participants' comments suggest that most are open to completing a co-op work term in NRR regions if the experience is unique and incentives are high. Some suggestions to increase student interest in NRR regions include student visits earlier in the curriculum to NRR regions, organizing workshops for employers to improve their job descriptions and organizing job fairs for students prior to application submissions.

A framework to assess student learning outcomes when a new teaching strategy is implemented in a self-care course

Paul Malik[1], Terry Li[1], Nardine Nakhla[1]

[1]School of Pharmacy, University of Waterloo

Objectives: To develop an evidence-based, practical and ethical framework for assessing pharmacy student learning outcomes when a new teaching strategy (i.e., a 'flipped classroom') is implemented in a self-care course.

Methods: The course coordinator, the instructors and one pharmacist teaching assistant met to agree on SMART (specific, measurable, attainable, realistic and timely) student learning outcomes that were pivotal to assess when evaluating the efficacy of a new teaching strategy. A literature search was conducted to extract assessment tools for each outcome. Because few validated assessment tools were available for self-care or minor ailments, elements of the most relevant tools were modified and built into the final framework. The assessments were designed to avoid instructor bias and minimize triviality.

Results: The three SMART outcomes were self-confidence, factual knowledge and performance in patient care. Self-confidence and factual knowledge gained throughout the course were assessed with pre- and post-course electronic surveys. Students reported their self-confidence in performing ten tasks relevant to self-care and minor ailment management using a five-item Likert Scale (e.g., how confident are you in your ability to develop a care plan for a minor ailment involving non-prescription drugs?). In the second part of the survey, students answered twenty multiple choice questions covering factual course content. The questions were created by the pharmacist teaching assistant with review from a faculty member but blinded from course instructors. Finally, performance in patient care was assessed by peer review from medical and pharmacy technician students after a patient simulation. After observing at least three pharmacy students, the inter-professional students were surveyed to report their level of comfort when referring patients to the cohort of pharmacy students for self-care information or minor ailment management. The full framework has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE#41753).

Conclusions: The developed framework was evidence-based where possible, practical and ethical, and was used to facilitate a study for evaluating the impact of a flipped classroom on student learning outcomes in a self-care course. A limitation is that the execution of this assessment depends on the recruitment of a pharmacist teaching assistant.

The lived experience of experiential learning of pharmacy preceptors: A phenomenological study

Shauna Gerwing[1], _Kalyani Premkumar_[2], _Yvonne Shevchuk_[1],

[1]College of Pharmacy and Nutrition, University of Saskatchewan; [2]College of Medicine, University of Saskatchewan

Background: Experiential learning is an integral part of the pharmacy curriculum. Educational institutions must collaborate effectively with preceptors to ensure that quality experiential learning occurs. To establish meaningful relationships, it is important that educational institution personnel understand the lived experience of the preceptors.

Objectives: The study's purpose was to describe the lived experience of experiential learning of preceptors. Questions that guided the research were: 1) What is the lived experience of experiential learning of pharmacy preceptors in Saskatchewan? 2) What is it like to be a pharmacy preceptor to a student participating in experiential learning? 3) What enhancements or constraints do pharmacy preceptors experience in experiential learning that may impact their understanding, desire, or ability to engage in experiential learning?

Methods: Qualitative methodology, in particular, phenomenology of practice as guided by Max van Manen (1990) was used in the study. Semi-structured, one-on-one interviews, with nine preceptors from hospital and community practice, were conducted. Themes, anecdotes, and detailed descriptions were used in this hermeneutic, interpretive, descriptive, phenomenological analysis to gain understanding and insight into the lived experience of experiential learning of preceptors.

Results: Learning and teaching, building a relationship, finding a balance, time for everything, feeling responsible, and managing difficult situations were themes identified. Together, these themes describe the lived experience of experiential learning for the pharmacy preceptor. These themes are not exhaustive, but do allow a thorough investigation of, and insight into experiential learning.

The results indicate that while preceptors valued experiential learning, participation in experiential learning involves balancing competing priorities of the workload of pharmacy practice with a shortage of resources and time. Good relationships enhanced experiential learning, particularly those in environments that were conducive to learning and teaching for both the preceptor and the student. Difficult situations, time, and increasing workloads constrained preceptor's desire to participate in experiential learning.

Conclusions: This phenomenological study may allow others to appreciate the lived experience of pharmacy preceptors and may encourage others to act in a tactful, empathetic manner when modifying and implementing experiential learning curricula. It may enhance the quality and quantity of experiential placements to benefit both students and preceptors.

PP01

Experience and appreciation of users of the Ask Your Pharmacist platform and of health care

Alexandre Chagnon[1,2], Line Guenette[1], Véronique Turcotte[3]

[1]Faculté de pharmacie, Université Laval; [2]Faculté de Médecine et des Sciences de la santé, Université de Sherbrooke; [3]Centre de recherche du CHU de Québec Faculté de pharmacie, Université Laval

Background: The general population is increasingly using information and communication technologies to seek health-related information, and more and more pharmacists use technology to connect with patients. A community pharmacist developed an online platform for consultation with pharmacists entitled "Ask Your Pharmacist" (AYP) to better inform the population about drugs.

Objectives: To evaluate the AYP platform by describing the experience and appreciation of users (patients and pharmacists) and by exploring the perceived usefulness and impact of this service in the province of Quebec.

Methods: An online survey was performed with patients and pharmacists having used the AYP platform at three different periods. Semi-structured interviews with some of these users and various healthcare workers were held over the phone. Interviews were audio-recorded, transcribed and coded and a mixed thematic content analysis was performed.

Results: A total of 53 patients and 27 pharmacists completed the survey. Most patients were satisfied with their experience with AYP. Most of pharmacists answered questions from their home, thought it took them between 6 to 15 minutes per question, and reported the need to search the literature to prepare their answer. Twenty-one healthcare workers and eight patients were interviewed. Many benefits and utilities of the platform have been identified, such as the great accessibility and availability. Some difficulties and worries were reported notably regarding the level of urgency and for complex situations.

Conclusions: Most patients and pharmacists were satisfied with their experience with the AYP platform. Many benefits have been identified. However, the platform is mostly useful for simples and non-urgent situations.

Use of benzodiazepines and other hypnotic medications increases with the number of chronic diseases among older adults: A population-based study in Québec, Canada

Caroline Sirois[1,2], Emmanuelle Gosselin[3,2], Marc Simard[3,2]

[1]Faculté de pharmacie, Université Laval; [2]Institut national de santé publique du Québec; [3]Département de médecine sociale et préventive, Université Laval

Objectives: To describe the annual prevalence of benzodiazepine and other sedative-hypnotic use in relation with chronic diseases among older adults in the province of Québec, Canada, from 2000 to 2016.

Methods: We conducted a population-based cohort study using data from the Quebec Integrated Chronic Disease Surveillance System. We included all individuals aged 66 years and over who were covered by the public drug insurance. All benzodiazepines and other medications used as sedative-hypnotic (e.g., tricyclic antidepressants, trazodone, quetiapine) were included. For each year, we evaluated the age-standardized proportion of individuals using these drugs, defined as the presence of at least one claim in the given year. We stratified our results according to the number of chronic diseases.

Results: The proportion of individuals using benzodiazepines decreased from 34.8% in 2000 to 24.8% in 2016, but multimorbid people remained the highest users. Conversely, the proportion of users increased for other sedatives, in particular for trazodone (1.2% to 3.3%) and quetiapine (less than 0.1% to 2.2%), and especially among individuals with 6 or more chronic diseases.

Conclusions: From 2000 to 2016, older adults in Quebec were less likely to be prescribed benzodiazepines, but used more trazodone and quetiapine. There is a need to address the use of these medications, particularly in multimorbid people who present a higher risk of adverse events.

PP03

Assessment of Ontario pharmacist's knowledge, attitudes and behaviors towards medication safety and adverse drug reaction reporting

Certina Ho[1], _Adrian Boucher[1,2]_

[1]_Leslie Dan Faculty of Pharmacy, University of Toronto;_ [2]_GlaxoSmithKline Canada_

Objectives: Pharmacists play an important role in identifying, reporting, and preventing adverse drug reactions (ADRs). The objective of this study is to provide insight into the knowledge, attitudes, and behaviors of Ontario pharmacists towards medication safety and ADR reporting.

Methods: We conducted a cross-sectional survey of Ontario pharmacists using a 29-item, online questionnaire that was available for a two-week period from October 11 to October 25, 2019. Analysis of scaled questions was performed using descriptive statistics. Thematic analysis of written responses was conducted to identify the barriers, facilitators, and opportunities to improve ADR reporting.

Results: We sent our questionnaire to 6277 pharmacists, of which 703 responses were collected with a response rate of 11.2%. Participants were mostly full-time, non-management community pharmacists with over 20 years of experience. Participants generally felt confident in the Canadian drug safety system, in how pharmacists stay informed about drug safety, and in their own ability to find new drug safety information. Participants knew how to report an ADR and perceived that it is a professional responsibility to do so. The most commonly perceived barriers to ADR reporting were when the reaction was already well known; there was unclear association between the drug and the reaction; and a lack of time. Participants would be more likely to report an ADR if the reaction was serious, the drug was new, or the reaction had not been described in the product monograph. Strategies to improve reporting emphasized a simplified reporting system, and greater awareness for pharmacists. Analysis of the written responses found that pharmacists preferred an integration of reporting into pharmacy systems, and greater interprofessional collaboration.

Conclusions: Ontario pharmacists were knowledgeable and supportive of ADR reporting but face significant system barriers to applying it in practice. Recommendations to improve ADR reporting should focus on simplifying and integrating reporting systems, further education of when to report and its value, and giving feedback or acknowledgment for reporting.

Poor medication adherence occurs in the year prior to an incident depressive episode

Diva Niaz[1], *Candace Necyk*[1], *Scot Simpson*[1]

[1]*Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta*

Objectives: Although depression is an accepted risk factor for poor adherence in diabetes, studies examining this association are either cross sectional or only measure adherence after depression diagnosis. Symptoms of depression likely begin well before diagnosis, which could affect adherence earlier than currently reported. Our objective was to measure medication adherence among newly treated people with type 2 diabetes in the year prior to an incident depressive episode.

Methods: This retrospective cohort study was conducted on new metformin users identified in Alberta Health's administrative data between 2008 and 2018. Our exposure of interest was an incident depressive episode occurring at least one year after metformin initiation. Control subjects were randomly assigned a pseudo depression date from exposed subjects so adherence would be measured at similar time points of diabetes duration. Poor adherence was defined as ≤80% of days covered by metformin within the year prior to the index date. Multivariate logistic regression was used to examine the association between depression and adherence.

Results: Of 165,056 new metformin users identified, 5136 (3%) had an incident depressive episode ≥1 year after initiating metformin. A pseudo depression date could be assigned to 113,560 (68%) control subjects. The mean proportion of days covered was significantly lower for subjects with a depressive episode (55.5% [SD 39.0%]) compared to controls (60.0% [SD 38.1%]) (p<0.001). After adjusting for other factors, subjects with a depressive episode were more likely to have poor adherence in the year before the incident depressive episode compared to controls (adjusted odds ratio 1.33; 95%CI 1.25,1.41).

Conclusions: These results suggest that poor adherence to oral antihyperglycemic medications appears in the year prior to depressive episode. Further research is needed to better help clinicians identify patients with diabetes who may be experiencing early symptoms of depression.

Assessing the feasibility and acceptability of frailty detection by community pharmacists

Emily Williams[1], Mina Tadrous[2], Colleen Maxwell[1,3], Nardine Nakhla[1]

[1]School of Pharmacy, University of Waterloo; [2]Women's College Hospital; [3]School of Public Health & Health Systems, University of Waterloo

Background: Recent literature argues the importance of frailty screening among high-risk older adults in community settings, including the need to educate and train various healthcare providers. To date, frailty has yet to be addressed specifically in this setting and the role of community pharmacists in the assessment and management of frailty is unclear.

Objectives: To elicit pharmacists' perceptions regarding the feasibility and acceptability of frailty screening in the community pharmacy setting and determine the perceived barriers and enablers of frailty assessment in this setting.

Methods: Primary data collection was completed using the Frailty Assessment Screening Tool in Community Pharmacy (FAST-CP) by two trained pharmacists among 23 individuals (12 men and 11 women, with 20 aged 65+ years) presenting to 2 Ontario community pharmacy sites. Data were examined, summarized qualitatively, and with descriptive analysis.

Results: Both pharmacists indicated feeling very comfortable using the FAST-CP tool which took approximately 6 minutes to complete. Pharmacists rated the tool a 4/5 for ease of integration (5 = very easy), 3.5/5 for perceived clinical usefulness and 4.5/5 for perceived value in the community pharmacy setting. Patients appeared willing to be assessed (4.91/5) and comfortable (4.96/5) throughout the assessment. Implementation barriers included time constraints in the busy pharmacy setting and assessment opportunities while facilitators were employing appointment-based models, scheduling alongside a medication review or clinic days.

Conclusions: Community pharmacists, with their specialized training and accessibility, may be ideally situated to play a larger role in assessing frailty among older adults. The FAST-CP is a quick and easily-integrated tool that allows further engagement in the care of older adults and presents an opportunity for deeper discussions regarding patients' health and medication concerns. Future work is required to validate the tool and explore expansion strategies and reimbursement models to optimize uptake of frailty screening in this setting.

A Canadian research agenda for non-prescription products and care of vulnerable older adults by community pharmacists

Emily Williams[1], Mina Tadrous[2], Colleen Maxwell[1,3], Nardine Nakhla[1]

[1]School of Pharmacy, University of Waterloo; [2]Women's College Hospital; [3]School of Public Health & Health Systems, University of Waterloo

Background: Canadian data regarding non-prescription product use (including over-the-counter and natural health products) is lacking, especially in the older frail population. In 2013, an American summit was held to determine research priorities regarding over-the-counter behaviours among older adults, but as of 2019, no Canadian equivalent had been pursued.

Objectives: To identify and prioritize key areas for further research necessary to ensure safe and effective use of non-prescription products among older vulnerable Canadians.

Methods: A one-day symposium was held in May 2019 comprising 18 panel members representing researchers, clinicians, subject-matter experts, policymakers, patients and caregivers. A list of priority areas was generated for the two main streams of research: (1) Non-prescription use in vulnerable older patients and (2) Role of the community pharmacist in the care of older adults. Ranking and post-symposium iterative review was employed to achieve priority consensus.

Results: The top five priority research areas for each stream were determined. The highest-ranking priority for stream 1 was the health risks (e.g., cognitive, gastrointestinal, renal) of commonly used non-prescription products alone and in combination with other drugs and diseases. Regarding pharmacist's role (stream 2), the highest-ranking priority was the development and/or adaption of tools and training for pharmacists to assess frailty in the community pharmacy setting. Three guiding principles for future research emerged from panel member feedback: (1) importance of a holistic data set on non-prescription use, (2) role of such data in refining identified priority research areas, clinical practice and decision tools, and (3) the importance of understanding the patient perspective on non-prescription use to optimize patient care and safety.

Conclusions: A robust Canadian non-prescription use data set is required to inform future research and deepen understanding of self-care decision-making by older adults to allow for optimization of health outcomes.

PP07

Physician perceptions of barriers and enablers to integrating a clinical pharmacist in a general practice clinic

Jamie Yuen[1], Nic Medgyesi[1], Jillian Reardon[1], Larry Leung[1], Jason Mi[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Objectives: Pharmacists from the University of British Columbia (UBC) Pharmacists Clinic (the clinic) provide comprehensive medication management services once to twice monthly via the co-located model at multiple general practice clinics in Vancouver. This study aimed to identify physician perceptions of barriers and facilitators related to integrating co-located clinical pharmacists to their practice.

Methods: To gain the perspectives of physicians, a descriptive qualitative research methodology was used. Purposive sampling and semi-structured interviews were used to collect data. Interviews were conducted in-person or via telephone and audio was recorded with participant consent. A thematic analysis with an inductive approach was used to analyze the data.

Results: Eight physicians from four general practice clinics were interviewed between August and September 2019. From these interviews, six themes were identified that contained barriers or enablers to the integration of a co-located pharmacist. The themes were: 1) identifying patients and the referral process; 2) electronic medical record utilization; 3) workload and logistics; 4) shifting physician perspectives; 5) impact of in-person communication; and 6) patient willingness. Enablers included EMR utilization for identifying suitable patients for pharmacist consultation, a dedicated workspace for the pharmacist, a physician champion of the service, and in-person physician-pharmacist communication. Barriers included identifying patients for referral, a lack of EMR interoperability, scheduling patients into pharmacist's limited hours, and physicians who are less committed to team-based care.

Conclusions: Physicians perceived several novel barriers and enablers to the integration of a pharmacist into their practice. Themes identified can help to inform future co-located collaborations between pharmacists and physicians.

PP08

Clinic administrative staff perceptions of barriers and enablers to integrating a clinical pharmacist in a general practice clinic

Jamie Yuen[1], Nic Medgyesi[1], Jillian Reardon[1], Larry Leung[1], Jason Min[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Objectives: Pharmacists from the University of British Columbia (UBC) Pharmacists Clinic provide comprehensive medication management services once to twice monthly via the co-located model at multiple general practice clinics in Vancouver. This study aimed to identify clinic administrative staff's (medical office assistant (MOA) or office manager) perceptions of barriers and facilitators to integrating co-located clinical pharmacists into their practice.

Methods: To gain the perspectives of participants, a descriptive qualitative research methodology was used. Purposive sampling and semi-structured interviews were used to collect data. Interviews were conducted in-person or via telephone and audio was recorded with participant consent. A thematic analysis with an inductive approach was used to analyze the data.

Results: Seven clinic administrative staff members (5 MOAs, 1 MOA/office manager, and 1 office manager) from 4 general practice clinics were interviewed between August and September 2019. From these interviews, 3 themes were identified that contained barriers or enablers to the integration of a co-located pharmacist. The themes were; (1) workload and logistics, (2) encouraging physician participation, and (3) patient views. Enablers included length of consultation (30-60 minutes), physician's verbal endorsement of the service to patients, and assigning one designated MOA to handle the pharmacist's schedule. Barriers included a lack of physician diligence for referrals, patient unawareness of the pharmacist's role, patient no-shows or cancellations, and a lack of standardized preliminary procedure to set up the pharmacist visits.

Conclusions: Clinic administrative staff perceive unique barriers and enablers to the integration of a co-located pharmacist. As essential members to the success of collaborative team-based primary care practice, administrative staff's views can help to inform future successful integrations of pharmacists into general practices.

PP09

Pharmacist perceptions of benefits and barriers of telehealth service delivery in the primary care setting

Jamie Yuen[1], Annie Wang[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Objectives: The objective of this study was to identify the benefits and barriers of telehealth service delivery as perceived by pharmacists practicing in a primary care setting.

Methods: A descriptive qualitative research methodology was used to gain the perspectives of primary care pharmacists regarding telehealth delivery. Purposive sampling and semi-structured interviews were used to collect data. Pharmacist interviews were conducted in-person or via telephone and audio was recorded with participant consent. Data was analyzed through an inductive qualitative thematic approach.

Results: Six primary care pharmacists were interviewed from October to December 2019 and 6 themes containing telehealth benefits and barriers were identified. The themes aligning with benefits of telehealth included (1) increased access to care, (2) facilitation of follow up consultations, (3) reduced burden on the healthcare system. Themes describing the barriers of telehealth included (1) technical difficulties with technology, (2) lack of funding model for pharmacist telehealth consultation and (3) clinical practice limitations.

Conclusions: This study identified several pharmacist-specific benefits and barriers associated with telehealth service delivery in the primary care setting. Pharmacists felt telehealth enabled access to pharmaceutical care, with limitations to the scope of care provided due to the nature of the consultation not conducted in-person. Themes identified can help inform future use of telehealth services by primary care pharmacists.

PP10

Indigenous knowledge mobilization of traditional and western medicines

Jason Min[1], Angela Dong[1], Larry Leung[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Objectives: This project aims to enhance knowledge mobilization and support the preservation of traditional medicines information practiced by an Indigenous community.

Methods: This project used a two-step approach: (1) ethical Indigenous community engagement and (2) co-development of project scope, methodology, and deliverables. The project team undertook an expansive community engagement process including Indigenous health leadership, community members, elders, and traditional knowledge keepers. An inductive approach was utilized throughout. Notes from conversations were hand-written and received approval from participants. Thematic analysis was done and approved by the project team.

Results: An approach of creating health promotion material was mutually agreed-upon to address the need to disseminate and preserve traditional medicine information within the community. Several themes emerged. Implications of taking both traditional and western medicines was deemed a critical topic, specifically addressing concerns of healthcare provider stigma and bias towards traditional medicines. A strong emphasis on preserving relationships was also identified, leading to the hesitancy of disclosing the use of a traditional medicine to healthcare providers for fear it might upset the individual. Finally, the integration of traditional languages on any project deliverables was a priority.

Three primary traditional medicines were identified. These medicines were translated in English and the traditional language. Information was collected from Indigenous members and scholarly references regarding traditional medicine use, mechanism of action, interactions with western medications, and safety considerations. A patient-friendly handout was co-created with the findings and disseminated to community members. Information in the project was deemed proprietary to the Indigenous community and dissemination was restricted to that community only.

Conclusions: There was an identified need for information on the safe and healthy use of traditional medicines and implications with western medicines. The use of a patient-friendly handout allowed the integration of the traditional language and supported a sustainable patient self-management resource. These findings suggest a number of opportunities for future projects and for pharmacists to have an important role in providing patient-centered, culturally safe care.

Development of a survey instrument to assess community pharmacists' roles, attitudes, and training needs in delivery of sexual and reproductive health services

Javiera Navarrete[1], Christine Hughes[1], Theresa J. Schindel[1], Nese Yuksel[1], Shigeo Yamamura[2], Tatta Sriboonruang[3]

[1]_Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta;_ [2]_Faculty of Pharmaceutical Sciences, Josai International University, Japan;_ [3]_Faculty of Pharmaceutical Sciences, Chulalongkorn University, Thailand_

Objectives: To develop and pilot a survey instrument designed to explore community pharmacists' training needs, attitudes, and roles in provision of sexual and reproductive health (SRH) services in Japan, Thailand, and Canada.

Methods: Questions were developed based on a literature search and review of studies exploring pharmacists' attitudes, practices, and roles in SRH. The World Health Organization's core SRH competencies for primary health care were also reviewed. Research team members revised the questionnaire with consideration to wording and scope of practice in each country. The survey was translated from English to Japanese and Thai languages. As part of the validity process, an expert review was completed. Also, online cognitive interviews and pilot testing were completed in Canada to establish readability and consistency.

Results: The final survey instrument consists of six sections: (1) provision of SRH services, (2) attitudes toward SRH services, (3) factors that influence SRH services, (4) self-reported confidence in providing education related to SRH, (5) professional development related to SRH, and (6) demographics. The instrument covers seven areas: pregnancy tests, ovulation tests, contraception (non-hormonal and hormonal), emergency contraception, sexually transmitted and blood-borne infections, maternal and perinatal health, and general sexual health. Additional questions were included for Alberta to reflect the scope of practice. The instrument was well received by experts and participants of the pre-testing stages. The expert review related to the content and pre-testing review focused on wording, organization, and webpage display. The survey was modified accordingly.

Conclusions: Pharmacists are well-positioned in Canada, Japan, and Thailand to provide SRH services. The development of a survey involving several stages will provide valuable information about community pharmacists' practices in SRH, improving our understanding of pharmacists' roles and attitudes.

Compliance of the drug circuit in care units and outpatient clinics: A cross-sectional observational study within a 500-bed teaching hospital in 2019

Laura Gosselin[1], Géraldine Marquot[1], Mathilde Guillot[1], Ayesha Sarigat[1], Suzanne Atkinson [1], <u>Jean-François Bussières</u>[1,2]

[1]Unité de Recherche en Pratique Pharmaceutique, Département de pharmacie, CHU Sainte-Justine, Montréal, Québec; [2]Faculté de pharmacie, Université de Montréal, Montréal, Québec, Canada

Objectives: Evaluate the conformity of the drug circuit in a hospital setting using a standardized grid.

Methods: Observational, descriptive, cross-sectional study carried out in all inpatient care units (n=17) and outpatient clinics (n=30) from July 15th,2019 to July 24th,2019 at CHU Sainte-Justine, a teaching hospital. The grid included 25 criteria for inpatient care units and 14 criteria for outpatient clinics; the criteria were divided into eight themes. Data were collected by four research assistants by direct observation and interviews with four criteria scores: compliant, compliant with recommendations, non-compliant or not applicable. Only descriptive statistics were carried out.

Results: A high rate of compliance was observed for most of the criteria. For the inpatient care units, five criteria had a compliance rate <75% (use of return bins, fridge registers, fridge contents, cleanliness of the carts, availability of blank labels). For outpatient clinics, two criteria had a compliance rate <75% (control sheet for controlled substances, register of refrigerators). Fifty hours of direct observation and data processing were required. The audit was conducted by four research assistants without successfully involving a representative from each unit or external clinic; such involvement could increase ownership of the criteria and possibly compliance. A personalized report by care unit or clinic was sent to team managers to ensure follow-up.

Conclusions: This descriptive study highlighted an original approach to assessing the conformity of the drug circuit in 17 inpatient care units and 30 outpatient clinics within a university hospital center. The proportion of conforming criteria varied from 42%-100% depending on the criteria. An annual evaluation is relevant to monitor the quality of the drug circuit.

PP13

Ten years of an environmental surveillance program of hazardous drugs program in Canada

Jean-François Bussières[1,2], _Cynthia Tanguay_[1]

[1]_Unité de Recherche en Pratique Pharmaceutique, Département de pharmacie, CHU Sainte-Justine;_
[2]_Faculté de pharmacie, Université de Montréal_

Objectives: Describe an environmental surveillance program of hazardous drugs in Canada from 2010 to 2020.

Methods: This is a descriptive study. An environmental monitoring program has been set up by the team of the Research Unit in Pharmaceutical Practice in collaboration with the Association for Occupational Health and Safety - Social Affairs Sector and the National Institute of Public Health of Quebec. Twelve measurement points (six in pharmacies and six in outpatient oncology clinics) were identified to quantitatively measure nine dangerous drugs (e.g., cyclophosphamide, ifosfamide, methotrexate, 5-FU, irinotecan, gemcitabine) and qualitative (e.g., docetaxel, paclitaxel, vinorelbine). The quantification and detection of antineoplastic drugs in sample extracts were carried out by high performance liquid chromatography - tandem mass spectrometry (UPLC-MS-MS). Each participating establishment carried out its measurements according to a standard operating mode and a questionnaire describing the volumes of activities and the contamination prevention measures in place.

Results: The program was implemented in 2010 with hospitals in Quebec; since 2017, it has been offered on a national scale and up to 93 health hospitals carrying out an activity in oncology have participated in the annual multicenter study up to now. Each hospital can access their individual contamination results from a secure portal and can compare their results with the 75th and 90th percentiles calculated for all participants. The program explores the impact of preventive measures (for example, washing of medicine bottles, place of priming of tubes, use of a transfer device in a closed system) and formulates recommendations to participating hospitals. The program also helps generate research questions and hypotheses to reduce contamination. More than 30 projects and papers were published since the beginning of the program.

Conclusions: This study describes an original evaluation research initiative in pharmaceutical practice that led to the implementation of an original environmental monitoring program for dangerous drugs in Canada.

PP14

Study on nurses' knowledge of pharmacy tools provided to them regarding drugs and the medication use process

Audrey Grisel[1], Elody Blaisot[1], Alexia Lefebvre[1], Suzanne Atkinson[2], <u>Jean-François Bussières[3]</u>

[1]Unité de Recherche en Pratique Pharmaceutique, CHU Sainte-Justine Montréal, QC; [2] Services pharmaceutiques et Unité de recherche en pratique pharmaceutique, CHU Sainte-Justine; [3] Département de pharmacie et unité de recherche en pratique pharmaceutique, CHU Sainte-Justine; professeur titulaire de clinique, Faculté de pharmacie, Université de Montréal

Objectives: To Evaluate the level of knowledge of the Pharmacy Intranet of nursing professionals within a university hospital. The pharmacy Intranet provides to nurses many different tools and is a complete resource for the medication use process and policies in our hospital.

Methods: It is a descriptive cross-sectional study. We asked a convenience sample of nurses to find the answer to 21 practical questions in the available tools provided through the pharmacy intranet (eg: confirm a dose, find the policy on high alert medications, etc). We used an audit grid in the form of a questionnaire. We also asked nurses what could be added or modified to help. The audit was conducted from December 3rd to December 17th, 2019. If the answer was incorrect or unknown, the research assistant would show the nurse where to find the answer. Only descriptive statistics were carried out.

Results: 102 nurses were audited mainly during the day (80%, 82/102), evening (14%, 14/102) and night shift (4%, 4/102). Audited nurses had an average of 10 ± 9 years of experience. The rate of correct answers varied from 5% to 90% (average 57% ± 25%). Several questions with a high rate of correct answers were related to accreditation requirements (e.g., high-alert drugs, prohibited abbreviations); however, this is not necessarily always the case (e.g., medication reconciliation). Other questions related to the local requirements were also well answered (e.g., interactive personalized life-support drug sheet at the admission of each patient). Questions with a low rate of correct answers were linked to different reasons (i.e., insufficient training, lack of awareness of the importance of the tool or perceived limited usefulness). Suggestions to improve intranet tools were integrated when possible. Following the audit, a short video was produced to highlight the key elements of the intranet, to optimize their navigation and increase knowledge transfer.

Conclusions: It is necessary to periodically audit the use of tools related to the medication use process and to adjust to nurses' needs.

PP15

Comprehensive medication management in patients with Parkinson's disease by pharmacists: A single armed, retrospective cohort study

Jillian Reardon[1], Kane Larson[2], Larry Leung[1], Jason Min[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia; [2]Previous pharmacy student

Objectives: To characterize patients with Parkinson's disease (PD) being cared for at a pharmacist-led, primary care clinic and quantify pharmacist interventions.

Methods: A retrospective review of patients with PD who were assessed by a pharmacist at the UBC Pharmacists Clinic (the Clinic) from November 12, 2013 to July 31, 2018 was conducted. Data was extracted for key characteristics such as chief complaint, demographics, prescription and non-prescription medications, drug therapy problems, pharmacist recommendations, and pharmacist actions to resolve drug therapy problems. Data from both initial consultations and follow-up visits was included.

Results: A total of 131 PD patients self-referred or were referred by a health care provider for pharmacist assessment over the study period. Patients were taking a mean of 5.8 prescription and 3.2 non-prescription medications. During initial consultations, the most common chief complaint was related to PD management (38%) and the most common pharmacist recommendation was related to adjustment of dopaminergic medications to improve motor symptom control (37%). Within a 16-month period, pharmacists identified 165 drug therapy problems, equating to an average of 1.3 per patient. Approximately 41% of patients lived outside of the Metro Vancouver District Region, where the Clinic is located, representing the geographic diversity of patients seeking care outside of their usual care environment.

Conclusions: Patients with PD seeking pharmacist consultation were complex due to volume of medications and presence of drug therapy problems. PD patients are likely to benefit from in-depth, consultative services from pharmacists.

PP16

Patient reported medication experiences at the UBC Pharmacists Clinic

Jillian Reardon[1], Gloria Chan[1]

[1]*Faculty of Pharmaceutical Sciences, University of British Columbia*

Objectives: Patient attitudes and experience with medications can impact compliance and health outcomes. This study aimed to qualify patient-reported medication experiences at the UBC Pharmacists Clinic.

Methods: A retrospective review of a sample of patients seen at the UBC Pharmacists Clinic for an initial pharmacist consult between January to June 2019 was conducted. Pertinent data (patient demographics, medication history, patient-reported medication experiences) were extracted from electronic medical records, deidentified, categorized and coded, and analyzed. Qualitative content-analysis was used to identify major themes within the patient-reported medication management data.

Results: A sample of 100 patients were included (61% female, mean age 71 years). On initial pharmacist visit, 80% of patients were health-care provider referred and 20% were self-referrals. Mean prescription medications and non-prescription medications were 5.9 and 3.2, respectively. The proportion of patients using medications for cardiac, psychotropic, pain, neurological, and/or diabetes indications were 71%, 51%, 52%, 23%, and 21%, respectively with patients fitting into multiple categories. The majority of patients expressed neutral attitudes towards medications stating they would take them if deemed necessary for their health. Most patients self-managed medications using vials (37%) or dosettes (19%). A smaller portion of patients needed assistance with medication management, either using pharmacy compliance packaging (15%) or caretaker assistance (6%). Sixteen percent of patients reported barriers to medication adherence (forgetting/unwilling to take doses >20% of the time, cost concerns, trouble with administration).

Conclusions: Patients seen at the Pharmacists Clinic were generally proficient at self-managing medications with minimal barriers to adherence. Patients seen for pharmacist referral did not express strong positive or negative attitudes toward medications but were generally accepting. These perspectives likely reflect a high health literacy of patients seen at the clinic and that referred patients were already used to taking a significant number of medications. Developing a standardized approach to assessing and documenting patient attitudes toward medications is warranted to better capture and utilize this information in the care of patients.

PP17

Economic evaluation of pharmacists prescribing for upper respiratory tract infections and contact dermatitis in Ontario, Canada: A cost-minimization analysis

John Kim[1], Adeline Tian[1], William Wong[1], Wasem Alsabbagh[1]

[1]School of Pharmacy, University of Waterloo

Objectives: Plans to enable pharmacists to prescribe for minor ailments are being developed in Ontario, depending on the potential to improve access to care. However, the economic impact of expanding pharmacists' scope of practice is largely unknown. The objective of this study is to evaluate the potential savings in healthcare spending in Ontario from introducing pharmacists as prescribers.

Methods: A decision tree was developed to perform a cost-minimization analysis of pharmacists prescribing for upper respiratory tract infections (URTIs) and contact dermatitis (CD) from a public payer perspective. Input parameters were primarily derived from published data while modelling assumptions were made if data was unavailable. The prescribing strategy where both pharmacists and physicians can prescribe was termed the RPh Model (RM), while the current prescribing strategy for URTIs and CD, where only physicians can prescribe, was termed the Usual Care Model (UCM). Two reimbursement strategies were considered. Fee-detached scenario (FDS) assumed consultation payments are given to pharmacists regardless of assessment outcome and fee-attached scenario (FAS) assumed that payments would only be made if a prescription is written.

Results: In the base-case analysis, the RM was cost-saving compared to the UCM. In the FDS, at a 38% service uptake rate, the RM saved $8.46 and $4.01 per patient compared to the UCM for URTIs and CD, respectively. In the FAS, the RM saved $12.58 per patient for URTIs. It was cost-saving to enable pharmacists to prescribe for both URTIs and CD in all variations of the deterministic sensitivity analyses. Per 10,000 patients, the RM resulted in 384 and 115 ED visits averted for URTIs and CD, respectively. Sensitivity analyses indicated that most of the modelling assumptions that were made had negligible impact on the overall outcome of the study.

Conclusions: Our study showed that enabling pharmacists to prescribe for URTIs and CD could potentially lead to large savings for the government. The FAS is projected to lead to larger savings than the FDS. In every scenario that was simulated, pharmacists as prescribers led to cost savings and decrease in ED visits.

PP18

Qualitative analysis of Reddit threads to identify vaping-related health concerns

Karen Dahri[1], _Karan Puri_[1], _Mary De Vera_[1]

[1]_Faculty of Pharmaceutical Sciences, University of British Columbia_

Background: The rate of electronic cigarette usage ("vaping") in North America has increased substantially, especially among young smokers. This past year, alarming reports have emerged in the literature of severe pulmonary disease and deaths related to vaping. It is unclear if these reports have had an impact on users' views. Reddit, a social news website that has 330 million monthly active users, a majority between the ages of 18-24, is a rich source of data to understand the views of the vaping community regarding these emerging concerns.

Objectives: To gather perspectives on vaping related health concerns among individuals who use electronic cigarettes.

Methods: The vaping subreddits were searched using key words to isolate for health-related posts between August to October of 2018 and August to October of 2019. Threads were reviewed by two investigators to determine if they met the inclusion criteria of English language and content related to health and vaping. Average user score of included submissions was noted, and the threads were subsequently analyzed with NVivo to auto-code for sentiment (machine identification of words with positive or negative connotation). Content analysis was also conducted through an inductive approach. Submission themes prior and post the health concerns (2018 vs 2019) were compared.

Results: A total of 843 threads were included. Threads posted in the 2019 timeframe involved negative news about vaping (174), misrepresentation of vaping (143) and tetrahydrocannabinol's (THC) role in the emerging health concerns (139). Users collectively assigned higher scores to THC's role in the emerging health concerns (score = 99) and misrepresentation of vaping (score = 52), whereas negative news about vaping was heavily downvoted (score = 4). Prior to publicized health concerns (2018), the primary content identified was related to government action against vaping (40).

Conclusions: The Reddit vaping community primarily engaged in discussion regarding the health concerns about vaping and the misrepresentation of vaping by mainstream media. While negative news stories about vaping dominated total submissions, the response to those posts by subreddit members was predominantly negative.

Portrait of pharmacists practicing in Quebec Family Medicine Groups (FMG): A focus on university affiliated teaching groups (FMG-U)

Marie-Claude Vanier[1], Nicolas Dugré[1], Anne Maheu[1], Léonie Rouleau[1], Lyne Lalonde[1], Line Guénette[2]

[1]Faculté de pharmacie, Université de Montréal; [2]Faculté de pharmacie, Université Laval

Background: The 2015 Ministry of Health funding program, recognizing pharmacists as one of the core professions to include in Quebec Family Medicine Groups (FMG), favored rapid growth of pharmacists' integration in those clinics. In January 2019, 79% (262/333) of FMGs included at least one pharmacist. However, integration of pharmacists in university affiliated teaching Family Medicine Group (FMG-U) started earlier and practice settings and tasks might differ.

Objectives: To describe and compare characteristics of pharmacists working in FMG-U with those working in FMG.

Methods: This Quebec province-wide cross-sectional study was the first-step in building a community of practice for FMG pharmacists. Pharmacists practicing in FMG or FMG-U were identified by phoning each clinic. They were interviewed and sent a link to an online questionnaire. Survey questions covered: FMG descriptors; tasks; satisfaction; needs to optimize their practice; demographics; training and practice. Data were compared using descriptive analysis and statistical tests (independent samples t-test for comparison of means and Chi square test for comparison of proportions).

Results: A total of 178 pharmacists completed questionnaire and included 46 (25.8%) of pharmacists working in FMG-U. Mean worked time by FMG-U pharmacists was significantly higher with 19.5 (±11.7) hours/week vs 15.8 (±10.8) for FMG. Pharmacists in FMG-U were more experienced (34.8% joined the practice > 3 years ago vs 6.8% for FMG (p=0.05). Tasks frequently performed were, for FMG-U and FMG respectively: answering family doctors' questions (95.6% vs 87.9%), medication reviews (95.6% vs 82.6%), follow-ups (69.6% vs 72.0%), medication adjustments to decrease risk (67.4% vs 51.5%) and informal therapeutic education to team (54.3% vs 18.9%). FMG-U pharmacists were more often included in team communications (82.6 vs 62.9% p=0,014), team meetings (60.9 vs 28.8% p=0.0001) and more involved in formal-informal teaching activities (36.9-54.3 vs 10.3-18.9 p< 0.0001).

Conclusions: Most FMG pharmacists are new to this practice. Data from this analysis suggest that FMG-U pharmacists are better integrated in the clinical team than FMG pharmacists, possibly because of their longer experience and greater hours at the clinic. Experience of FMG-U can be shared to other FMGs in the community of practice to facilitate pharmacists' integration in those teams.

Shades of gray in vaccine decision making: Understanding the challenges of influenza vaccine hesitancy in Ontario community pharmacies

Nancy Waite[1], Sherilyn Houle[1], Richard Violette[1], Gokul Raj Pullagura[1]

[1]School of Pharmacy, University of Waterloo

Objectives: Sadly, vaccine hesitancy (VH) was recently recognized by World Health Organization as one of the top 10 threats to global public health. Yet, limited research explores healthcare providers' experience of this phenomenon. Our study aims to understand community pharmacists' self-perceived knowledge, attitudes and experiences with influenza VH, and explore factors affecting their engagement with patients about the influenza vaccine.

Methods: A mixed-methods approach was used; a cross-sectional survey followed by semi-structured interviews with Ontario community pharmacists. The online survey was sent to pharmacists who had agreed to participate in research through the Ontario College of Pharmacists and survey questions explored self-perceived knowledge, attitudes and behaviour towards influenza VH. Pharmacists could opt into a phone interview and were asked questions that provided a more nuanced and in-depth understanding of their experience with influenza VH. The survey data was analyzed descriptively, and the interview data was analyzed using a thematic analysis framework.

Results: There were a total of 885 survey responses (response rate 16%), and 22 interviews were conducted. Pharmacists reported serving an average of 16 (SD 28) individuals hesitant to receive the influenza vaccine each week. Their self-reported knowledge pertaining to influenza disease, confidence and ability to identify and address influenza VH was consistently high. Pharmacists' engagement with patients about the influenza vaccine was modulated by a complex and mutually reinforcing constellation of attitudes and behaviours which included: a binary (pro-vaccine or anti-vaccine) perception of patient vaccination decisions; a conflation of those expressing hesitancy with those that were anti-vaccine; and a passive approach to patient engagement, wherein patients were found to be the primary initiators of vaccine conversations. Although pharmacists recognized the importance of educating patients and addressing their vaccine-related concerns, barriers such as limited time, inadequate staffing, and poor remuneration restricted optimal patient engagement about influenza vaccinations.

Conclusions: If we are to capitalize on the patient care skills and convenient access to community pharmacists in order to address VH, future interventions must enable proactive pharmacist led patient interactions. This will require helping pharmacists understand how to address vaccine hesitancy and mitigating the identified operational and financial barriers.

PP21

Implementation of the appointment-based model in community pharmacies

Tiana Tilli[1], Qiqi Lin[2], Annalise Mathers[2], Jen Baker[1], Saleema Bhaidani[1], Louis Wei[1], Paul Grootendorst[2], Suzanne Cadarette[2], Lisa Dolovich[2]

[1]Wholehealth Pharmacy Partners, Markham; [2]Leslie Dan Faculty of Pharmacy, University of Toronto

Objectives: Community pharmacy practice is traditionally reactive in nature, waiting for patients to request medication refills. These refills are usually not aligned, resulting in decreased adherence and workflow efficiencies. The appointment-based model (ABM) is an alternative, proactive model of care that synchronizes prescription refills and schedules regular appointments for the patient and pharmacist to review medication needs. In the US, the ABM has improved patient adherence. This study is the first in Canada to evaluate the impact of the ABM within independent community pharmacy practice across Ontario with regard to medication adherence and uptake of clinical services.

Methods: In September 2017, the ABM was implemented across five independent community pharmacies in Ontario operating under the Wholehealth banner. In October 2018, a convenience sample of three pharmacies was selected; demographic and quantitative data was extracted from the pharmacy management software. Descriptive statistics, frequencies, and quantitative indicators were analyzed.

Results: Preliminary analysis of a subset of 40 patients (52.5% female; mean age (± SD) 71.3 ± 8.8) revealed medically complex patients prescribed on average 6.1 ± 2.1 medications. Polypharmacy was experienced by 80% of patients. Patients had a statistically significant reduction in mean number of distinct refills dates (6.4 ± 3.4 six months pre-implementation vs. 4.1 ± 2.1 six months post-implementation, p <0.001) yet a statistically significant increase in the mean number of refills (10.5 ± 4.7 six months pre-implementation vs. 12.1 ± 5.5 six months post-implementation, p = 0.005). This reduced filling complexity may reflect higher levels of adherence. Full analysis of 131 patients, including evaluation of clinical services, is ongoing and will be presented.

Conclusions: These findings support the broader adoption of the ABM as a proactive model of pharmacy care that has potential to increase medication adherence for complex patients. Future work will evaluate patient and pharmacy staff experiences of the ABM.

PP22

Trajectories of care in patients with chronic obstructive pulmonary disease

Sandrine Henri[1], Ronald Herrera[1], Amélie Forget[1,2], Lucie Blais[1,2,3]

[1]Faculty of Pharmacy, University of Montreal; [2]CIUSSS du Nord-de-l'île-de-Montréal; [3]AstraZeneca Pharmaceutical Chair in Respiratory Health

Background: Individuals with chronic obstructive pulmonary disease (COPD) navigate the healthcare system in many ways. A better understanding of COPD patients' trajectory of care (ToC) could help policymakers optimize resource allocation.

Objectives: To identify and characterize ToCs in individuals with COPD in Quebec, Canada.

Methods: A retrospective COPD cohort was built by linking several Quebec administrative databases (Régie de l'assurance médicale du Québec, Maintenance et exploitation des données pour l'étude de la clientèle hospitalière and Databank of Official Statistics on Québec) and Quebec respondents to the Canadian Community Health Survey (CCHS), available from 2007 to 2013. CCHS provided data on the social, environmental and health characteristics of participants. Also, administrative databases, available from 1996 to 2016, provided data on ambulatory visits, emergency department visits, and hospitalizations. Cohort entry occurred 2 years following survey completion. In the 2 years following CCHS, ToCs were identified through sequence analyses, an emerging statistical method which regroups patients based on their use of healthcare services (HCS). Chi-squared and V tests were used to identify patients' characteristics that differ from one ToC to another.

Results: The cohort includes 3303 participants: mean age of 68 yo and 54% women. Five ToCs were identified in the cohort of COPD patients: 1) low use of HCS (43%), 2) average use of HCS predominantly with specialists (16%), 3) high use of HCS predominantly with family physicians (20%), 4) high use of HCS predominantly with specialists (16%), and 5) high use of HCS predominantly in acute care (5%). Patients' characteristics that best distinguish ToCs were age, comorbidity index and perceived health.

Conclusions: Sequence analysis revealed that most patients seem to be treated in ambulatory care and that only 5% of patients' ToC was characterized by acute care. This might indicate judicious patients' follow-up. The next step is to evaluate whether ToCs can predict mortality among COPD patients.

Asthma medication use during pregnancy: Does timing of asthma diagnosis matter?

Cristina Longo[1], Simone Issa[1,2], Amelie Forget[1,2], Lucie Blais[1,2,3]

[1]Faculté de pharmacie, Université de Montréal; [2]Centre intégré universitaire de santé et de services sociaux du Nord-de-l'île-de-Montréal; [3]Endowment Pharmaceutical Chair AstraZeneca in Respiratory Health

Objectives: Asthma medication use during pregnancy is recommended by international guidelines, with poor control being linked to higher risk of perinatal outcomes. Women newly diagnosed with asthma before pregnancy are more likely to incorporate medication use into their routine and persist even after pregnancy. Women newly diagnosed with asthma during pregnancy are less likely to use asthma medications due to fear of adverse effects. This study aims to explore whether asthma medication use during pregnancy differs in women with asthma during the first 19 weeks of pregnancy compared to women diagnosed 2 years before pregnancy.

Methods: We conducted a retrospective cohort study using the Quebec asthma and pregnancy database formed by the linkage of Quebec healthcare administrative databases between January 1, 1998 and March 31, 2010. Use of inhaled corticosteroids (ICS), ICS/long-acting ß2-agonists (LABA) and short-acting ß2-agonists (SABA) during pregnancy was defined as the number of filled prescriptions from 20 weeks of pregnancy (CE) until delivery. Use of oral corticosteroids (OCS) during pregnancy was defined as the number of days of filled prescriptions from CE until delivery. Poisson regression models were used to compare the rate of asthma medication use between women diagnosed with asthma before and during pregnancy while controlling for confounding variables.

Results: The cohort included 1,731 asthmatic women diagnosed before pregnancy and 359 women diagnosed during pregnancy. Women with pregnancy-onset asthma were found more likely to use ICS [aRR 2.0, 95% CI 1.6–2.3]and SABA [aRR 2.0, 95% CI 1.7–2.4] and less likely to use OCS [aRR 0.5, 95% CI 0.3–0.8] during pregnancy than women diagnosed with asthma before pregnancy. No difference in ICS/LABA use [aRR 1.0, 95% CI 0.8–1.4] during pregnancy between both groups.

Conclusions: Taking into consideration low asthma medication use during pregnancy and the potential of more severe asthma when onset occurs during pregnancy, these results support asthma screening when pregnancy is planned to initiate appropriate asthma therapy before or as early as possible in pregnancy.

Impact of drug insurance type (private/public) on the cost of drugs in Quebec

Michel Chamoun[1,2], Amélie Forget[1,2], Isabelle Chabot[1], Mireille Schnitzer[1], Lucie Blais[1,2,3]

[1]Faculté de pharmacie, Université de Montréal; [2]Centre intégré universitaire de santé et de services sociaux du Nord-de-l'île-de-Montréal; [3]Endowment Pharmaceutical Chair AstraZeneca in Respiratory Health

Background: In the province of Quebec, residents are either insured by the Public Drug (PDP) or a private drug plan. Drug cost in Quebec has three components: molecule's price, wholesaler margin of profit and pharmacist's fee. The first two components are regulated by the PDP and are the same for publicly and privately insured patients. The third component is fixed (around CAD$8.40) and regulated by the PDP for publicly insured patients while it is determined freely by the pharmacy owner for privately insured patients.

Objectives: This study aimed to compare the drug and out-of-pocket costs of Quebec residents covered by private drug plans to those covered by the PDP.

Methods: We used a sample of prescriptions filled between January 1ˢᵗ, 2015 and May 23, 2019 selected from reMed, a Quebecers' drug claims database. We created strata of prescriptions filled by privately insured patients based on the DIN, quantity dispensed, number of days of supply, pharmacy identifier and a date corresponding to a publication of RAMQ's List of Medications that were matched to stratum of prescriptions filled by publicly insured patients. The difference in drug cost and out-of-pocket expenses between private plans and the PDP were analyzed with linear regression models.

Results: Based on 38 896 strata of prescriptions (162 019 prescriptions in total), we observed that privately insured patients had to pay CAD$9.35 (95% CI: 5.58 ; 13.01) more on average per prescription than publicly insured patients (CAD$62.34 vs CAD$52.99), representing a difference of 17.6%. We also found that out-of-pocket expenses were on average 1.01$ (95% CI: -1.22; -0.80) lower per prescription for privately than publicly insured patients (CAD$6.94 vs CAD$7.95).

Conclusions: This study showed that, on average, drug cost is substantially higher for privately insured Quebecers. Knowing that adherence is affected by drug cost, these results will be useful to help public health authorities to make informed decisions about drug policies.

Development of a community pharmacy-based intervention for patients with uncontrolled asthma

Claudie Turcotte[1,2], Rébecca Fénélon-Dimanche[1,2], Catherine Lemière[2,3], Marie-France Beauchesne[1,4], Bachir Abou-Atmé, Lucie Blais[1,2]

[1]Faculté de pharmacie, Université de Montréal; [2]Centre de recherche de l'Hôpital du Sacré-Cœur de Montréal; [3]Faculté de médecine, Université de Montréal; [4]Centre hospitalier universitaire de Sherbrooke

Objectives: Achieving optimal asthma control (AC) can be difficult, despite the availability of effective treatments. Studies have found that community pharmacists can play an effective role in the management of patients with uncontrolled asthma (UA). The objective of this study was to develop an intervention that enables the identification and management of patients with UA in community pharmacies.

Methods: Focus groups (FG) with 5 and 6 community pharmacists were conducted using a semi-structured interview guide. Covered topics included criteria to identify patients with UA, content of the intervention, and logistical issues in the management of patients with UA in pharmacies. Individual interviews with 5 pharmacists and 3 patients with asthma were also conducted to test the intervention's prototype and finalize its content. Individual interviews and FG verbatim were analyzed with a thematic approach, using an iterative process.

Results: During FG, pharmacists discussed how they screen patients to identify those with UA using prescriptions refills and their needs for a convenient and valid AC assessment tool. Pharmacists mentioned that they must identify the potential cause of UA in order to appropriately guide their intervention. During individual interviews, pharmacists were optimistic regarding the intervention's implementation in pharmacies. Patients have shared their interest and willingness to be followed by their pharmacist to improve AC. The final intervention developed consists of a structured face-to-face consultation with the pharmacist in order to measure AC, to identify the cause of UA and to assist the patient according to it, and to set goals with the patient for the follow-up at 3 months.

Conclusions: A consensus was obtained for the intervention's key elements. The next step is a feasibility of implementation study in community pharmacies that will start in January 2020.

Compounded nifedipine and diltiazem for wound healing: Importance of base selection according to drug release profiles

Remigius Agu[1], _Arezou Teimouri[1]_, _Pollen Yeung[1]_

[1]College of Pharmacy, Dalhousie University

Background: Topical nifedipine and diltiazem are currently compounded in community pharmacies with commonly used bases (e.g., white petrolatum and Glaxal Base™). However, literature information on the optimal base for the drugs' release is scarce. For topical formulations, the base should facilitate drug release and permeation through the skin for therapeutic effects.

Objectives: To determine release profiles of extemporaneously compounded nifedipine and diltiazem in commonly used bases in pharmacy practice.

Methods: Nifedipine 0.2, 2 and 10% (w/w) release from Glaxal Base™, K-Y® Jelly, Aquaphor® Healing Ointment, and diltiazem 2% (w/w) from Glaxal Base™, hydroxyethyl cellulose-based gel, and white petrolatum, was determined using the Franz-Diffusion cell system. The cumulative release was calculated at 0.5, 1, 1.5, 2, 3, 4, and 6 hours. Two-way ANOVA with Tukey's posthoc test was used for statistical analyses with a p-value of <0.05 considered significant.

Results: At 0.2%, cumulative nifedipine release was highest from Glaxal Base™. At 2 and 10%, nifedipine release was highest from K-Y® Jelly, although this was only significantly different from Glaxal Base™ at 6 h and 1.5, 4, 6 h ($p < 0.05$), respectively. Diltiazem release from Glaxal Base™ and white petrolatum was significantly lower than the gel ($p < 0.05$). No significant difference in diltiazem release from Glaxal Base™ at 0.5 h was observed versus white petrolatum ($p > 0.05$). Nifedipine and diltiazem release both followed Higuchi's mathematical model with the highest coefficient of determination (R^2) for all formulations.

Conclusions: Glaxal Base™ is the recommended base for compounded topical nifedipine (0.2%). For higher concentrations of nifedipine (2 and 10%), both Glaxal Base™ and K-Y® Jelly are options for base selection. A hydroxyethyl cellulose-based gel is recommended for diltiazem (2%) topical.

In vitro antioxidant activity of endophytic yeast Pichia kudriavzevii isolated from Alchornea cordifolia

_Mutiat B. Ibrahim[1]_*, Elizabeth O. Oyebanji[2], Muinah A. Fowora[3], Abdulrahman Usman[4]

[1]_Department of Pharmacognosy, Faculty of Pharmacy, University of Lagos, Lagos State, Nigeria;_
[2]_Department of Biological Sciences, Mountain Top University, Ogun State, Nigeria;_ [3]_Molecular Biology and Biotechnology Department, Nigerian Institute of Medical Research, Lagos State, Nigeria;_
[4]_Department of Pharmaceutics and Pharmaceutical Technology, Faculty of Pharmacy, University of Lagos, Lagos State, Nigeria._

Background: Endophytes are of biotechnological interest due to their bioactivity. Antioxidants are important protector of cellular damage.

Objectives: This study aimed to evaluate the antioxidant potential of an endophytic fungus isolated from _Alchornea cordifolia_ (Schum. & Thonn.) Müll. Arg (Euphorbiaceae).

Methods: Endophytic yeast was isolated from the leaves of _A. cordifolia_ and identified by ITS-rDNA sequence analysis. Antioxidant property of the isolated endophytic yeast culture filtrate extracted with ethylacetate was screened in vitro. 2, 2- diphenyl-1-picrylhydrazyl (DPPH) radical scavenging and reduction of ferric ion by _ortho_-phenanthroline methods were used to evaluate the antioxidant activity.

Results: The ethyl-acetate extract of _Pichia kudriavzevii_ showed potent antioxidant activity against DPPH radical with IC50 value of 108.2 ± 0.018 μg/ml. The fungal extract also showed an excellent antioxidant activity for reduction of ferric ions with an absorbance value of 0.830 at 500 μg/ml.

Conclusions: These results suggest that metabolites produced by the endophytic fungus _Pichia kudriavzevii_ isolated from the leaves of _Alchornea cordifolia_ can be a potential source of natural antioxidant compounds.

POSTERS – PHARMACEUTICAL SCIENCE
PS04

A physiological approach to predicting pharmacokinetics in chronic kidney disease

Paul Malik[1], Shams Ismaeil[1], Urooj Advani[1], Sebastian Djie[1], Andrea Edginton[1]

[1]*School of Pharmacy, University of Waterloo*

Background: The current approach to approximating the pharmacokinetics of drugs in patients with chronic kidney disease (CKD) only accounts for changes in the estimated glomerular filtration rate. However, CKD is a systemic and multi-faceted disease that alters many body systems.

Objectives: To develop and evaluate a whole-body mechanistic approach to predicting pharmacokinetics in patients with CKD.

Methods: Physiologically-based pharmacokinetic (PBPK) models were developed in PK-Sim v8.0 (www.open-systems-pharmacology.org) to mechanistically represent the disposition of eight compounds in healthy human adults. The compounds selected were eliminated by glomerular filtration and active tubular secretion to varying degrees. After a literature search, the healthy adult models were adapted to patients with CKD by numerically accounting for local changes in glomerular filtration rate, kidney volume and renal blood flow, as well as systemic changes in hematocrit, plasma protein concentrations and gastrointestinal physiology. Model performance in CKD was evaluated against pharmacokinetic data from literature.

Results: Integration of the CKD parameterization enabled predictions for clearance and overall exposure that were within 1.5-fold error across all compounds and patients with varying stages of renal impairment. Clearance was slightly over-estimated in patients with severe CKD for compounds that were substrates for renal transporters. A modest improvement was noted over the conventional approach, though the difference was most pronounced for acebutolol.

Conclusions: Accounting for the systemic burden of CKD improves predictions for pharmacokinetics in renal impairment. A physiological representation of the local changes in CKD enables the pursuit of mechanistic research questions. Further research is required to qualify its use for 'first-in-CKD' dose selection and clinical trial planning.

Mucoadhesive nasal delivery system for hypothyroidism

Remigius Agu[1], *Obinna Esomchukwu[1]*, *Ali Imran[1]*

[1]College of Pharmacy, Dalhousie University

Background: Hypothyroidism is the most common endocrine disorder affecting 3-5% of the global population. Oral levothyroxine tablet is currently the mainstay of replacement therapy. However, there are significant pathophysiological and pharmacological challenges that lead to therapeutic failure. Some patients are unable to absorb oral levothyroxine, thus depending lifelong IV levothyroxine injections, which is both expensive and inconvenient.

Objectives: To develop, optimize, and characterize nasal powder delivery systems for levothyroxine using mucoadhesive polymers: chitosan and hydroxypropylmethylcellulose.

Methods: Six nasal levothyroxine formulations were developed with either chitosan or hydroxypropylmethylcellulose as mucoadhesive. The formulations were prepared through freeze-drying by varying the drug to polymer ratio (1:1, 1:3, and 1:5). The surface morphology, particle size, zeta potential, thermal properties as well as the *in vitro* release were assessed to determine the physicochemical properties and release characteristics of the formulations, respectively.

Results: The freeze-dried formulations displayed a compact needle-like surface morphology. LT4-chitosan formulations, 1:1, 1:3, and 1:5 had mean particle size of 2.45 ± 0.88 µm, 2.76 ± 1.38 µm, and 1.59 ± 0.27 µm, respectively. Mean particle sizes for 1:1, 1:3, and 1:5 LT4-HPMC formulations were 0.56 ± 0.02 µm, 0.22 ± 0.06 µm, and 0.46 ± 0.04 µm. Zeta potential for LT4-chitosan formulation 1:1, 1:3, and 1:5 were -18.7 ± 1.00 mV, -16.2 ± 0.79 mV, and -19.17 ± 1.01 mV, respectively. LT4-HPMC 1:1, 1:3, and 1:5 formulations had zeta charges of -11.66 ± 3.16 mV, -6.06 ± 3.92 mV, and -9.53 ± 1.68 mV, respectively. Differential calorimetric analysis confirmed drug-polymer integration in all formulations, and X-ray powder diffraction showed both chitosan and HPMC formulations as crystalline configuration. The formulations with the highest *in vitro* release were LT4-HPMC 1:3 and LT4-chitosan 1:5.

Conclusions: Results of this study indicated that chitosan and HPMC can be used as systems for the intranasal delivery of LT4.

Stability of compounded topical nifedipine in cream, gel and ointment bases

Arezou Teimouri[1], Remigius Agu[1], Pollen Yeung[1]

[1]College of Pharmacy, Dalhousie University

Background: Topical nifedipine is compounded in community pharmacies with readily available bases such as Glaxal Base™, K-Y® Jelly, and Aquaphor® Healing Ointment. Literature information on the stability of these products is scarce. Stability studies provide pharmacists with the scientific rationale for assigning beyond-use-dates (BUDs) to topically compounded products.

Objectives: To investigate the stability of compounded nifedipine cream, gel, and ointment formulations dispensed in white plastic (WP) and glass amber (GA) jars.

Methods: Extemporaneously compounded nifedipine cream (Glaxal Base™), gel (K-Y® Jelly) and ointment (Aquaphor®) in WP and GA jars were stored at 4°C, 23°C and 40°C. We determined potency on days 0, 7, 14, 30, 60, and 90 and subsequently assigned beyond-use-dates (BUDs) based on USP recommendations, organoleptic properties, and pH changes.

Results: Nifedipine potency in cream and ointment stored in WP jars was within ±10% of initial for 90 days (excluding day 14 for cream). In GA jars, potency was outside the acceptable range by day 14 at 23°C but within range for 90 days at 4°C (excluding day 30). Nifedipine potency was maintained for 90 days in both jars at 23 and 4°C (excluding day 30) and in WP jars at 40°C, but 60 days stored in GA jars. The pH of formulations was stable with changes of less than 1-unit pH. At 40°C, a significant decrease in apparent viscosity of cream was evident on day 90. There was a decrease in apparent viscosity and phase separation of the ointment at 40°C and an increase in apparent viscosity (difficult to mix) at 4°C on day 14 onwards. Significant organoleptic changes were observed by day 7 at 40°C (decrease in apparent viscosity and an abnormal odor by day 90), day 30 at 4°C (thicker consistency), and day 90 at 23°C (abnormal odor).

Conclusions: Storage in WP jars at 23°C is recommended for compounded topical nifedipine cream and ointment (for 90 days), and for gel (60 days). Products should be kept in the dark due to the light-sensitive nature of nifedipine.

Optimizing doxorubicin-G-CSF chemotherapy regimens for the treatment of triple-negative breast cancer

Rosalba Vivian Paredes Bonilla[1]

[1]Faculté de pharmacie, Université de Montréal

Background: Cytotoxic chemotherapy continues to be a first line treatment option for the majority of cancers, however, neutropenia is a common toxic side-effect of treatment. To mitigate the risk of febrile neutropenia and associated immunosuppression, prophylactic treatment with granulocyte colony-stimulating factor (G-CSF), an endogenous cytokine responsible for neutrophil production regulation, is administered concomitantly; the size of the dose and the exact timing of combined chemotherapy and G-CSF is crucial to obtain positive treatment outcomes.

Objectives: Leveraging previous work that optimized regimens based on G-CSF timing (Craig et al., 2015), the aim of this work is to use a quantitative systems pharmacology approach to optimal scheduling to determine chemotherapy regimens against Triple Negative Breast Cancer (TNBC) that maximize anti-tumour effects and reduce the risk of neutropenia.

Methods: We combined PK/PD models of doxorubicin and G-CSF with a Gompertzian tumour growth model, and a QSP model of neutrophil production. The integrated model was then leveraged to simulate various scenarios of the cytotoxic chemotherapy with prophylactic G-CSF regimens. We performed parameter estimation of tumour growth _In Vitro_ from TNBC Cell lines Growth (McKenna et al., 2017) and calibrated the neutropenic effects from (Vainstein et al., 2006). We modulated the frequency, number of cycles, and the dose size of the chemotherapy, and by the means of an optimization function we selected the bests regimens. Finally we performed a sensitivity analysis to measure which parameter is more sensitive to fluctuations in the Gompertzian tumour growth model.

Results: Our results suggest that the frequency of chemotherapy impacts on overall tumour growth, but at a cost to neutrophil counts. We found that $30mg/m^2$ and $45mg/m^2$ were the dose sizes with less Neutropenic effects. $45mg/m^2$, every 14 days for 6 cycles represents the best choice that maximizes the anti-tumour effects. Finally, we found that our Gompertz model is sensitive to changes in the `α growth parameter but less in the β parameter. This is consistent with the behaviour that we see during tumour growth when interrupting chemotherapy and dosing again.

Conclusions: In conclusion, we predicted that regimens with intermediate doxorubicin dosage amounts strike the balance between avoiding neutropenia and controlling tumour growth over the treatment cycle. This study contributes to the understanding of the use of doxorubicin with G-CSF, and demonstrated how rational considerations can positively impact on clinical decision-making.

PS08

Determining blood-brain-barrier penetration of small molecule drugs using machine-learning modelling algorithms

Thomas Bogdanowicz[1], _Mayuri Gupta[2]_, _Christopher Barden[2]_, _Donald Weaver[1,2]_

[1]Leslie Dan Faculty of Pharmacy, University of Toronto; [2]Krembil Research Institute, University Health Network

Objectives: The aim of this study was to build robust in-silico machine-learning models to predict brain concentration parameters of small molecule drugs. Kp (brain:blood concentration ratio) and Kpuu (unbound brain:blood concentration ratio) are fundamental pharmacokinetic parameters used to evaluate CNS druggability and were selected as the targets for our models.

Methods: The Python computer programming language was used in conjunction with the RDKit cheminformatics platform to construct and tune six different predictive algorithms (linear, random forest, support vector, gradient boosting regressor, gaussian process and boosted decision tree). RDKit generated a molecular fingerprint (2048 bit binary code) for each molecule, which was used as input information for the creation of each model. Given a molecule's structure, each model is set to predict Kp and Kpuu. The coefficient of determination (R^2) was used to evaluate each model on new data, to assess its predictive power. The influx/efflux ratios of four blood-brain-barrier transporters (OCT1, OCT2, BCRP, Pgp) were similarly modelled and integrated into the Kp and Kpuu models to further improve their predictive accuracy on new data.

Results: The Bayesian gaussian process and the gradient boosting regressor were identified to be the most accurate models to predict both Kp and Kpuu, with R2 scores of >0.90 in both test sets. The inclusion of blood-brain-barrier transporter information resulted in a slight (0.02-0.05) increase in R2 on test sets of both Kp and Kpuu models.

Conclusions: Predictive Kp and Kpuu models have been created to support drug design teams assess and evaluate brain penetration capacity of small molecule drugs for research purposes. To increase practical usability of this work, all predictive algorithms have been integrated into a freely accessible installable program, available on the internet for use on any computer.

PS09

Development and evaluation of a theranostic nanomedicine platform for targeted drug delivery in rheumatoid arthritis

Zeynab Nosrati[1], Tullio V. Esposito[1], Marta Bergamo[1], Cristina Rodriguez-Rodriguez[1], Katayoun Saatchi[1], Urs O. Häfeli[1]

[1]Faculty of Pharmaceutical Sciences, University of British Columbia

Background: Many rheumatoid arthritis (RA) patients fail to respond satisfactorily to frequently given anti-arthritic drugs or experience side effects. The main reason for non-ideal treatment is that insufficient drug doses reach the joints, therefore higher and more frequent doses needed.

Objectives: To improve the drug pharmacological profile and direct the anti-inflammatory activity to the inflamed joints, the purpose of our study was developing a pro-drug with increased circulation time resulting in sustained release when it reaches the microenvironment of the inflamed joints.

Methods: Our methods encompass the chemical syntheses of the polymeric prodrugs and the investigation of their stability and release kinetics. The pharmacokinetics of the prodrug was established after radiolabeling with In-111, and preclinical SPECT/CT imaging in an RA mouse model. The efficacy of the prodrugs is also established in the same RA model and compared to the free drug given in the same form/ timing as it is currently administered to patients. In vitro stability measurements of the prodrugs in human synovial fluid from rheumatoid arthritis patients is ongoing to better understand the impact of the local environment of an inflamed joint and how that influences drug release.

Results: Delivering methotrexate (MTX) bound to a carrier polymer produces a significant increase in drug uptake in the inflamed joints. When MTX was delivered as a prodrug, a 2 to 4 times lower dose given every two weeks was just as effective as two standard dosages per week of free MTX. In addition, attaching folic acid (a targeting ligand that selectively binds to folate receptors) to the polymeric carrier helped to keep the active drug longer in the targeted lesion.

Conclusions: In this study, using SPECT/CT we show our prodrug approach delivers higher concentrations of anti-arthritic drugs to inflamed joints than has previously been possible, despite lower and less frequent drug doses.