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CPERC 2019 Poster Abstracts

POSTER ABSTRACTS

2019 AFPC Canadian Pharmacy Education and Research Conference
June 11-14 • Edmonton, Alberta

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The importance of experiential education facilitators to institutional pharmacy practicum sites in British Columbia: assessment of the role and associated stakeholder perceptions

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Background: The Experiential Education Facilitator (EEF) role was created to provide on-the-ground pharmacist support to practice educators (PEs) and learners with the intent of optimizing student learning and assisting sites in managing clinical workload.

Objective: To assess the role of the EEF and associated PE and learner perceptions.

Methods: Daily logs were collected from seven EEFs over a 16-week period to determine their time spent on various tasks. Prospective surveys were simultaneously disseminated to PEs and learners to determine the perception of their experiences with the EEF during their institutional practicums.

Results: 386/539 (72%) of the daily logs disseminated to the EEFs were completed. EEFs spent most of their time organizing activities for learners, supporting PEs, evaluating learners and facilitating teaching sessions. Of the 85 surveys disseminated, 20 (24%) PEs and 14 (16%) learners responded. PEs stated the most supportive tasks provided by EEFs were orienting the learner to the site, organizing the practicum structure, providing workload relief, determining learning activities, and working with challenging learners. Learners found EEFs most helpful with site orientations, reviewing practicum assignments and cases, and facilitating therapeutic discussions, and 12 (87%) noted feeling more confident in their clinical skills after working with the EEF. The majority of PEs (75%) and learners (61%) did not experience challenges in their interactions with the EEFs. The most frequently cited issue was the unavailability of support when the EEF was away from the site due to vacation leave or committed to other non-EEF activities (e.g. patient care responsibilities).

Conclusion: EEF support was perceived positively by both PEs and learners. Conversely, the absence of EEF support was noted to be a challenge by both stakeholders. EEFs enhance practicum experiences for both PEs and learners by augmenting educational opportunities, providing another avenue of support, and acting as an advisor to students and PEs when needed.

AFPC's response to the Joint Statement of Action to Address the Opioid Crisis in Canada

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At the 'Joint Statement of Action to Address the Opioid Crisis in Canada' summit in 2016, AFPC committed to conducting an environmental scan to identify the extent to which current curricula address pain management, opioid use and misuse, as well as to adapt draft competencies for health professionals in pain management and opioids to pharmacy practice. A working group was created consisting of representatives from each of the 10 Faculties of Pharmacy in Canada. The working group conducted a curricular scan to delineate and summarize the state of undergraduate pharmacy programs with respect to content in this area. Key information was collected and summarized for each course that included content related to pain management or opioids. A framework was developed encompassing competency statements related to pain, opioids, opioid overdose and opioid use disorder, and cross-cutting themes.

This work resulted in the following recommendations:

1. The most common approach to delivering content related to pain and opioids has been to embed it within courses across the curricula. Therefore, each AFPC Faculty should systematically review their courses to ensure content is delivered consistently across their program, in a coherent manner, without contradictory messaging or redundancies.
2. AFPC Faculties that are missing key pain and opioid topic areas should take steps to incorporate them.
3. AFPC Faculties should review their content in the area of opioid use disorder in particular, to ensure appropriate and adequate coverage.
4. AFPC Faculties should utilize the competency framework for pharmacists in both undergraduate and continuing professional development programs.

The terms of reference for the opioid working group have been revised to now focus on the dissemination and uptake of the recommendations. The final report from this work has been submitted to the federal Opioid Response Partners secretariat.

Healthcare student competence and confidence with prescribing: a cross-sectional study

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Objective: Previous research has shown that prescribing competence is poorly correlated with prescribing confidence, and has questioned whether undergraduate programs adequately prepare interns and junior practitioners for safe and rational prescribing. The goal of this project is to investigate whether prescribing competence and perceived prescribing confidence of fourth year pharmacy and medicine students at the University of Alberta are correlated.

Methods: A cross-sectional design will be used to quantitatively measure prescribing competence using five prescribing case scenarios, and qualitatively explore prescribing confidence using a survey. All fourth year pharmacy and medicine students at the University of Alberta are eligible to participate. Answers to the cases will be graded based on therapeutic appropriateness and inclusion of all legal requirements. The confidence survey will assess confidence of both assessment and prescribing skills, and consists of a four-point confidence scale. The cases and survey were pilot tested by practicing pharmacists and a physician.

Results: Recruitment is currently underway, and results are expected by March 2019. Currently, 23 assessments have been completed in full, 15 by pharmacy students and 8 by medicine students. To assess the internal consistency of competence scores and self-perceived confidence ratings, cronbach's alpha will be used. The Spearman correlation coefficient (r) will be used to determine the correlation between prescribing competence and confidence for both cohorts independently. Significance will be defined as $P < 0.05$. The overall level of prescribing competence and self-perceived confidence will be calculated and compared between the two cohorts of students.

Conclusion: This project will gauge the level of prescribing competence and confidence of future prescribers graduating from the University of Alberta, which may guide curriculum changes or improvements.

Pharmacist and physician competence and confidence with prescribing: a scoping review

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Objective: Prescribing is a growing scope of practice for pharmacists. The objective of this scoping review is to assess of the literature related to pharmacist and physician competence and confidence with respect to prescribing.

Methods: Online databases MEDLINE (1946 to present via OVID), EMBASE, and Global Health were used to identify articles from inception to October 2018. Peer-reviewed articles describing either the competence or confidence of physician, pharmacist or student prescribing, including inappropriate prescribing and prescribing errors were included. Abstracts, research protocols, literature reviews and letters were excluded. Articles that focused on patient perspectives, an intervention related to prescribing or prescribing education, a specific medication class or medical condition or other health professional prescribing were also excluded. No limits for language were set.

Results: After applying the inclusion and exclusion criteria, 32 eligible articles remained. Sixteen articles were reviewed in full from hand searching, one being added to the final selection, resulting in a total of 33 articles included. Of these, 16 were published in the United Kingdom, 22 studied medical prescribing, 9 studied pharmacy prescribing, and two studied both. Many studies demonstrate that medical students and junior doctors are not competent in prescribing when they enter practice, although their perceived confidence is often higher than their assessed competence. While fewer studies investigate pharmacist competence and confidence, those that do describe competent prescribers lacking confidence in their prescribing knowledge. Additional emergent themes included self-awareness, lack of education and educational improvements, prescribing errors and resources, prescribing culture and barriers to prescribing, gender differences and benefits to prescribing.

Conclusion: There is little consensus from the outcomes of these studies related to prescribing competence or confidence, while most of the research focuses on junior doctors prescribing. While some reflect positively on prescribing competence and confidence, others show major deficits in competence and lack of confidence. Further research needs to be done to evaluate pharmacist competence and confidence with respect to prescribing.

Special populations – a proposed framework incorporating pediatrics and geriatrics

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Objective: When developing a new Doctor of Pharmacy curriculum, the transition of a pediatrics and geriatrics course from the B.Sc. program was reassessed. The purpose of our research was to prepare a framework that defined and outlined special and vulnerable populations, highlighting where geriatrics and pediatrics are represented.

Methods: A literature search was conducted through Medline, including terms 'geriatrics, pediatrics, vulnerable, special population' (inception to December 2018). Professional and educational bodies from Medicine and Pharmacy were consulted for publications regarding special or vulnerable populations.

Results: Definitions of special populations were not universally agreed upon, but we defined special population' as being outside the typical adult population, requiring a unique approach or additional knowledge and/or skills to provide care to. Vulnerable populations are included in special populations, but were defined in the literature and by professional bodies based on social determinants of health. Pediatrics and geriatrics falls under special populations, but these patient groups also have aspects of vulnerability.

Conclusion: A framework was developed that defined vulnerable populations consistent with the literature. A new group of special populations was identified that included geriatrics and pediatrics, which have unique aspects of care, but also overlap with vulnerable populations. The framework can be used to guide design and implementation of pharmacy curricula.

Curriculum mapping: implementation and acceptability of a curriculum mapping tool

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Objective: The purpose of our study was to use a syllabus creation tool to support curriculum mapping across 2 faculties at the University of Alberta. Our objectives were to (1) demonstrate functionality of the syllabus tool for creating course syllabi and starting to map curriculum, and (2) to report results of an evaluation of user acceptability from a University of Alberta pilot.

Methods: With support from University of Alberta Information Services Technology (IST) eClass team, a new moodle based syllabus creation tool was developed. Use of the tool was piloted with the Faculty of Pharmacy and Pharmaceutical Sciences (FPPS) and the Faculty of Kinesiology, Sport, and Recreation (KSR). Courses in the undergraduate programs that were considered mandatory were included. Syllabi were created in FPPS with research assistant support, while the KSR staff had an information seminar but entered their own data. A cross-sectional survey design was used to collect data about the user experience with a focus on acceptability and promotion of course design principles.

Results: The tool assisted in creating course syllabi and mapping information. There were n = 64 (of 87 possible participants) instructors in KSR, and in FPPS n=12 (of 38 possible participants). They evaluated the preparatory seminar and online resources as adequate (M=3.5 – 4.0 on a 6 point scale), and showed acceptance of functionality associated with entering general course information (M = 4.33) but lower acceptance when using the tool to input session information (M = 3.26). They reported that the tool enhanced some reflection about their teaching. The primary concern identified was time commitment for the first data entry, and flexibility of output as a key area for improvement.

Conclusion: The tool was implemented at 2 different faculties and showed functionality in creating a syllabus. The users found it somewhat acceptable, with suggestions for improvement and efficiencies.

Curriculum mapping: representation of interprofessional education in pharmacy and physical education

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Objective: The purpose of our study was to apply the interprofessional education (IPE) framework developed at the University of Alberta (U of A) to the undergraduate pharmacy curriculum, and the physical education curriculum at the University of Alberta.

Methods: The IPE framework chosen was developed at the U of A in 2016, and is based on the interprofessional pathway for health sciences students at U of A, as well as international frameworks previously published. The framework is structured with 6 main competencies. The mapping was done by abstracting course objectives from syllabi of required courses. Content was analyzed descriptively.

Results: There were 140 outcomes from 24 courses that mapped to at least one of the sub-competencies across the 6 core competencies. The majority, 59 (42%) were related to role identification and only 3 (1%) related to conflict resolution. The second year in Pharmacy had the greatest number of IPE competencies, primarily driven by the required interprofessional course, while fourth year, including courses in experiential education, included the fewest competencies. In physical education, 7 courses contained 12 outcomes that were tagged with 16 sub competencies in the 3 core competencies, with the most common being collaborative leadership, and the lowest being interprofessional communication.

Conclusion: The mapping showed inconsistencies across years in the programs, and variability in the 6 competencies covered. The framework was helpful in mapping the IP content, but increased clarity in the course objectives and prospectively considering the framework may assist in documenting IPE across the curricula.

A call to act: Indigenization of pharmacy programs

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Objectives: The purpose of our scholarly activity was to provide an action plan in response to the Truth and Reconciliation Commission (TRC) of Canada's Calls to Action for indigenization of pharmacy programs in Canada.

Methods: A team of individuals from faculties across Canada collaborated through in-person and remote meetings to integrate information from the TRC, government reports from Canada, and a literature review (Medline, from inception to 2018) into a document to guide pharmacy education leaders in Canada.

Results: A 5-year plan was prepared, with a target audience of the Deans or Directors of Faculties or Schools of Pharmacy in Canada. The plan included steps toward reconciliation and indigenization in each of the 5 years. The groundwork identified for this plan includes an understanding of the history of Indigenous people in Canada, colonialism, and the extraordinary gap in health and living standards between Indigenous and non-Indigenous people in Canada. The need for reflection and preparation was highlighted before any Faculty or School proceeds with indigenization. The 5 year plan focuses on the following priorities, in sequence for each year: (1) faculty development, (2) cultivating cultural safety and respectful engagement with Indigenous communities, (3) recruiting Indigenous learners, (4) integrating Indigenous content into classroom-based learning, (5) promoting engagement with Indigenous communities through experiential learning. Each year has associated goals and evidence when a Faculty or School may have succeeded in reaching that goal.

Conclusions: A structured, goal-oriented, 5-year plan for indigenization was developed for guiding leaders and administrators in pharmacy programs in Canada toward truth and reconciliation.

Lessons learned by sabbatical

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Objective: To share learnings from a sabbatical experience, and identify practical lessons that clinical faculty members can apply when considering a sabbatical.

Methods: Reflective methodology was used to review the different stages of the sabbatical process, including planning, application, experience, follow-up, future, and planning the next sabbatical. Documentation from the application, during the sabbatical, and follow-up reports were reviewed. Notes from meetings with colleagues were also reviewed. Key learnings were abstracted and categorized.

Results: A sabbatical for a faculty member with clinical responsibilities is rare and challenging. Written and online resources for academics, as well as university policies usually support focused research activities, but there are many practical barriers. Advice from colleagues and leaders across health sciences faculties is valuable, particularly partnerships, location, and duration. Important considerations include what is being left behind (undone), what has to be accomplished during the sabbatical (what is done), and future impact (what will be done). Critical partnerships are necessary, but selection of an accommodating host/supervisor readily available to engage can be difficult for pharmacy practice research. The activities with the potential for greatest long-term success, and the most in-the-moment enjoyment, were primarily related to on-the-spot opportunities, rather than pre-planned structured milestones.

Conclusion: A sabbatical for a clinical faculty member is possible and can be rewarding, but strategic planning, particularly regarding the supervisor, is necessary far in advance. Flexibility throughout the sabbatical to take advantage of learning opportunities can enhance the experience.

Partners in pharmacy: an intraprofessional OSCE with pharmacy and pharmacy technician students

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Study Objectives: Pharmacists and pharmacy technicians work closely together in practice upon graduating, and share some overlapping roles and responsibilities. However, there are limited opportunities for these individuals to meaningfully interact and learn together prior to graduation. Therefore, it is important to create these opportunities during their training. We introduced a new intraprofessional learning activity for pharmacy students from the University of Waterloo School of Pharmacy and pharmacy technician students from Lambton College. Our research aim was to assess whether the event improved confidence in collaborative practice and provided educational value. In addition, we explored feedback regarding what aspects provided the greatest learning and what suggestions could enhance the experience.

Methods: The 2-hour event entitled "Partners in Pharmacy" consisted of a practice Objective Structured Clinical Exam (OSCE) and case discussion, followed by a facilitated debrief that emphasized roles, responsibilities, communication, and conflict management. Pharmacy and pharmacy technician students worked in pairs or small groups to complete the tasks or cases. OSCE stations included glucometer education, insurance coverage for prescriptions, and prescription checking. The group discussion centered on a methadone compounding error. After the event, students were asked to complete an electronic questionnaire. Results were analyzed using descriptive statistics, and compared between learner groups. Written responses underwent thematic analysis.

Results: Of the 43 students who participated in the event (21 pharmacy students, 22 pharmacy technician students), 21 students completed the questionnaire for a response rate of 49%. The majority of respondents (90% or more) agreed that the session increased their confidence in working collaboratively, and that working in pairs/groups enhanced their learning. Results were similar between learner groups. Respondents indicated that the OSCE was the most valuable component.

Conclusions: An intraprofessional event including an OSCE and case discussion increased reported learner confidence in collaborative practice and was viewed to provide educational value, particularly the OSCE component.

The value of peer assessment in the education of healthcare professionals

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Objective: In peer assessment, students acquire higher level learning through both receiving and providing feedback to their peers. The aim of this review is to determine the relevance of peer assessment in health professions education and its applicability in a pharmacy curriculum.

Methods: A Medline search was conducted using search terms such as, 'students', 'peer assessment' and 'practice lab'. The search resulted in 181 articles, in which 29 were reviewed. Articles focusing on healthcare professional students, peer feedback and peer assessment were included in the review. Excluded from the review were articles focusing strictly on peer teaching without discussion on assessment.

Results: The majority of the articles discussed medical students (n=15), followed by nursing students (n=6), dentistry students (n=5) and pharmacy students (n=3). Six of the articles focused on peer assessment of communication skills while sixteen articles focused on various clinical tasks (OSCEs, simulations). Some advantages of integrating peer assessment in pharmacy curriculum included reducing faculty member workload and provision of consistent grading criteria. Students reported that peer assessments improved their critical analysis skills, self-reflection skills and confidence. Variability and validity of grades were limitations identified; however, in one study, pharmacy student and faculty feedback indicated agreement. When disagreements in grades occurred, students were allowed an opportunity to challenge the grade which strengthened agreement between peer assessors and faculty. Overall, students were receptive of peer assessment methods but they identified that peer assessors could provide more constructive feedback.

Conclusion: The literature suggests that peer assessment can be a valuable tool to enhance student learning and alleviate faculty workload if implemented in a pharmacy curriculum. However, there needs to be further research into improving validity of peer assessment and students' abilities to give feedback before widespread integration.

Tools utilized to measure characteristics associated with pharmacist success in students of health profession programs

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Objective: Although there is growing evidence to support the idea that personal characteristics are important predictors of pharmacist success, how to best measure them remains largely unexplored. The objective of this scoping review was to identify tools that measure these characteristics specifically related to health profession programs and describe whether they predict success.

Methods: A search was conducted in Ovid MEDLINE (1990 – January 2018) to identify articles investigating the relationship between personal characteristics of students applying for or completing a health profession degree and various indicators of success. The search was restricted to English language articles that included at least one measure of academic or professional success. Additional studies that met the inclusion criteria were added from citations in retained articles.

Results: A total of 860 articles were initially retrieved; 75 studies that used 59 tools were included. For each personal characteristic category, tools utilized as measures were identified and compiled as a basis for description. The tools were categorized as measures of: personality (103 relationships to success - RTS; 81% predictive - P), emotional intelligence (57 - RTS; 49% - P), learning style (28 - RTS; 50% - P), work-life balance (54 - RTS; 31% - P), critical thinking (24 - RTS; 75% - P), motivation (10 - RTS; 70% - P), moral judgement (4 - RTS; 57% - P), and other (6 - RTS; 63% - P). The most commonly utilized tool was the NEO Personality Inventory-Revised followed by the Mayer Salovey Caruso Emotional Intelligence Test.

Conclusion: This scoping review identified and described many tools that have the potential to measure personal characteristics that may predict pharmacist's ability to achieve success in practice. This information could also be used to help inform decisions about which tools may be useful in pharmacy school admission processes.

Distributed preceptor development and self-efficacy

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Objectives: Self-efficacy in teaching relates to positive teaching behaviors and can be influenced by preceptor development. We measured teaching self-efficacy pre and post preceptor workshops delivered at experiential rotation sites (i.e. distributed preceptor development).

Background: To identify gaps in our required online training program, a needs assessment conducted in 2016 identified perceived and unperceived learning needs of preceptors. Key themes included: 1) increasing accessibility of live sessions and 2) valuing the preceptor role by providing advanced training to further develop and support preceptors.

Methods: Customized interactive workshops were developed and focused on advanced training in areas of deficiency frequently cited by preceptors and students: "Giving and Receiving Feedback" and "Working with struggling students". Workshop design was informed by social constructivism and andragogy. Eighty percent of workshops were offered at experiential rotation sites. Perceived self-confidence relating to feedback and students in academic difficulty were measured pre and post workshop using a 5-point Likert scale. Self-efficacy scores were analyzed using descriptive statistics. Narrative comments were grouped into common themes.

Results: Data were evaluated for a 12-month period (Oct 2017-Oct 2018). Of the 320 participants; 43% and 37% had > 10 or < 5 years of preceptor experience, respectively. Mean self-efficacy scores related to identifying, communicating and developing action plans for struggling students were all higher post-workshop. The greatest improvement in self-efficacy was in working with the faculty on student remediation. Mean self-efficacy scores relating to elements of effective feedback and influencing student responsiveness to feedback improved post-workshop. Confidence with delivering positive or negative feedback remained unchanged after the workshops. Aspects participants liked most about the workshops were: 1) challenging case examples; 2) opportunities for peer discussion/networking; 3) role play and small group work. Suggestions for improvement included allowing more time for workshops and customizing case scenarios for specific clinical areas.

Conclusions: Advanced preceptor workshops focused on identified needs and delivered on site were well received. Self-confidence improved immediately following workshop delivery. Future initiatives include building capacity to expand distributed workshop offerings and measuring impact on student performance.

The use of on-line video capture interviews for admissions at the University of Alberta

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Purpose: Traditionally at the FoPPS the only assessment tools used for admissions were the applicant's grades and a mailed-in written "Letter of Intent". To permit some informative assessment of the applicant's verbal communications skills, an on-line interview process was implemented in 2014. By webcam, students answer a series of video questions related to personal interests, motivation for healthcare, and ethical reasoning. The recordings are later viewed and scored by admissions committee members. Our aim was to assess student perceptions of the use of the interviews, and to seek out relationships between the scoring of interviews and academic achievement in the FoPPS BSc(Pharm) program.

Methods: A survey was developed to measure student perceptions of acceptability, validity, and preference about the online interview process. The questions focussed on in-person vs. the online approach, advantages and limitations of the process. Using academic records, regression analysis was used to assess the strength of relationships between the interview scores and academic achievement (overall and some selected basic or clinical science-based, communications or skills-based).

Results: A total of 206 students (127 Year 1 and 79 Year 4 students) responded to the survey (87% response rate). Students had positive acceptability on the on-line interview. They reported agreeing most strongly that the interviews provided information to assess verbal communication, personal interest, and personal attributes. Students also mostly preferred the use of an on-line process vs. an in-person interview for reasons including cost and convenience. There some modest concern about there being risk of advanced knowledge of the questions. In relating interview scores to performance in Pharmacy, there was only a significant relationship between interview scores and grades in one Practice Skills course ($p < 0.01$), and none between scores and gender or number of prepharmacy years.

Conclusion: Students favourably viewed the on-line interview process. Modifications to the scoring process for interviews, or the interview questions themselves, could potentially lead to higher predictability of performance in grades from interview scores.

Design and implementation of a writing-intensive course in a Canadian accredited Middle Eastern pharmacy program

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Objective: To describe the design, delivery and impact of a writing-intensive course delivered at a Canadian accredited Middle Eastern pharmacy school to develop pharmacy students' writing, critical appraisal and peer mentoring skills.

Design: The Pharmacy Research, Evaluation and Presentation Skills VI course (PHAR 506) was offered to fourth-year pharmacy students at the College of Pharmacy, Qatar University. In this course, students critically appraised scientific research articles, completed one pre-journal club reflective critique and moderated one journal club session. In addition, students wrote two pharmacy review articles (PRAs) based on an assigned scientific research article. Moreover, the students peer mentored each other's written PRA.

Assessments and Evaluations: Assignments were assessed using grading rubrics developed by the course coordinators. The PRA assignments were evaluated by a College level program learning assessment committee in relation to their adherence to the Scholar and Communicator learning outcomes, two of the seven learning outcomes outlined by the Association of Faculties of Pharmacy of Canada (AFPC) guidelines. The percentage of students who achieved the pre-defined target of 80% in the Scholar and Communicator learning outcomes were 91.3% and 88%, respectively. Moreover, a student self-assessment survey administered at the end of the course identified that 85% of the students thought that they gained the necessary writing skills that will help them in their future careers.

Conclusions: The course improved pharmacy student's scientific writing, peer-assessment and critical appraisal skills. Indeed, further practice is needed to reinforce the skills learned and to strengthen their writing skills.

Students' satisfaction of an academic coach program

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Background: In the fall of 2018 the Faculté de Pharmacie of Université de Montréal implemented a pilot project offering a program of an academic coach (teacher resource) that recommended tools and study strategies to first year students experiencing academic difficulties early in the semester. The hypothesis was that by offering an early academic support, students would perform better and their level of stress would decrease. The primary objective of this study was to evaluate students' satisfaction of the academic coach program.

Methods: An anonymous survey using the institutional platform was sent to all students participating in the academic coach program. The survey had 30 questions regarding characteristics of participants, program expectations, tools and strategies used and, effects of the program on academic performance, stress level and other variables. Descriptive statistics were used to analyse the data.

Results: In total, 22 students were followed by the academic coach from September to December 2018. A total of 11 (50%) participants responded to the survey. Results showed that 72% of respondents were totally/very satisfied with the program and 82% stated that the program either exceeded or met their expectations. The tools and strategies proposed by the academic coach were totally or very well adapted to the students' needs. 64% of the students said that their academic performance improved and 36% said that their anxiety decreased. The majority of students said that their study strategies improved and that they would be part of the program again if available. Most students would like the academic coach to be more available.

Conclusion: The students are highly satisfied with the academic coach program. It is well adapted and meets students' needs.

Relevance to Pharmacy Education: Offering early academic interventions to pharmacy students could improve their academic performance and reduce stress. The results are favourable to the continuation of the program and to evaluate the possibility to expand the program to other students.

Evaluation of peer tutoring at Université de Montréal

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Objectives: The Faculté de Pharmacie of Université de Montréal has been financing peer tutoring for several years for undergraduate students Doctorate of Pharmacy (Pharm.D.), Bachelorate in BioPharmaceutical sciences (BSBP) and International pharmacy graduate program (QeP). Peer tutoring consists in group sessions where senior students help junior students prepare for their exams. Thus, the present study's objectives are to evaluate the perceived benefits of peer tutoring, to describe and compare practices between the three programs, to survey students on their satisfaction and to suggest recommendations to improve peer tutoring.

Methods: A descriptive survey sent to 966 students of the Faculté de Pharmacie was conducted from October 29 to November 5, 2018. An electronic survey was available on the institutional platform that contained between 10 and 26 questions depending on participation in tutoring sessions. The lead author observed tutoring sessions in the three programs, met with members of Faculté de Pharmacie as well as members from four others health faculties at Université de Montréal and made a review of the scientific literature.

Results: The participation rate of the survey was 21.5%. The main reason for peer tutoring participation for Pharm.D. and BSBP students was to have «cues» for exams (what type of questions, what to study, ...). QeP students attended to guide and organize their studying. The survey revealed that the majority of students agreed that peer tutoring had a positive impact on academic results, helped to decrease their stress before exams and met their expectations. However, peer tutoring is not uniform across programs. For example, the number of sessions is higher in the BSBP program. It is also the only program in the Faculty to keep track of the numbers of participants per session.

Conclusion: Peer tutoring program is relevant and appreciated by students. The Faculté de Pharmacie should continue to finance the project as it has a positive impact on students. Nevertheless, a standardization of peer tutoring practices is recommended for all programs.

Refocussing the grading system of an assessment-intensive programme on competencies

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Background: An assessment-intensive programme, administered by the Continuing Pharmacy Professional Development faculty at UBC, spans 12 weeks and includes sessions from three pharmacy practice skills areas: Patient Dialogue, Therapeutics, and Pharmacy Practice Lab. Each week the participants in the programme submit assignments in the three areas. Grades in the program are based on the results from the assignments in weeks 9 to 11. A psychometric evaluation of the grading system revealed barely satisfactory precision of the final scores. Modeling studies indicated that both increasing the number of tasks and changing the weights of components in the final score had a limited effect on precision.

Objectives: The goals of this study are: 1. Evaluate the precision of the final scores when the scores are derived from ratings of the competencies included in each task rather than from task specific checklists; 2. Explore the reliability of the final competency scores as derived from the ratings.

Methods: One cohort's twenty anonymized records provided data for the analyses. Rescoring consisted of mapping the checklist items for each task to 6 broad competencies, creating rating scales for each competency, and re-scoring each task using the rating scales. Reliability of final scores as derived from the new task scores was evaluated by means of Cronbach's alpha and Generalizability Theory analyses. For each competency, a final score consisting of all ratings across tasks was derived. Generalizability analyses explored the precision of the final competency score and modeled conditions for optimal reliability.

Results: Using ratings of competencies rather than checklists in deriving the task scores, improved the precision of task, area and final scores, moving them within the acceptable range of reliability. The reliability of the competency scores as derived from the ratings across tasks was acceptable for all but one competency score.

Conclusion: These results would allow for refocussing the assessment decision making in the course on competencies, as well as for designing reporting, performance tracking and feedback systems that would capture specific strengths and weaknesses.

Implementing and evaluating a train-the-educator program for pharmacy practice educators

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Objective: To implement and evaluate training for pharmacy practice educators in recognizing and supporting students experiencing challenges on practicum.

Methods: An in-person, half-day training workshop held at UBC Vancouver was developed for pharmacist practice educators in collaboration with content experts in student support, experiential education, and educational design. Workshop design incorporated lecture-style teaching, small and large group discussions, and case-based learning, including a video animated case. A train-the-educator model was utilized, whereby practice educators completing this training would then apply the training in precepting students.

To evaluate workshop outcomes, an online survey consisting of open-ended, multiple choice, and rating-scale questions was designed with incorporation of the first two levels of Kirkpatrick's model to assess how participating practice educators received the training and how their confidence addressing challenges changed post-training. This survey was voluntary, however completion was linked to the receipt of continuing education credits.

Results: A total of 27 practice educators participated in the workshop and 23 completed survey responses were evaluated. Of these, 96% of participants agreed they would recommend this workshop to a colleague. Additionally, 96% of participants agreed the teaching and learning methods used were effective. The majority of participants reported high confidence in identifying a student experiencing a challenge (96%), having a conversation with a student experiencing a challenge to discuss their concerns (87%), determining the urgency of the situation (91%), and coming up with an appropriate plan to address the student experiencing a challenge (96%) after completing the workshop. This was an improvement from their level of confidence prior to the workshop, as less than 50% indicated high confidence in any of these same areas prior to training. 96% of participants indicated they were committed to applying their training to precepting students.

Conclusion: This well-received workshop improved the overall confidence and commitment of participant practice educators in recognizing and supporting students experiencing challenges on practicum. This is anticipated to translate to increased support for students on practicum.

Development of a housing and regional information resource to support students relocating for pharmacy practicums

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Background: In the Entry-to-Practice PharmD (E2P PharmD) program at the University of British Columbia (UBC), students undertake 42 weeks of experiential education during their four-year program. These practicum placements may be located anywhere across the province and students are responsible for finding and organizing their own travel and accommodations.

Objective: To develop a housing and regional information resource to support students as they prepare for their practicums across the province.

Methods: To inform the development of this resource, a needs assessment survey was disseminated to all undergraduate pharmacy students to determine their perceived challenges in relocating for practicums. An environmental scan of the Canadian Faculties and Schools of Pharmacy and the various health and human service programs at UBC was conducted to determine the resources and assistance currently offered to students by other programs for practicums.

Results: 224 students (26%) responded to the survey with 55% of respondents finding short-stay accommodations as the most challenging aspect of preparing for practicums. Students ranked regional information submitted by locals and a listing of transportation options as highly desired features of a resource. Six faculties of pharmacy and five UBC health programs responded to the environmental scan and varying levels of student support were found to be provided by programs. An online resource, the Regional Resources Hub, was then created with 1) a housing database with accommodations submitted by students, practice educators, landlords or others, 2) a regional information database with advice/tips submitted by practice educators and students who have been to or are from the region, and 3) a Piazza® discussion board to encourage student collaboration and information sharing.

Conclusion: The Regional Resources Hub was designed to assist students in preparing for their practicums by providing useful information on transportation, accommodations and the amenities and resources within various regions across the province. Next steps include an evaluation of the resource by soliciting student perceptions on its utility and identified areas for improvement.

Implementing a personal health record at the UBC Pharmacists Clinic – a narrative review of the pragmatics

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Objectives: The implementation of Personal Health Records (PHRs) have many documented benefits and limitations. The primary purpose was to conduct a narrative review of the evidence on the practical implications of adopting a PHR at a pharmacist-led clinic. With the growth of Faculty-owned pharmacist care practices and the concomitant development of informatics and primary-care curricula, there is a need for clinicians and educators to better understand PHR use and adoption to support best-practices.

Methods: A narrative review was completed to identify scientific and grey literature to better understand: (i) the impact of PHRs on clinical outcomes and patient health behaviours? (ii) the known costs and desirable features of a PHR? and (iii) the current PHR capabilities of community pharmacy software systems? Different vendors were compared in terms of features, costs, interoperability with the OSCAR (Open Source Clinical Application and Resource) electronic medical record systems.

Results: Fifteen articles were analyzed. Three main themes were found for patient-perceived benefits: (i) enhanced patient-provider communication, relationship and trust; (ii) empowered health care decision-making; and (iii) improved quality of care. Three main themes were found for patient-perceived concerns: (i) privacy and security concerns; (ii) confusion and uncertainty with technology; and (iii) erosion of patient-provider relationship. There were conflicting results that limited generalizability on the impact of PHRs on clinical outcomes including physical and psychosocial health indicators. There was a positive association between improved glycemic control and adherence with PHR use. Other health indicators such as blood pressure and anxiety/depression scores were not impacted with PHR use. Available community pharmacy software systems, although changing, scarcely offer features that mimic a PHR.

Conclusions: Although PHRs have been proposed to improve communication, quality of care, and enable patient empowerment, there are a number of patient-perceived concerns that limit their widespread use. The implementation of PHRs in pharmacist practice is supported by limited evidence and further research is needed to evaluate impact on clinical outcomes.

Preparing students for tomorrow's practice - exploring pharmacy and technician students' digital health literacy and impact on curricula

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Study Objectives: To explore the current state of pharmacy and pharmacy technician students' self-rated digital health literacy, use of technology in student activities, and identify strategic areas for informatics curricular improvements and innovations.

Methods: A mixed methods design using surveys and interviews was conducted over a 4-month period. An online eHEALS survey was deployed to currently enrolled 2nd, 3rd and 4th year pharmacy students at the University of British Columbia (UBC) and pharmacy technician students across 4 different programs in BC. Students were offered to participate in a post-survey interview exploring detailed questions regarding their use of technology in their daily lives and practicums, and possible improvements that could be made in future informatics curricula. Interviews were available either through phone or in-person, and were audio recorded for accuracy. Quantitative and qualitative thematic analysis was done.

Results: A total of 26 pharmacy students and 3 technician students completed the eHEALS survey, with 6 students participating in the interview. 50% of the participants were 2nd year students, 81% of the students were 25 years and younger, 85% were female. Most of the students felt they knew what (88%), where (85%) and how to find (77%) health resources available on the Internet. Less students (77%) rated that they have the skills to evaluate health resources they find on the Internet. 62% of students rated that they feel confident in using information from the Internet to make health decisions.

Conclusions: Overall, respondents self-rated digital health literacy was high. Pharmacy and technician students are aware of the health information available online and have the knowledge of where and how to find them. However, they feel less confident in several other surprising areas. Low respondents from technician students did not allow for meaningful comparisons between the two cohorts. Differences between being digitally literate and digital natives were thematically explored. Results suggest several areas that may be targeted for impactful informatics curricula and future research.

Evaluation of the course “writing a scientific paper” in the master’s program in advanced pharmacotherapy

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Background: In 2011, a new course on scientific writing was introduced in the Master’s program in advanced pharmacotherapy. The goal of this course was to provide tools to the residents regarding writing a scientific paper and it required to submit a paper for publication consideration in a peer-review journal. Ultimately, the goal was to promote continued scientific writing beyond graduation.

Objective: The objectives were to: 1- evaluate if pharmacists who previously took the course during their training and graduated continued to publish scientific or professional articles; 2- identify the barriers to publication in the workplace environment and 3- provide objective data on whether this course should be maintained.

Methods: An online survey was e-mailed in December 2018 to the 224 pharmacists who graduated from the Master’s program in advanced pharmacotherapy at the Faculty of Pharmacy, University of Montreal between 2011 and 2017.

Results: A total of 89 (39.7%) pharmacists completed the survey. Among the participants, 84.3% mentioned that the course provided them with tools to write and publish an article. A total of 32.6% of respondents published at least one professional article and 43.5% published a scientific article. The majority of respondents (82.3%) identified lack of protected time as a limiting factor to writing articles and 91.0% had no time specifically allowed for this task. Most (84%) of pharmacists mentioned that this course should be maintained in the curriculum.

Conclusion: The writing course met its stated objectives and provided necessary tools and resources to promote scientific or professional publication beyond graduation. The data collected provided the justification to maintain this course in the Master’s program. However, lack of protected time from employers requires to be addressed in order to create an environment conducive to publication.

Ethical issues in the entry-level Doctor of Pharmacy degree

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Background: In 2011, Laval University launched an Entry-Level Doctor of Pharmacy Degree (Pharm.D.). The new program is built around the development of five professional competencies. The teaching and the evaluation of ethical aspects has been improved in the Pharm.D.

Objective: To make students aware of the importance of personal ethical reflection and decision support tools in complex professional situations.

Methods: Ethical issues were incorporated into the Pharm.D. program in years 2 and 3. The learning and assessment were developed with the help of a pedagogical advisor and an ethicist.

Results: In the winter of the second year, students have a theoretical course, given by an ethicist, on ethical decision-making in the pharmacy practice. The ethical issues covered the internal environment (year 2) and the external environment (year 3). After the theoretical course, students become familiar with the decision support grid. Workshops are done in groups of 30 students where two cases are worked in team. Each team will present the important elements of their decision support grid. Following the cases worked in team, an ethical debate takes place with the presence of the person responsible of the course and a pharmacist in practice. Students are invited to share their thoughts and questions. Following the debate, the students review their support grid for ethical decision-making. A workshop using the same steps is done in the summer of Phase 2 to consolidate the achievements related to the grid. During the winter of year 3, more workshops are done, but in the form of an individual reflection using professional practice situation. Students will have to position themselves on two complex situations that include social debates (ex. medical assistance in dying).

Conclusion: The learning activities linked with the ethical aspects were included in the Pharm.D. program. Also, students reported their appreciation with the reflection format of the activities.

Preceptor experiences with novel student-preceptor models in pharmacy education: a qualitative analysis

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Background: Implementation of the Entry-to-Practice Doctor of Pharmacy program has required institutions to host more students for experiential rotations. In response, some institutions have explored novel student-preceptor models: peer-assisted-learning (PAL; ≥ 2 students of the same educational level), near-peer-teaching (NPT; ≥ 1 junior student(s) with ≥ 1 senior student(s)), and co-preceptorship (CoP; ≥ 2 preceptors).

Objectives: The objectives of this study were to describe the experiences of pharmacy preceptors in novel student-preceptor models and to assess the models using Kirkpatrick's framework for evaluating educational interventions.

Methods: Pharmacists who hosted final-year University of Toronto pharmacy students in novel student-preceptor models in institutional settings were interviewed. Transcripts were coded and analyzed using Kirkpatrick's framework to generate themes about participants' experiences and perceptions of the models.

Findings: Twenty preceptors from 13 institutions were interviewed, and 13 themes were identified. Fourteen preceptors had experience with PAL, nine with NPT, and nine with CoP. Preceptors perceived that NPT and PAL fostered comfortable learning environments that supported students' success; challenges included increased time spent teaching multiple students and completing evaluations. CoP allowed preceptors to balance teaching with clinical duties while broadening students' exposure to different practice settings. Preceptors improved skills in time management, communicating feedback, and adapting to students' learning needs. Novel rotation models allowed preceptors to provide care to more patients and complete projects, thus extending their professional practice. They also perceived that students participating in these models developed a greater sense of responsibility for patient care, and they are primed to work collaboratively with pharmacy colleagues.

Conclusion: Preceptors expressed satisfaction with novel student-preceptor models. The models enhanced the learning, skill development, and professional practice of both preceptors and students. Widespread adoption of these models in pharmacy experiential education would support students' development of knowledge, skills, attitudes, and behaviours essential for their future practice.

Novel student-preceptor models in pharmacy education: a qualitative analysis of the PharmD student experience

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Objective: To describe students' experiences and perceptions of novel student-preceptor models and evaluate the effectiveness of these models on students' learning.

Methods: Pharmacy students who had experienced at least one novel teaching model in their experiential rotations were invited to participate in semi-structured interviews. Models included peer-assisted-learning (PAL; two or more students of same educational level), near-peer-teaching (NPT; one or more junior students with one or more senior students), and co-preceptorship (CoP; two or more preceptors). Interviews were transcribed, coded, and analyzed for themes. Themes were mapped according to the Kirkpatrick model for evaluating educational training.

Results: Twenty semi-structured interviews were conducted. Forty-three experiences (19 CoP, 14 PAL, 10 NPT) were described from 14 institutions. Many themes overlapped between the three models. In CoP, students described increased preceptor availability and exposure to different patient care approaches. Challenges arose when preceptors had different student expectations. Students overwhelmingly endorsed a multi-learner environment. Both PAL and NPT students felt well supported as collaboration with other learners was readily fostered. Potential challenges in PAL and NPT were difficulties when personalities conflicted and when there was a significant knowledge gap between the learners. All three models allowed for the development of skills including communication and collaboration. Learners reported an enhanced approach to patient care and professional practice including approaches to teaching as new preceptors.

Conclusion: Pharmacy students valued their experiences in novel student-preceptor models. These opportunities had a positive impact on overall learning during the rotations and as new practitioners.

Use of virtual interactive cases in a 2nd year pharmacy skills lab

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Background: Students struggle with information gathering from patient cases early in their advanced pharmacy practice experience placements. The Virtual Interactive Cases (VIC) software is an innovative, interactive tool for creating simulated patient encounters to facilitate deliberate practice opportunities. Our group implemented the use of VIC cases in the second year Medication Therapy Management (MTM3) lab to enhance opportunities for students to practise information gathering through a simulated hospital patient encounter and electronic health record.

Objectives: 1. To implement a Virtual Interactive Case scenario into one MTM3 lab. 2. To obtain feedback from students and clinical instructors on their experience with VIC in the lab.

Methods: Four different VIC cases were developed for use in MTM3 in the winter term of 2018. Each student was given 20 minutes to work up their assigned a VIC case individually, including gathering pertinent information and identifying drug therapy problem(s). The student then communicated the care plan with the prescriber (role-played by a trained standardized patient actor) while being assessed by a clinical instructor. To familiarize students with VIC, practice cases were provided prior to the lab. A post-lab questionnaire was disseminated to all students and clinical instructors.

Results: Two hundred and twenty seven out of 236 students enrolled in the course participated in the VIC lab. Fifty-five (24%) students and 22 (100%) clinical instructors completed the questionnaire. The majority of students (62%) felt that the allotted time was insufficient. Despite this, most students (70%) had the impression after leaving the session that they performed well and 84% of students received a grade of pass or honours on the lab. Half of the respondents felt that this experience gave them a perspective of hospital practice. Clinical instructor feedback identified knowledge gaps that prevented the standardized patient actors from answering important case questions appropriately.

Conclusions: VIC was successfully implemented into the MTM3 course. Students' perception on time allotted did not translate into poor performance. Students' experience may be improved by utilizing clinical instructors to role-play health care providers in future labs. The impact of VIC lab on information gathering skills requires further assessment.

Connecting a simulated virtual patient program with real-life clinical placements: perspectives from year 3 students at the University of British Columbia

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Background: In 2017-2018 Virtual Patients (VP) were piloted with Entry to Practice Doctor of Pharmacy students to develop their clinical reasoning skills and better prepare them for experiential rotations. Our evaluation of the pilot found that students felt VP cases were a valuable learning tool. However, whether students found the cases to enhance their inpatient experiential rotations was unknown.

Study Objectives: To examine the impact of VP cases on Year 3 students' inpatient experiential rotations.

Methods: Third year students (N=215) were invited to participate in an online survey that contained both closed and open-ended questions. Survey questions solicited student perspectives on the helpfulness of VP cases in developing their clinical skills and preparing them for their experiential rotations. Quantitative analysis of close-ended survey responses was completed. For the open-ended responses, 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.

Results: Forty-three students (response rate = 20%) participated in an online survey following completion of their summer 2-week inpatient rotation. Findings suggest students agreed/strongly agreed (A/SA) that VP cases helped them to develop their clinical reasoning skills (84%). The most commonly identified themes related to this benefit included having to identify necessary information and using a methodological approach. However, students were less likely to state that VP cases helped them to: organize their thought process for patient assessments (51% A/SA); improve their confidence when assessing patients during inpatient experiential rotations (49% A/SA); and feel more prepared for their inpatient experiential rotations (67% A/SA). Student perceptions about how VP cases could be improved were also identified.

Conclusions: Overall, students did not feel that the VP cases improved their confidence and thought process while on experiential rotations. More work needs to be done to translate learning to student performance in real life practice.

Experiential opportunity: student intra-professionalism and mentoring in a community practice placement site

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Background: First year Bow Valley College (BVC) pharmacy technician students in Calgary are required to participate in an intra-professional half day experience with University of Alberta (UofA) fourth year pharmacy students completing their community practice placements.

Objectives: The goals of the experience are to provide students with an opportunity to learn about the roles and responsibilities of a pharmacist and pharmacy technician. Students interact in a practice based learning environment to gain an appreciation of the scope of practice of other health care professionals providing pharmaceutical care.

Methods: Faculty from UofA and BVC coordinate visits to the community pharmacy sites where fourth year students are completing placements. Technician students provide the pharmacist student with their resume and two questions prior to the visit. Using role playing and patient cases there are planned activities and discussions regarding the roles and responsibilities of technicians and pharmacists in a community pharmacy practice, fundamentals of team work and how to create a professional work environment.

The fourth year students act as preceptors and mentors to the technician students and complete a brief professionalism assessment for the technician students.

Results: UofA student surveys following the experience indicated the experience was overall positive. Comments were used to modify the experience for future students. BVC students completed a written reflection and overall they found the experience useful and insightful. UofA students were asked to reflect on their mentorship and preceptor skills as well as self-awareness of their professional responsibilities such as role modeling.

Conclusion: Both pharmacist and technician students describe involvement in an intra-professional experience in a practice based learning environment allowed them to learn about professional roles and responsibilities. UofA students found this experience insightful regarding their emerging professional identities. The experience involving a real vs simulated environment has many benefits however collaboration of the visits requires collaborative effort by both faculties.

Pharmacy curriculum in Newfoundland and Labrador: 1971-2016

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Study Objectives: My study explores the history of pharmacy education in Newfoundland and Labrador from the perspective of curriculum changes over time. It describes similarities and differences between program iterations, discusses the role of tradition in shaping curriculum, and suggests considerations for future curricula.

Methods: I obtained annual course calendars from university and college archives based on program dates and then chronologically documented the program structures, entrance requirements, required courses, and course descriptions. I analyzed the data to reveal what was emphasized and taught in the curriculum, while connecting it to perspectives on pharmacy practice during that time period. In particular, I identified commonalities and differences in program organization and curricular topics.

Results: Pharmacy practice and pharmacists' roles have traditional roots, which are subsequently reflected in curriculum. The College of Trades and Technology diploma program started in 1971, followed by the transition to a bachelor's degree program at Memorial University in 1986, and concluded with the 2016 admission cycle, just prior to the introduction of the PharmD curriculum. Foundational sciences, language and communication, pharmacy practice, pharmaceutical sciences, pharmacotherapy, business, research, and health systems are eight recurrent curricular topics. Critically examining curricula provided me the opportunity to think deeply about the selection, and just as importantly, the omission of certain courses and topics, such as the absence of social sciences and humanities. Furthermore, it is an opportunity to consider parallels and divergences with other pharmacy education programs.

Conclusions: As the School of Pharmacy at Memorial University transitions to the Entry-to-practice PharmD degree, and amidst the national conversation around expanding scope of practice, it is useful to look back at the history of pharmacy education in the province so we can reflect on changes that have occurred and where we, as a profession, are heading. Additionally, it is important for both novice and experienced educators to reflect on what and how they teach. These choices represent the values we emphasize for future pharmacists and will ultimately affect what they bring to practice upon graduation.

Development, implementation and evaluation of videos for modelling pharmacists' consultation skills

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Objectives: To describe the development, implementation and evaluation of instructional videos to model communication skills for pharmacist consultations in the Skills Lab curriculum of a four-year Bachelor of Science in Pharmacy Program.

Methods: Video scripts were written for three pharmacist consultations: New Prescription, Non-Prescription, and Monitoring. The exemplar videos modelled consultations following the *Dalhousie Pharmacist's Patient Care Process* and *Calgary Cambridge Guide*. Standardized patients and pharmacists were professionally video-recorded playing roles in the Skills Lab setting. Videos were segmented into stages of the interview with commentary added. Two videos (New Prescription and Non-Prescription) were used as part of assigned preparatory materials completed before attending a workshop for second year students. One video (Monitoring) was used as part of a lecture for third year students. Students were invited to participate in a survey containing 5-point Likert and open-ended questions to evaluate their perceptions of the videos for modelling communication skills for pharmacist consultations. Results were compiled and analyzed for themes.

Results: Seven out of 86, 19/86 and 20/89 students completed the survey for each of the three videos, respectively. One hundred percent, 94%, and 84% of respondents for each of the three videos respectively, agreed or strongly agreed that the videos helped them to better understand how to conduct the pharmacy consultation and that the videos were an effective part of the teaching method for introducing communication skills. Students' ratings were lower for questions relating to the videos' effectiveness at demonstrating empathy and physical assessment skills. Students suggested videos could be improved if they were modelling "one good example and one bad example for comparison."

Conclusions: Instructional videos modelling communication skills for pharmacist consultations were implemented as part of teaching methods in the Skills Lab. Students indicated that the videos helped them better understand how to conduct the three types of pharmacy consultations but were less effective at modelling empathy and physical assessment skills. Future videos should consider modelling these specific pharmacist consultation skills.

Clinical simulation pilot project for fourth year pharmacy students at Université de Montréal

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OBJECTIVE: During their 40 week-community pharmacy and hospital experiential practice, many Pharm.D. students may not be exposed to acute and stressful clinical situations. Clinical simulations using standardized patients are used to train health care professionals. Objective was to assess feasibility of clinical simulations with fourth-year students and to describe their appreciation for this method of teaching (Kirkpatrick level 1).

METHOD: This activity was proposed to the entire cohort of fourth-year pharmacy students and 21 of them volunteered for a half-day clinical simulation. Students were divided in four groups where each student was exposed to 2 scenarios: 1) aggressive patient on methadone; 2) cancer patient with severe pain. Two actors played in each scenario which was followed by a debriefing period lead by clinical pharmacists. Students had to complete three different written questionnaires about anxiety, self-confidence in learning and simulation design scale at various points in time.

RESULTS: A total of 16 and 20 respondents filled out the questionnaires after the first and second simulation respectively. Based on the anxiety scale, students were less anxious and worried after the scenarios when compared to baseline. The students liked the quality of the acting and the debriefing period. After the first and second simulation, 93% and 90% of the students were fully in agreement that the simulations should be offered at least once to all pharmacy students.

CONCLUSION: This pilot project demonstrated the feasibility of clinical simulations in pharmacy. The simulations were appreciated by students. The next phase will encompass half of the fourth-grade cohort (nearly 90 students) with an impact measure of simulations on learning (Kirkpatrick scale level 2).

Nonprescription medications and minor ailment education across North American pharmacy schools

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Study Objectives: The use of nonprescription medications by the public to manage minor ailments is on the rise, and pharmacists' scopes of practice are expanding to allow minor ailments prescribing to manage these common conditions. Thus, it is imperative that pharmacy students are prepared to care for self-treating patients by conducting thorough assessments, facilitating evidence-based therapy recommendations, and adequately educating on the agreed-upon plan.¹

Statement of Methods: An environmental scan was carried out in PubMed and Embase that looked at nonprescription medications, minor ailments and self-care curricula in pharmacy schools across the United States. Reports that discussed recommendations to enhance nonprescription medication and self-care education were especially relevant. Key words included nonprescription, minor ailments, education, and pharmacy. The search strategies were limited to English studies and between the years of 2004 to 2018.

Summary of Results: There is a paucity of Canadian literature on the subject of nonprescription medicines and minor ailments education in pharmacy programs. However, such research has been conducted in the United States. A survey distributed to U.S. colleges and schools of pharmacy five times between 2003-2016 highlighted the changes in nonprescription drug therapy instruction over these years. Changes seen in the U.S. illustrate minor ailment education becoming more important in curricula including a decrease in the number of schools that do not require any nonprescription medicine courses in their curricula.^{2,3}

Statement of Conclusions: Advising on nonprescription medicines is an integral part of pharmacy practice in Canada. However, there is no clear picture of what minor ailments education looks like across pharmacy curricula in Canada. The research team's next steps are to disseminate an adapted version of the U.S. survey (mentioned in 'Summary of Results') across Canadian pharmacy schools, and conduct follow-up phone calls with academics in each institution to illuminate the current state of nonprescription medicines and minor ailments education in Canada. This research is the first of its kind and part of a larger grant initiative.⁴

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Admissions variables as predictors of academic performance in a post-baccalaureate Doctor of Pharmacy program

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Background: Elements considered for admission to the PharmD for Practicing Pharmacists (PPP) program at the University of Alberta include applicant GPA, curriculum vitae (CV), cover letter, professional references, and a personal interview. An evaluation of admissions processes and variables is an important component of overall program assessment.

Objective: To examine admissions data from the PPP program for associations with academic performance in didactic coursework in order to determine strongest predictors of success.

Methods: Admissions data was collated from applicants to the on-campus program between 2014 and 2017. Of the admitted students, grades in the four didactic courses were analyzed with their admissions data to determine if one or more of the variables correlated with performance in the academic coursework. Graduation year from the first professional pharmacy degree was also considered in the analysis.

Results: Data from 117 applicants were reviewed. Seventy-one of these were admitted to the program between 2014-2017. There was no apparent difference in the mean GPA of admitted and non-admitted students in the first two cohorts admitted, while the GPA of admitted students was higher in the most recent cohorts. For most other admissions variables, there was a difference in the mean scores of admitted and non-admitted students. A more recent graduation year was correlated with a higher overall admission score. Of those admitted to the program, admissions total score positively correlated with all course grades and overall program GPA. Admission GPA correlated with overall GPA within the PPP program, whereas CV, cover letter, reference letters, and interview did not correlate with grades.

Conclusions: Admission GPA appears to be the most consistent variable predicting academic performance within the PPP program. Future research to examine admissions variables and performance in experiential courses will provide further insight into the value of non-GPA based admissions variables.

Teaching pharmacy students to prescribe: evaluating the relationship between motivation, student engagement, and self-efficacy during an innovative lab activity

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Objectives: To determine if a gamified lab activity adds value to the student experience. Furthermore, to determine whether outcomes differ between students who are intrinsically versus extrinsically motivated (i.e., focused on mastery versus approval or grades).

Methods: We developed a lab activity based on “The Amazing Race” to engage second-year pharmacy students in rehearsing the skills to assess and adapt an inappropriate prescription for hypertension. We developed a 7-point Likert-type survey consisting of 27 questions by combining subscales of existing instruments (student engagement, self-efficacy, task value, intrinsic motivation, and extrinsic motivation) to evaluate the activity. The survey was available for one week after the lab and data was de-identified prior to analysis.

Students’ dominant motivation type was determined from their internal and external motivation scale scores. We analyzed the data using a t-test ($p=0.05$) to determine whether motivation type influenced engagement and self-efficacy.

Results: 128 students were surveyed and 121 submitted (94.5% response rate). We performed a factor analysis on 27 items and 5 factors were identified: student engagement ($\alpha=0.94$), self-efficacy toward patient care ($\alpha=0.92$), self-efficacy toward communication skills ($\alpha=0.83$), intrinsic motivation ($\alpha=0.77$), and extrinsic motivation ($\alpha=0.77$).

65 students were internal dominant, 45 were external dominant, and 10 were neutral. On average, students “agreed” the activity was engaging and were “rather sure” about their skills. No significant difference was observed between intrinsically and extrinsically motivated students for student engagement (5.2 vs 5.0, $p=0.52$) or self-efficacy towards communication skills (4.5 vs 4.4, $p=0.59$). Intrinsically motivated students felt significantly more confident performing patient care activities such as adapting a prescription (4.6 vs 4.0, $p=0.01$).

Conclusion: Gamification adds value to pharmacy skills labs, as both internal and external dominant students rated their engagement relatively high. The next step is to assess self-efficacy with a pre and post-activity study design to evaluate the activity’s impact on this outcome.

Pharmacy prerequisites associated with interactive and non-interactive OSCE performance

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Objective: To identify academic prerequisites associated with interactive and non-interactive OSCE performance in the undergraduate pharmacy program at the University of Saskatchewan.

Methods: Retrospective data consisted of prerequisite grades and OSCE scores of 1183 students admitted to the undergraduate pharmacy program of the U of S from 2003 to 2017. Interactive and non-interactive OSCE scores from four sets of OSCEs in years 3 and 4 of the pharmacy program (Phar 465 and Phar 565) were calculated. Associations between OSCE scores and prerequisites were analysed using Pearson correlation and linear regression. Students were excluded from the analysis if one or more prerequisite courses were completed at another university.

Results: There were few significant correlations seen between the BSP prerequisites and OSCE scores. Although there were a large number of statistically significant correlations found with the Pharm D prerequisites, the strength of the correlations was uniformly weak (0.10 to 0.20). Courses in Nutrition, Physiology, and Microbiology showed the strongest association with interactive OSCEs. The strongest associations with non-interactive OSCEs were seen with Nutrition and Microbiology.

Conclusions: OSCEs assess a range of clinical skills including verbal communication, professional judgement, application of knowledge, and problem solving ability; thus, OSCEs might serve as an important proxy for measuring future clinical success. Our previous research identified a strong association between persistent academic success in the pharmacy program and prerequisites associated with higher-level learning skills such as knowledge organization, skill mastery and knowledge synthesis and application. The weakness of the associations between prerequisites and OSCEs while consistent with other findings in the literature, may point to an important limitation in the scope of important clinical and problem-solving skills currently assessed by OSCEs in this and other pharmacy programs.

Exploring students' experience of learning during practicum

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The UBC Faculty of Pharmaceutical Sciences' E2P-PharmD curriculum involves 42 weeks of experiential education. Many students enter the program without relevant practice education experience. Therefore, it is important to provide support for student learning in practicum settings. Identifying opportunities for learning is the first step in building the necessary supports. The goal of this study was to identify the situations and conditions conducive to learning in practicum settings. The research questions focused on (1) identifying practicum situations and conditions conducive to effective learning, and (2) the differences in learning between academic and practicum setting, across years and types of practicum (hospital or community).

Nine students from all years of the UBC Pharmacy Program were selected through stratified purposeful sampling and individually interviewed, using qualitative interview methods about their practicum learning experience. Data summarization and transcript coding for themes and categories, analyzed in the tradition of interpretational analyses, was applied.

The practicums were described as conducive to acquiring interprofessional skills, self-assessment skills and feeling of self-efficacy. A "learning script" emerged from the participants' descriptions. Common elements of this script included: a "trigger", which could be a preceptor assigned task, or independently set goal by the student; an iterative process of "practice" involving preparation, looking up necessary information, application of the information, reflection-in-action, self-assessment and looking for feedback; in some cases there was "follow up" and/or "reflection-on-action". Conditions for effective learning when enacting this script included preceptor's support, clearly defined (and accepted by the student) responsibilities, sense of independence, involvement in interaction with patients. A stronger sense of initiative for self-improvement appeared to evolve as students progressed through the years. Differences in the "learning script" emerged across hospital and community settings in the level of students' independence, preceptors' guidance, and the variety of patients.

These data will allow us to build an educational tool about learning how to learn in practicum settings so that students may gain the most out of their practicums.

Service learning and AFPC competencies: assessment of a course revision

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Objective: To describe the revision, implementation, satisfaction with, and assessment of a service-learning course.

Background: With a curricular change to a PharmD program in 2017-18, the service-learning course at the University of Saskatchewan was revised in 2018-2019 to conform to AFPC outcomes and to closer integrate with other courses in the curriculum.

To meet course requirements, year one students completed 60 service-learning hours in a community-based organization (CBO) in Saskatoon over two terms (30 hours each term), attended an oral group reflective session, and completed a written reflection. AFPC outcomes of health advocate, professional, and communicator were assessed. Formative, summative, peer, and self-assessment was utilized to assess the students. Assignments and assessments were revised to align with AFPC outcomes and to ensure competencies were reflected over all components of the course. The evaluation form was reformatted to a rubric with defined criteria that students had to demonstrate to achieve proficiency in the competency.

Methods: Students evaluated the course through a survey. Faculty met with CBO staff after the course completion to assess satisfaction and obtain feedback about the revised course. Data was gathered and assessed using mixed-methods.

Results: All students, except one, successfully completed course requirements. The student has since undergone remediation and has completed course requirements. All 73 students completed the course evaluation. Overall, 89% of students felt they were able to achieve the competencies with 100% agreeing that they improved their communication skills. Additional details were gathered through the survey and are available for presentation.

CBO staff felt the course was successful. Suggestions to modify the evaluation form, especially the communication competency, and to have the course extend over two terms as opposed to two separate course offerings were adopted.

Conclusion: The course was deemed valuable by both students and CBOs. Based on feedback, the course was revised in 2018-19 to become a two-term course. The evaluation form was revised to add the collaborator competency and to break up the communicator competency.

Implementation and evaluation of immersions for year one PharmD students at the University of Saskatchewan

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Objective: To describe the implementation of year one PharmD immersions in community pharmacy, medSask, and Medication Assessment Centre (MAC) settings, and to determine if these settings are effective for students to achieve AFPC competencies of care provider, communicator, professional, and scholar at a year one proficiency level.

Background: The PharmD curriculum at the U of S was designed so that students could begin experiential learning in Year 1 Term 1. These experiences were described as immersions or site visits and began in 2017- 18. Students completed four 3-hour immersions in community pharmacy and two MAC and medSask immersions over two terms. Each site and visit had specific competencies for students to achieve and a unique evaluation form. Students also completed written reflections of the community experience.

Methods: A mixed methods design was used in which qualitative (student and preceptor survey responses, and student reflective assignments) and quantitative (student and preceptor assessments for immersions and mandatory student course evaluations) data were collected and analyzed. Data were collected through student and preceptors surveys following course completion and submission of final grades. Student and preceptor satisfaction with the immersions was assessed and feedback about possible improvements was solicited through the survey.

Results: Overall, 95% of students agreed that they were able to achieve course competencies while 5% remained neutral. Preceptors overall felt the course was successful. Additional details and data were gathered and are available for presentation. The suggestion to have the course extend over two terms as opposed to two separate course offerings was adopted. The evaluation forms were modified, where appropriate, based on feedback from both students and preceptors and to better align with competencies assessed within the immersions.

Conclusion: The course was deemed valuable by both students and preceptors. Based on feedback, the course was revised in 2018-19 to become a two-term course. Future immersion refinement or adjustments will be determined and course revisions will occur as needed.

The SIMpathetic program: implementing simulation stethoscopes in an E2P PharmD program at the University of British Columbia

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Background: Human patient simulators (HPS) are currently used in our program to help teach physical assessment to Entry-to-Practice Doctorate of Pharmacy (E2P PharmD) students. However, HPS present limited opportunities for live interaction in communication and bedside manner while performing physical assessment. Therefore, during the 2018-19 academic year, the SIMpathetic Program, which combines the use of simulated stethoscopes with standardized patients, will be piloted with Program Year (PY) 1-3 students.

Study Objectives: To describe the implementation of the SIMpathetic program and the preliminary data on its perceived benefits and challenges.

Methods: Students from PY 1-3 will be exposed to two novel cases requiring the use of a simulation stethoscope to assess a standardized patient. Upon completion of the second case, students, facilitators, and standardized patients are asked to complete a survey to assess their experiences with the simulation stethoscope and to provide suggestions for activity improvements. To date, only PY2 preliminary survey data has been completed and available for analysis.

Results: Program Year 2 survey results suggest that 80% (152/189) of students perceive the SIMpathetic program as very/extremely useful to effectively prepare them for physical assessment in future practice. More students report feeling very/extremely confident in conducting physical assessment after using the simulation stethoscope (57/189 = 30%) compared to those who felt very/extremely confident prior to its use (27/189 = 14%). Suggestions for activity improvements include providing more preparatory materials and opportunities to practice, and real-time feedback from facilitators.

Conclusions: The SIMpathetic program was designed to provide opportunities for E2P PharmD students to develop their communication skills and bedside manner in relation to physical assessment. Next steps include completing PY1 and PY3, revising the activity to maximize its benefit, and looking for other areas in our program where simulation stethoscopes could be used to supplement or replace HPS.

Engagement of pharmacy students in practice based research

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Objective: Pharmacy students completing community practice placements often have unique opportunities to participate in pharmacy practice research projects which allow them to develop research skills while contributing to practice. Yet, student engagement and sustained involvement are common barriers to practice based research. The goal of this study is to describe a peer led model of pharmacy student engagement in practice based research and subsequent recruitment.

Methods: Fourth year pharmacy students completing their 8-week community practice placement (N=45) were invited to participate in a project with the goal of identifying critical inhaler errors in Albertans. Students attended a project presentation and received data collection forms, list of critical inhaler errors and instructions one week prior to their placement starting. To monitor students' progress and address possible questions, a peer student followed up and tracked participants' recruitment via phone calls, Facebook posts and emails. Students were contacted at weeks 2, 4, 5 and 7 and by individual request. Strategies to overcome commonly reported concerns, questions and motivational messages were addressed in emails.

Results: During the first round of phone calls students had recruited 40 patients and reported barriers including lack of familiarity with data collection process, low confidence in completing the asthma action plan and inability to integrate study procedures into pharmacy workflow. By the end of week 4 and 5, the number of recruited patients were N=86 and N=128 respectively. The approximate time to conduct each round of phone calls was five hours. Students were enthusiastic and displayed interest and effort in contributing to practice based research.

Conclusion: Peer support in engaging pharmacy students in practice based research was feasible and supported the robust recruitment of Albertans with asthma and COPD. Frequent communication with a peer was effective in identifying issues that had the potential to jeopardize the study and also proposed their timely solutions.

Putting the pieces together - implementation of a jigsaw classroom to teach pharmacy students

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Background: The Jigsaw teaching technique (<https://www.jigsaw.org/>) was implemented into Program Years (PY) 1-3 of a 4-year entry-to-practice PharmD program at the University of British Columbia. A Jigsaw classroom was used to teach Head, Eyes, Ears, Nose and Throat dosage forms in PY1, respiratory dosage forms in PY2, and contraceptives in PY3. Although this technique has been used in elementary and high schools, its use in healthcare education is limited.

Study Objectives: To describe the implementation and evaluation of a Jigsaw classroom into a pharmacy curriculum.

Methods: Prior to the Jigsaw tutorials, students were divided into six smaller groups of 6 students. One student from each group was assigned to be the leader or expert for a particular dosage form or topic. The expert was asked to research and be prepared to teach their topic to their small group. At the beginning of the 3.5 hour tutorial, all the experts for a particular topic met for 30 minutes to solidify their knowledge and discuss teaching strategies. Students then rotated through six stations; during which each expert took turns teaching their topic to their small group. The session concluded with a Faculty member reviewing the key points from each topic with the entire class and students completed an online quiz.

Results: Instructor reflections and feedback from students were reviewed. Students reported the Jigsaw teaching technique reinforced their learning by teaching and working collaboratively with their peers. Suggestions for improvements include more comprehensive preparatory materials and accountability for topic experts to prepare well for the sessions.

Conclusions: Based on Faculty and student feedback, the use of the Jigsaw technique improved the learning experience for students. Next steps include expanding use of this technique to teach other topics, and measuring the impact of the Jigsaw classroom on students' retention of knowledge and skills and their ability to teach.

Implementation of an academic teaching practicum for program year 4 entry-to-practice PharmD students

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Background: Academic teaching rotations within the Entry-to-Practice (E2P) PharmD program at the University of British Columbia (UBC) have been offered to post-graduate PharmD students and BC Pharmacy Practice residents since September 2015. Building on the success of these rotations an academic teaching practicum was created for Program Year 4 (PY4) E2P PharmD students.

Objectives: To describe the implementation of an academic teaching practicum elective for PY4 E2P PharmD students within an E2P PharmD Program.

Methods: In response to the Faculty's call for non-direct patient care placements, a 4-week academic teaching practicum was created and offered as an elective to PY4 E2P PharmD students. Practicum objectives and activities were developed to align with existing academic teaching rotations being offered and with the Association of Faculties of Pharmacy of Canada (AFPC) Educational Outcomes.¹ A practicum specific manual for students and preceptors was also created to outline the objectives, activities, expectations and assessments specific to the academic teaching rotation.

Results: In the fall of 2018, a 4-week academic teaching practicum elective was launched with a total of four students completing the practicum by the end of the academic year. Four different faculty members participated in the elective and each precepted one student. Over the 4-weeks, students completed various required practicum activities including participating in teaching sessions of various formats for students in PY1 to PY3, developing learning materials and assessments, and evaluating students.

Conclusions: Implementation of the academic teaching practicum provided PY4 E2P students with a practicum opportunity aimed to develop their knowledge and skills in adult learning and pedagogical practices. Next steps include promoting a greater awareness of the elective with PY4 students and refining the practicum based on feedback gathered from this first iteration.

¹ Educational Outcomes for First Professional Degree Programs in Pharmacy in Canada. Quebec City. Association of Faculties of Pharmacy of Canada (AFPC); 2017.

The evolution of a national online educational resource for informatics

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Objectives: To improve the quality of the “Informatics for Pharmacy Students” e-Resource to allow relevant and valid teaching and learning about e-health in Canadian schools of pharmacy, and to expand its utility to other health professions

Method: Against a backdrop of electronic health records, digital information resources, and expanded scopes of practice, the e-Resource was developed in 2012 by the Association of Faculties of Pharmacy of Canada with funding by Canada Health Infoway. With the goal of updating and expanding the e-Resource, modifications and reorganization resulted in the release of two subsequent versions. Formal internal evaluations helped inform the directions taken to improve the e-Resource. Content modifications underwent a structured review process through an editorial advisory committee and peer review. Several other sources informed revisions: faculty case reports on integration and curriculum changes, learning management system analytics, and feedback from student users.

Results: Version 3 was released in August 2017 with significant revisions and additional learning activity development. All chapters were enhanced and updated, with improved navigation and formatting for a streamlined learning experience.

To date, over 5000 learners have enrolled (with over 4800 enrolled prior to its launch). User testing revealed little or no technical difficulties and satisfaction with content and platform. Two chapters were translated into French. Approximately 500 students and faculty have accessed the French version.

An interprofessional version has also been launched, intended for use by medical, nursing and pharmacy students. The topics chosen for development were e-MedRec and e-Prescribing. The platform has been redesigned for greater appeal to other professions: <http://elearnhcp.ca/>

Conclusion: Continuous improvement and expansion of the e-Resource has resulted in a robust, stable platform about information and communications technology in healthcare for use in health professions education.

Pill counter, businessperson or health care provider? A discourse analysis of professional identity in pharmacy education

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Background: Professional identity formation - the development of professional values, actions, and aspirations – is gaining momentum as a movement for educational reform in health professions education. Currently, and historically pharmacist identity has been contested: are they merchants or health care professionals? This unformed professional identity may have significant effects on recruitment, retention, acceptance by other healthcare professionals, and approval by society.

Objectives: The objectives of this study were to explore (1) what have been the professional identities in pharmacy education over the last century in North America and (2) which one(s) currently dominate the curricula.

Methodology: A Foucauldian informed historical critical discourse analysis was undertaken to uncover the educational assumptions underpinning pharmacist identity over time. This analysis, allowed for the questioning of the roles of the pharmacist that are taken for granted and assumed as rational and inevitable.

Results: This study identified five prominent discourses in the literature related to the professional roles of pharmacists over the last century. The identities are the "apothecary", "druggist", "merchandise", "expert advisor" and "health care provider". Each of these discourses constructs the pharmacist's professional role in different ways and as such makes possible certain language, subjects, and objects. An unexpected finding of this research was that over the years there were no clear discursive shifts in the education literature, but rather discursive "pile-ups" of all identities.

Conclusions: Each identified discourse remained present throughout the entire archive. These "discursive pile-ups" suggest that each discourse continues to have relevance to pharmacy educators, and as such competes for space in the curriculum. This likely contributes to the identity challenges pharmacists currently face. This critical discourse analysis reveals that pharmacist identity constructs are not straightforward, self-evident, or progressive. Pharmacy educators must determine the ultimate goal of pharmacy education and begin a formal process of inculcating the ideal identity discourse in pharmacy curricula.

Pharmacy student and patient educator perceptions on a patient-centred care activity in a lecture theatre

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Objectives: Patient-centred care is a core concept for pharmacy programs; ensuring that patients are put at the forefront of their health and care. While most students work with real patients on experiential practicums, exposure to patients in the curriculum is limited due to challenges with time, space, and available patient educators. The purpose of this study was to evaluate pharmacy student and patient educator perceptions of a patient activity delivered in a lecture theatre.

Methods: A 30-minute activity was piloted in a first-year PharmD course. 222 students were placed into groups of 6 and assigned to 1 of 12 patient educators during a particular time-slot for the activity. Following the activity, electronic surveys were deployed, which included Likert-scale and open-ended questions. Surveys gathered information on student perceptions of important learning points, deployment in a lecture theatre, and value of activity and patient perceptions on additional learning points for future activities. Analysis was conducted based on descriptive statistics.

Results: Surveys were sent to 222 first year pharmacy students and 12 practice educators. Survey completion rate was 99% for students and 100% for the patient educators. Students agreed (18%) and strongly agreed (81%) that the activity was overall enjoyable and valuable. Common learning points from students included the importance of developing a connection with patients and the significant impact pharmacists can play in their lives. Students would have preferred smaller, breakout rooms, but felt the large lecture hall was still an appropriate space. Both students and patient educators would like to see rotating stations in the future to allow groups to interact with more patients.

Conclusions: Pharmacy students and patient educators expressed positive attitudes and value towards actively listening to one another to learn about the importance of fostering meaningful patient-pharmacist relationships. Early exposure and high impact activities like these can be organized and implemented even with limited time and space availability.

Indigenous community-driven clinical pharmacists services

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Objectives: Our goal is to find ways of fostering meaningful collaboration with Indigenous communities to improve patient care through a new initiative entitled, "Community-driven Clinical Pharmacist Services." This initiative is unique in that it involves partnering with Indigenous communities, the First Nations Health Authority and the University of British Columbia's Pharmaceutical Sciences' Pharmacists Clinic, to co-develop and implement clinical pharmacist services. Strong relationships have been built through mutual respect and a shared vision of fostering an initiative focusing on community-centered and nation-based needs.

Methods: This initiative involves five Indigenous communities and consists of two phases. Phase I explores community needs and priorities for clinical pharmacist services through open conversations. There is a commitment to have conversations with community members, Elders, local healthcare providers, and health directors. Conversations occur through community visits, one-on-one interviews, and/or online questionnaires. Information gathered is then reviewed and a community-specific plan is co-developed detailing recommendations for services. Phase II focuses on implementing sustainable clinical pharmacist services, as identified and developed in Phase I. This could include direct service delivery by the UBC's Pharmacist Clinic or local pharmacists, direct support to local healthcare providers, or other community-identified solutions.

Results: One community has completed Phase I, resulting in the collation of valuable insights into the community's healthcare needs and priorities. Such responses included a desire for pharmacist-led education sessions and one-on-one medication management via in-person and telehealth. Information gathered has allowed design and development of community-specific services to begin through ongoing collaboration between the community and the faculty-run clinic.

Conclusions: This grassroots approach represents the opportunity for reciprocity – learning from expert community members and utilizing university and health authority resources to provide community-driven, nation-based clinical pharmacist services. The communities involved in the initiative express a need for increased and optimized pharmacy services and are open to partnering with the faculty-run clinic and health authority. An opportunity is presented for more partnerships between Indigenous communities and faculty-run clinics to improve culturally safe pharmacist services and most importantly, health outcomes.

Pharmacist's perceptions towards their preparedness to participate in medical assistance in dying

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Objective(s): To determine Newfoundland and Labrador (NL) pharmacists' willingness to participate in medical assistance in dying (MAiD) and identify potential barriers to their participation.

Methods: An online survey was made available to all pharmacists practicing in NL through the Pharmacists Association of NL. The survey was active from May 25th to July 13th 2018. The questionnaire included multiple choice, Likert-scale, and open-ended questions. Information on pharmacist demographics, views towards MAiD, willingness to participate in MAiD, factors contributing to unwillingness, concerns on participation, perceptions about their knowledge, skills, and ability to interpret provincial practice guidelines was collected. Analysis of data was conducted by descriptive statistics for quantitative data and content analysis for open-ended questions.

Results: A total of 176 valid survey responses were received, which represented approximately 24% of pharmacists in NL. Over 80% of respondents were willing (very willing or probably willing) to participate in the following aspects of MAiD: dispense prescriptions (83.6%), provide drug information to physicians (92.6%), and respond to patients' general inquiries (85.8%). Over 60% of respondents felt they lacked knowledge about the MAiD process, oral/IV medications for MAiD, what information to give patients about MAiD, and the knowledge needed to counsel physicians on MAiD medications. Only 16.5% of respondents had participated in MAiD education and 85.2% felt pharmacists should be required to complete an education program before participating.

Conclusion: The majority of respondents are willing to participate in MAiD. However, there are pharmacists unwilling to participate and their individual rights to exercise conscientious objection should be protected. Despite the majority of respondents being willing to participate there are potential barriers limiting pharmacists' ability and willingness to participate. The survey results suggest there needs to be additional supports (e.g. educational, emotional) developed to assist pharmacists in this new practice area.

Formation of a collaborative interprofessional primary health care deprescribing research team in Nova Scotia

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Study objective: To describe the development of a collaborative interprofessional primary health care deprescribing research team in Nova Scotia.

Methods: Initiated by two College of Pharmacy faculty members, a core group of 6 health care researchers with an interest in forming an interprofessional primary health care deprescribing research team met in 2016. Based on positive feedback, the next steps involved building the team which included 1) creating the team (determination of needed expertise; description of roles and responsibilities); 2) establishing goals/objectives; 3) determining team functioning (leadership, ascertainment of common mission, determining communication strategies and delineating decision-making approaches); and 4) monitoring team outputs (e.g. presentations, publications, grants); and team functioning (e.g. discussions at team meetings, team assessment survey, social network analysis).

Results: The first team meeting was in April 2017, and as of January 2019 the team had expanded to 9 core members with research assistants/students added to the team as necessary. At initial team meetings, the two College of Pharmacy faculty members assumed a co-leadership role, established the overarching goal of the team, set specific objectives and reached a consensus on various aspects of team functioning. The team has received five grants. Eight posters/oral presentations have been presented and two manuscripts are in preparation. A team assessment survey was completed in the spring of 2018 which resulted in changes to communication strategies. A social network analysis is underway.

Conclusions: An interprofessional deprescribing primary health care research team was successfully formed in Nova Scotia. This success has hinged on a team committed to working well together, sharing common goals, effective communication, positivity towards the research and celebrating successes.

Successful implementation of clinical pharmacy services: lessons from the field

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Background: Despite the positive impact of clinical pharmacy services on resource utilization and patient health outcomes, many community pharmacies have yet to implement these services routinely into daily practice.

Objective: To summarize existing literature on implementation methods and consolidate practical strategies community pharmacies can utilize in their own clinical service implementation process.

Methods: Damschroder et al's Consolidated Framework for Implementation Research (CFIR) was chosen as a theoretical framework to classify the implementation methods and strategies outlined in the literature for this narrative review. Searches were conducted in PubMed, Google Scholar, EMBASE, and selected pharmacy practice and implementation journals. Additional targeted searches provided further insight into general concepts originally identified in the first stages of the search.

Results: A total of sixty-two papers were identified, with the overwhelming majority containing concepts related to the "Inner Setting" CFIR domain. "Process" and "Outer Setting" were highly referenced as well, with "Intervention Characteristics" being the least common. The majority of specific examples extracted from these papers relate to the "Inner Setting" and "Process" domains, yielding thirty-nine and fifteen of the sixty-four total examples, respectively.

Conclusion: Through the use of the CFIR, our paper explored a wide variety of pharmacy services and offers practical implementation examples from the field. The importance of the "Inner Setting" is very apparent and logical, as our focus was on implementation strategies within the scope of individual pharmacies. While the general lack of outcomes data in the literature should be noted, these consolidated pragmatic examples can be used by pharmacies undergoing their own implementation process of clinical services into a community setting, and furthermore as a foundation for the development of an implementation blueprint.

Implementation of pharmacist care planning services in Alberta: a step in the right direction?

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Objective: Remuneration for pharmacist care planning services was implemented in Alberta in 2012. The objective of this study is to understand how care planning services are performed by pharmacists, as well as strategies used to implement these services in practice.

Methods: This qualitative study utilized a longitudinal, multiple-case study approach. Purposive sampling was used to identify 4 cases (community pharmacy sites) which were selected based on services provided, practice context, and location. Data collection included document review, observation, and semi-structured interviews of pharmacists, pharmacy technicians, other pharmacy staff, health care providers and patients. Interviews were audio recorded and transcribed verbatim. A constructivist grounded theory approach was used to analyze data.

Results: A total of 94 hours of observation and 77 interviews were conducted. The overall process of care planning was similar between pharmacy sites, however there were differences in how care planning was performed and extent of collaboration with other health care providers. Care planning services were provided at the community pharmacy, in the patient's home, as well as "on-site" at long term care facilities or physician's offices depending on the pharmacy site. Documentation to support collaboration differed between cases. Community pharmacists co-located with physicians developed and implemented collaborative care plans. Strategies that were commonly used to implement care planning services included software adaptations to flag eligible patients and prompt follow-ups, software changes to support documentation, organizational changes and task shifting. Implementation strategies tended to evolve over time as pharmacists learned from experience.

Conclusions: A government-funded compensation plan for pharmacy services was put forward to support changes in pharmacists' roles and contribution to primary health care. A number of implementation strategies were used by pharmacists to integrate care planning services into practice. Our data suggest that care planning services are still evolving however pharmacist's roles have shifted to more patient-centred care. Findings may be useful to pharmacy practice researchers in other jurisdictions as well as educators.

Using a patient panel approach to identify patients for pharmacist referral and the impact of pharmacist intervention on the management of uncontrolled type 2 diabetes

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Objective: A pharmacist with the UBC Pharmacists Clinic (the Clinic) working collaboratively in a co-located setting with a family physician at Blundell Medical Clinic explored a systematic, proactive approach to identifying patients within a patient panel, via ICD 9 codes, for pharmacist referral. The first group of patients identified had a type 2 diabetes diagnosis and HbA1c >8%. The objectives were to determine if this approach is an effective way to identify patients for pharmacist referral and if the pharmacist interventions led to an improvement in HbA1c for those with uncontrolled type 2 diabetes.

Methods: A retrospective review of patients seen at Blundell Medical Clinic by the pharmacist between June 2016 and July 2018 was conducted. Pertinent data (patient characteristics, medications, HbA1c measurements, drug therapy problems (DTPs) and pharmacist recommendations) were extracted from electronic medical records at the two clinics and analyzed.

Results: Of the 12 patients identified, each patient averaged 3 appointments with the pharmacist. Patients were 75% male with a mean age of 63.6 years, mean duration of illness of 13 years, mean HbA1c of 9.1%, averaged 1.8 DTPs at the initial visit. Pharmacist recommendations included initiating insulin in 15.4% of patients, increasing insulin dose in 41.6% of patients and increasing adherence in 25% of patients. Following pharmacist intervention, the mean reduction in HbA1c from first to last visit was 1.18% and 1.33% from first visit to 3-6 months post last visit.

Conclusion: The results support a proactive approach using a patient panel as a way to identify patients with uncontrolled diabetes for pharmacist consultation. Pharmacist interventions in collaboration with a family physician were associated with reductions in HbA1c measurements. This patient panel approach is sustainable in a collaborative, primary care setting to identify future patients for pharmacist consultation.

Impact of collaboration between the UBC Pharmacists Clinic and a neurologist in the management of headache patients

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Rationale: Pharmacists are well positioned to provide support and medication management to patients with headache disorders.

Objectives: To characterize patients referred to UBC Pharmacists Clinic by a neurologist for headache management and evaluate clinical outcomes related to headache burden.

Methods: A retrospective review of all patients referred to a clinic pharmacist by a neurologist between 2014 and 2017 was conducted. Pertinent data (patient characteristics, headache type, frequency and severity of attacks, medication use) were extracted from electronic medical records for initial and follow-up pharmacist visits to enable pre-post comparison.

Results: A total of 105 patients were included (73.3% female, mean age 47.6 years). On initial pharmacist visit, 44.8% of patients had a diagnosis of chronic migraines; 22.9% had migraines without aura, 17% had episodic migraines, 9.5% had mixed headaches, 4.8% had migraine with aura, 1% had tension headaches. Mean headache frequency was 19.6 attacks monthly, decreasing to 7.1 on follow-up ($p \leq 0.05$). Initial headache severity was reported as mild, moderate or severe in 10, 45 and 36.7% of patients, respectively with data unavailable for 8.3%. Headache severity was not consistently reported on follow-up. Pharmacists recommended non-pharmacological measures, pharmacologic prophylaxis alone, a combination of abortive and prophylaxis therapies and abortive therapy alone for 85, 48.3, 41.7 and 5% of patients, respectively. De-prescribing of drugs was recommended for 53.3% of patients. On follow-up, increased use of headache prophylactic medications and decreased use of abortive medications was seen. Over half of patients were deemed to be at risk for medication overuse headaches and received pharmacist intervention and education to manage this.

Conclusion and implications for practice: Pharmacist interventions, in collaboration with a neurologist, demonstrated clinically meaningful reductions in headache frequency. Pharmacists have the unique knowledge, skills and accessibility to make meaningful impacts for headache sufferers.

Acknowledgement

This work has previously been presented as a poster at the following conferences:

Canadian Pharmacists Conference, June 2-5, 2018, Fredericton NB

Canadian Society of Hospital Pharmacists, BC Branch AGM, Nov 24-25, 2018, Vancouver BC

Patient experiences and perceptions of a university affiliated pharmacist-led clinic

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Objectives: The University of British Columbia Pharmacists clinic provides comprehensive medication management to patients following a healthcare practitioner referral or self-referral. This study aimed to qualify patient expectations and perceptions related to care received through this pharmacist-led model.

Methods: A two-step mixed qualitative-quantitative approach was used consisting of a paper-based survey prior to the initial pharmacist consultation, followed by a telephone-based survey post consultation. The paper-based survey used open ended questions to capture patient expectations of consultation. Post-consultation telephone surveys consisted of a rating scale, to solicit patient satisfaction, and open-ended questions, to capture the patient experience. Patients were successively enrolled until saturation point was achieved. Qualitative content-analysis was used to identify major themes.

Results: Sixteen patients completed both pre and post study elements. Ten patients completed the initial survey but not the post-survey and were considered lost to follow-up. Of the patients recruited (n = 26), 50 % (n = 13) self-referred and 50 % (n = 13) were referred by healthcare providers. Post-consultation, 100 % (n = 16) of patients were very satisfied with their appointment and would recommend it to others. The majority of patients expected to obtain more information about medication adverse effects and possible drug-drug interactions, likely reflecting public perception of pharmacist scope. Content analysis in comparison of initial expectation pre- vs post-consultations found expectations were either met (38%) or exceeded (62%) for all patients. Four major themes emerged: i) obtaining clarity around current drug therapy, ii) pharmacist accessibility (time, communication, relatability), iii) education and activation of patients to partake in self-management, and iv) constructive feedback regarding degree of pharmacy learner involvement during consultations.

Conclusions: Pharmacist services exceeded patient expectations likely due to lack of awareness and experience with pharmacists practicing in consultative settings. Emergent themes suggest areas of focus for pharmacists working in community-based care.

Acknowledgement

This work has previously been presented at the following conferences:

Canadian Pharmacists Conference, June 2-5, 2018, Fredericton NB, *oral presentation*

Canadian Society of Hospital Pharmacists, BC Branch AGM, Nov 24-25, 2018, Vancouver BC, *poster presentation*

Understanding the efficacy and safety of cannabis use in women's health: a scoping review

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Objective: The reproductive life cycle is at the forefront of women's health, influencing a female's choices, actions and health throughout her lifetime. At each stage, from menstruation to menopause, certain conditions or symptoms may arise warranting therapy interventions. As legalization pushes societal acceptance of cannabis as an alternative drug therapy, there is increased patient interest in using cannabis for their symptom management. Our primary objective is to review existing literature regarding cannabis use, in the context of women's health-related conditions or symptoms, to evaluate the quality of findings and identify current knowledge gaps.

Methods: A systematic search in MEDLINE, EMBASE, CINAHL, Cochrane Library, and ProQuest Dissertations & Theses Global from inception to September 2018 identified relevant literature on keywords derived from cannabis and women's health topics. Search terms included "cannabis, marijuana, or cannabinoids" and "women's health, menstruation, perinatal, maternal, or menopause". Inclusion criteria specified English-only studies related to the efficacy or safety of cannabis use as a primary measure or objective; all animal studies were excluded. Titles and abstracts were initially screened by two independent reviewers, using consensus on inclusion criteria. Full-text screening of remaining articles was conducted by one reviewer for complete relevance assessment against the research objective. Information regarding the form of cannabis studied, reason or indication for use (including outcomes), and female population characteristics was to be extracted. Scoping review was reported using the PRISMA-ScR checklist.

Results: A total of 3033 results were retrieved from all five databases and 2489 unique results were exported for review. Screening is ongoing and complete results will be available prior to conference date. Data extraction will provide narrative summaries and categorization of evidence.

Conclusions: This review will summarize the research landscape of cannabis use in women's health to highlight current gaps in knowledge. Results will be used to guide future work in understanding how women want to use medical cannabis and for what reasons.

What characteristics are associated with success in healthcare practitioners? A scoping review

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Study Objective: The primary objective of this study was to conduct a scoping review of the literature regarding characteristics that contribute to professional success.

Methods: In order to create a current and comprehensive description of personal characteristics that have been shown to be predictive of professional success in healthcare practice, a comprehensive search was conducted using Ovid MEDLINE. The search was restricted to English language articles with date of publication from 2000 to present. Characteristics identified as potentially linked to pharmacist success that served as the basis for the review included: motivation, critical thinking, emotional intelligence, core competencies, and work-life balance. Titles and abstracts were independently screened based on predefined inclusion criteria. Full-text articles were then reviewed and data were independently extracted and coded for recurring themes.

Results: Of 1118 identified, 10 articles were relevant and analyzed further. Nurses, physicians, and pharmacists were described in a variety of publication types: narrative reviews, survey reports, a case study, an opinion piece, a phenomenological study, and a systematic literature review. Content analysis revealed six broad themes: (1) 'personal mastery', which encompassed emotional intelligence and stress management; (2) 'dedication', which described being invested in themselves and their work; (3) 'collaborator', demonstrated by relating well to people and forming trusting relationships; (4) 'problem solver', including maintaining a global perspective when approaching tasks; (5) 'inspirer', by demonstrating enthusiasm, creating supportive environments, and encouraging professional growth; and (6) demonstrating 'excellence' through leadership in a focused area.

Conclusions: Research on the topic of personal characteristics and success is limited. The six themes identified as characteristics that contribute to healthcare practitioner success link closely to previous work. Future research could explore each of the six characteristics to see if they can be developed in professional programs and throughout a healthcare practitioner's career.

Quantitative exploration of Atrial Fibrillation patients' knowledge gaps: a systematic review and meta-analysis

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Background: Poor patient understanding of their disease and medications has been associated with poor adherence. Identifying patients' knowledge gaps is the first step towards improving patient education strategies.

Objective: To review the literature on AF patients' knowledge to identify their condition- and medication-related knowledge gaps.

Methods: Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, we searched PubMed, Embase, CINAHL, and PSYCHINFO from inception. Studies were included regardless of design, publication year, setting, and quality. Different questions were asked of patients in different studies to assess the same area of knowledge, so we grouped data from related questions into *knowledge categories*. For each study, we extracted the proportion of participants who correctly answered the questions in each knowledge category. A random-effects model meta-analysis and heterogeneity estimate(I²) calculation was performed for each knowledge category. A category was considered a knowledge gap if the pooled mean number of participants who demonstrated knowledge of it was $\leq 50\%$. Qualitative data was summarized narratively. Quality of included studies was assessed using study design-specific tools.

Results: We included 21 studies (4703 patients). Eight studies assessed patient knowledge of AF, two assessed knowledge of stroke, fifteen assessed patient knowledge of anti-thrombotics and no studies assessed patient knowledge about rate and rhythm medications. 80% were of high quality. Twenty-seven knowledge categories were identified with 1-12 studies contributing per category. AF knowledge gaps were: AF can be asymptomatic, AF predisposes to heart failure, the name of one's own diagnosis, women's higher risk of stroke, and the definition of ischemic stroke. For medications, knowledge gaps included: drug-drug and drug-food interactions, vitamin K content of foods, the term "INR" and its interpretation, and actions to take in case of missed doses.

Conclusion: This systematic review identified several knowledge gaps among AF patients in clinically important areas that can act as targets for education strategies.

Assessment of atrial fibrillation patients' education needs from patient and clinician perspectives: a qualitative descriptive study

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Introduction: Patients' lack of knowledge is a key barrier to therapy adherence. We aimed to gather insights into atrial fibrillation (AF) patients' education needs from patient and clinician viewpoints.

Methods: We conducted a qualitative descriptive study using purposive sampling and semi-structured interviews with AF patients and clinicians recruited from AF clinics. Data from patients and clinicians were analyzed independently and iteratively through inductive qualitative thematic analysis.

Results: Eleven clinicians and 10 patients were interviewed. Three themes emerged from analysis of clinician data: (1) patients' knowledge gaps and misconceptions, (2) clinicians' experiences teaching AF patients, and (3) clinicians' suggestions for AF education programs. Four themes emerged from the patient data: (1) emotional appraisal of the disease, (2) information seeking behavior, (3) knowledge gaps, and (4) education preferences. A key finding was identification of the need for education that addresses patients' unjustified anxieties by emphasizing that AF is not fatal, and that many patients with AF live a normal life. Risk communication was identified as the most challenging aspect of AF education. In synthesizing our findings, we developed evidence-based recommendations for educational strategies for AF.

Conclusion: We found that AF patients have many knowledge gaps and misconceptions, significant emotional education needs, and a positive attitude towards online and classroom education. In synthesizing our findings, we developed evidence-based recommendations which can inform the design of AF patient education programs and initiatives.

Persistence of use of pharmaceutical cannabinoid agents in Manitoba, Canada: a population-based cohort study

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Objectives: Despite the mixed evidence to support their efficacy and their well-characterized side effects, pharmaceutical cannabinoids are used for a variety of conditions, such as pain. Randomized controlled trials are not able to measure the 'real-world' persistence of medication use. Hence, this study aimed to estimate the persistence of use of pharmaceutical cannabinoid agents, and the potential socio-demographic characteristics and medical conditions associated with the discontinuation of these agents in a naturalistic setting.

Methods: A retrospective, population-based, cohort study using health administrative data from the Manitoba Population Research Data Repository. Incident pharmaceutical cannabinoid users, from April 1st, 2004 to April 1st, 2016 were included and followed for one year from the date of first prescription dispensation. Persistence was defined as continuous use without a gap exceeding 60 days between prescriptions. The primary outcome was time to discontinuation of pharmaceutical cannabinoid use within one-year, adjusted for user's key potential sociodemographic characteristics and medical diagnoses.

Results: Among 5,881 pharmaceutical cannabinoid users, 5,452 were incident users, of whom only 18.1% (95%CI, 17.08-19.12) continued using cannabinoids at one year. Duration of use was highest for nabilone (Median, IQR; 33, 25-199 days) and lowest for nabiximols (20, IQR 7-30). Age and income status had a significant effect on persistence of cannabinoid use. Fibromyalgia (HR, 95%CI; 0.89, 0.84-0.95), osteoarthritis (0.91, 0.82-0.97), and substance use disorder (0.85, 0.76-0.94) diagnoses associated with longer use. Cancer associated with shorter use (2.73, 2.02-3.67).

Conclusions: In a naturalistic setting, persistence of pharmaceutical cannabinoids use was low. Their rates of discontinuation were influenced by age, income, and specific medical conditions of the cannabinoid users. The reason for these observed differences and the effects of the recent legalization of recreational cannabis in Canada warrant further investigation.

Predictability of capillary blood spot toward venous whole blood sampling for therapeutic drug monitoring of tacrolimus in solid organ transplant recipients

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Background: Therapeutic drug monitoring (TDM) of tacrolimus in whole blood obtained from venipuncture is routinely practiced due to its narrow therapeutic range. Dried blood spots (DBS) may act as a suitable alternative for tacrolimus TDM due to relative ease of sampling and processing. The objective of this literature review was to provide a critical evaluation on the feasibility (i.e. bias and precision) of DBS for predicting tacrolimus whole blood concentrations in solid organ transplant recipients.

Methods: A comprehensive systematic literature search using PubMed, Scopus, EMBASE, and Google Scholar (until March 2019) identified 80 potentially relevant papers. The primary objective was to extract bias and precision data. The nature and performance of the analytical assay were also examined.

Results: A total of 11 studies (7 adults and 4 pediatrics) had available paired (i.e. both DBS and blood) data representing kidney, liver, heart, and pancreas transplants. The reported accuracy data in all studies were within acceptable threshold (<15%). This is supported by the lack of systematic or proportional differences between DBS vs. blood from Passing Bablok or Deming Regression analyses (N=11). However, the precision data were not consistently reported and only 3 studies met the acceptable threshold (< 15%). All DBS were analyzed by liquid-chromatography mass-spectrometry, which was proven to be sensitive and reliable for the small blood volume collected. The area-under the concentration-time curve (AUC) of tacrolimus derived from DBS was proven to be a better predictor of whole blood compared to single concentrations (N=2 studies). No differences in prediction were observed between pediatric and adult patients.

Conclusion: DBS is a promising approach for tacrolimus TDM. However, in order for DBS to become a useful substitute of tacrolimus whole blood monitoring in solid organ transplant patients, further systematic studies with sufficient power and comprehensive prediction-error analyses are required.

Guiding therapy with BRAF/MEK inhibitor combinations for BRAF-mutated melanoma

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BACKGROUND: Advanced melanoma is frequently associated with certain genetic mutations, 50% of which occur within the BRAF gene complex. Genomic testing is indicated in this setting to confirm the presence of a BRAF mutation for consideration of drug therapy. Pharmaceutical treatment strategies have attempted to target these mutations to induce inhibition, particularly that of BRAF V600E mutation. Although patients treated with BRAF inhibitors as a monotherapy exhibit disease progression within five to seven months, combination therapy with a MEK inhibitor appears to offer superior therapeutic results. The approved BRAF/MEK combination therapies include dabrafenib/trametinib, encorafenib/binimetinib and vemurafenib/cobimetinib. All combination therapies showed improvement for progression-free survival and better overall survival compared to monotherapy. However, there are no direct comparisons between these combinations, leaving the clinician with a dilemma regarding therapeutic selection.

OBJECTIVE: The primary objective of this review was to evaluate the literature and compare the pharmacological characteristics of the BRAF/MEK inhibitor combination therapies with the aim of creating a clinical tool to help guide clinicians in choosing the most appropriate and tolerable therapy for their patients.

METHODS: A literature search was performed, primarily focusing on systematic reviews and drug monographs, to compare and contrast different combination therapies. Areas of focus included pharmacokinetic properties, safety, convenience and cost. An assessment of common comorbidities that may influence drug therapy choice was performed and guidelines were created to outline the risks or precautions involved when selecting a specific therapy.

RESULTS: A flow chart depicting various contraindications of drug therapies based on patient comorbidities or other factors was created using the differences between BRAF/MEK combinations noted in the literature. This chart may be used as a tool to aid in clinical judgment for selecting drug therapy based on patient circumstances.

CONCLUSION: Given the variations in characteristics of BRAF/MEK combinations, including CV risk, QT risk, and contraindications around metastasis, this tool should aid clinicians in selection of appropriate therapy for melanoma patients.

Early childhood antibiotic use and autism spectrum disorders: a population-based cohort study

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Background: Changes in microbiota composition as a result of antibiotics use in early life has been proposed as a possible contributor in the etiology of autism spectrum disorders (ASD). We aimed to examine the association between early life antibiotic exposure and risk of ASD.

Methods: This was a population-based cohort study which included all live births in Manitoba, Canada between April 1, 1998 and March 31, 2016. We utilized administrative health data from the Manitoba Population Research Data Repository. Exposure was defined as having filled one or more antibiotic prescription during the first year of life. The main outcome was ASD diagnosis. Cox proportional hazards regression models were used to estimate the risk of developing ASD in the overall population and in a sibling cohort.

Results: Of all subjects in the cohort (n=214 834), 94 024 (43.8%) filled an antibiotic prescription during the first year of life. During follow-up, 2965 children received an ASD diagnosis. Compared to children who did not use antibiotics during the first year of life, those who received antibiotics had a reduced risk of ASD (adjusted HR 0.91, 95% CI 0.84-0.99). Number of treatment courses and cumulative duration of antibiotic exposure were not associated with ASD. In the sibling-controlled analysis, early childhood antibiotic exposure was not associated with ASD (adjusted HR 1.03, 95% CI 0.86 – 1.23).

Conclusions: Our findings suggested no clinically significant association between early childhood antibiotic exposure and risk of autism spectrum disorders and should provide assurance to concerned prescribers and parents.

Regulation of cardiac automaticity by 17 β -estradiol during pregnancy

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Pregnancy is associated with an elevated resting heart rate (HR) which is a known risk factor for cardiac arrhythmias. Many significant hormonal changes occur during pregnancy. Notably, major increase in 17 β -estradiol (E2) coincide with HR acceleration. However, the mechanisms underlying the association between E2 and HR remain largely unexplored. Accordingly, we aimed (1) to determine the role of E2 on the increased HR and cardiac automaticity during pregnancy, and (2) to delineate the involvement of the estrogen receptor isoform alpha (ER α) and beta (ER β).

17 β -estradiol administration (30 μ g twice daily for 4 days) to non-pregnant female mice lacking ER α (ERKO α) or ER β (ERKO β) and their wildtype (WT) littermates significantly increased plasma E2 concentrations, up to late pregnancy levels (18-19 days of gestation) (23.3 \pm 5 nM). Analysis of surface electrocardiograms showed an important acceleration of HR following E2 treatment in WT (520 \pm 15 bpm; +E2 = 571 \pm 16 bpm; n = 8; p = 0.001) and ERKO β (511 \pm 15 bpm; +E2 = 580 \pm 10 bpm; n = 10; p < 0.001) mice. However, the HR remained unchanged in ERKO α mice (520 \pm 16 bpm; +E2 = 530 \pm 21 bpm; n = 7). To further investigate the role of E2, nodal-like human-induced pluripotent stem cell-derived cardiomyocytes (N-hiPSC-CM) were treated with E2 (100 nM for 48h). Spontaneous action potential rate from control and E2-treated cells showed that E2 significantly increases the automaticity of the N-hiPSC-CM (79.0 \pm 2.2 bpm, n = 11; +E2 = 99.6 \pm 5.5 bpm, n = 8; p < 0.05). In addition, the diastolic depolarization rate of the spontaneous action potential was also increased in E2-treated cells (27.3 \pm 0.9 mV/s, +E2 = 53.1 \pm 4.2 mV/s, p < 0.05).

In summary, administration of 17 β -estradiol recapitulates the pregnancy phenotype and accelerates HR in both WT and ERKO β mice, but not in ERKO α . These results implicate the E2-ER α pathway as a major contributor to pregnancy-induced increased HR. In addition, the increased N-hiPSC-CM automaticity following E2 treatment support a direct effect of E2 on cellular automaticity. Finally, these data demonstrate that the effects of E2 are also applicable to human nodal cells.

New evidence on the kinetic solubility profiles of indomethacin amorphous solid dispersions in water-insoluble hydrogel carriers

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Introduction: Kinetic solubility profiles of ASDs based on soluble carriers typically exhibit the so-called “spring-and-parachute” concentration-time behavior, whereas those based on insoluble carriers (including hydrogels) are known to show sustained supersaturation under nonsink dissolution conditions. The objective of this study is to verify whether it is at all possible to obtain “spring-and-parachute” kinetic solubility profile from ASDs based on crosslinked poly(2-hydroxyethyl methacrylate) (PHEMA) hydrogel beads.

Methods: The preparation of ASDs of a model poorly soluble drug indomethacin (IND) in PHEMA beads involved sorption from concentrated drug solution prepared in a good swelling solvent followed by solvent evaporation to achieve desired drug loadings. Dissolution testing of ASD samples was conducted on a Vankel 700 dissolution apparatus (USP II) in 250 mL of dissolution medium (pH 4.5 buffer) at 37°C and 150 rpm under nonsink conditions.

Results: Comparing the kinetic solubility profiles of ASD IND in PHEMA beads (11.18% loading at 20 mg IND dose) of different particle sizes, it is shown for the first time that a spring-and-parachute dissolution profile from ASD of IND can occur in water-insoluble PHEMA hydrogel of the smallest particle size range (< 75µm). Above this smallest particle size range, this “spring-and-parachute” behavior is avoided. This is also tested to compare the kinetic solubility profiles of ASD IND in PHEMA beads of the same particle size range but at different total dose levels (5, 10 and 20 mg). The results obtained support the concept that when lowering the total dose to generate an IND concentration below the critical supersaturation, the “spring-and-parachute” characteristics disappear and a sustained supersaturation results.

Conclusion: We have provided new evidence that it is indeed possible to obtain “spring-and-parachute” kinetic solubility profiles from ASDs based on water-insoluble hydrogel carriers via the use of the smallest particle fraction at high IND dose levels.

Commercially available North American phenytoin formulations and possible excipient interactions and food effects

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Background: The U.S. Pharmacopeia defines excipients as inert substances other than the active pharmaceutical ingredient (API) that are added in a drug delivery system in order to aid in the manufacturing process, enhance stability, bioavailability, safety, effectiveness and delivery of the drug. A remarkable example of API–excipient interaction is the 1968 phenytoin intoxication outbreak in Brisbane, Australia. The first formulations released into the market contained CaSO₄, which interacted with phenytoin – an unknown fact at the time - resulting in decreased bioavailability. When the manufacturer replaced CaSO₄ by lactose, the amount of drug absorbed was much higher, resulting in the observed intoxication outbreak. Follow-up studies hypothesized that phenytoin was converted to an insoluble calcium salt prior to ingestion.

Objective: To investigate further the interactions between excipients and phenytoin to delineate possible clinical implications and mechanistically re-examine the hypothesis and interpretations of previous studies.

Methods: Titration experiments with phenytoin and calcium salt were performed. Isothermal micro-calorimetry was used to determine incompatibilities between excipients, phenytoin/ phenytoin sodium and milk. The compounds were characterized by H¹NMR. Commercially available phenytoin sodium capsules in both Canadian and American markets were tested in milk and water.

Results: The calorimeter results indicate that phenytoin sodium interacts with CaSO₄ in aqueous media and precipitates. Surprisingly, phenytoin sodium also interacts with lactose through a Maillard reaction that can occur at body temperature. Commercial phenytoin sodium products interacted with milk and the products containing lactose in their formulation presented browning in water.

Conclusion: Interestingly, in Canada and the USA, the reference product contains lactose as an excipient in the formulation, whereas the Canadian generic formulations do not. A new incompatibility between phenytoin sodium and lactose has been discovered and an incompatibility with calcium was confirmed. This finding may have clinical implications, as both interactions could lead to an API-excipient interaction and food effects.