Association of Faculties of Pharmacy of Canada

Association des facultés de pharmacie du Canada

2017 CANADIAN PHARMACY EDUCATION AND RESEARCH CONFERENCE (CPERC) | 2017 CONFÉRENCE CANADIENNE SUR L'ENSEIGNEMENT ET LA RECHERCHE EN PHARMACIE (CCERP)

Poster Abstracts

TABLE OF CONTENTS

PHARMACY EDUCATION

PE26 A 12 question-and-answer guide to help pharmacy students with their preparation for pharmacy clerkships

PE27 Accreditation of experiential learning sites at the Faculté de pharmacie de l'Université de Montréal

PE28 Recognizing the role of collaboration in interprofessional curriculum planning: a one year post-implementation reflection

PE29 Pre-requisites Associated with Academic Success in the BSP and planned Pharm D program (2017) at the University of Saskatchewan

PE30 Development of an Evaluation Plan for the Dalhousie College of Pharmacy Entry to Practice Doctor of Pharmacy Program

PE31 Are Characteristics of Success Integrated into Pharmacy School Admissions?

PE32 Relationship of admission scores and student characteristics to performance within a pharmacy program and on national licensure

PE33 Examining the impact of formative assessment question-generation on student learning

PE34 Evaluating the function and impact of formative assessments in UBC's E2P PharmD program

PE35 Assessment of the Education and Skill Needs of Community Pharmacists Concerning Addiction

PE36 Evaluating modifications in calculations curriculum in response to 100% benchmark

PE37 Reconciliation in Canadian pharmacy education: content is just the beginning

PE38 The Art of Pharmacy: Pharmacy and Art Collaborating to Facilitate Learning

PE39 Pharmacy students' reactions to the implementation of a code of good pharmaceutical practices online and in social media: follow-up after 2 years

PE40 Development of a web blog to support the teaching of management in hospital pharmacy residency curriculum

PE41 Development of 25 web vignettes about the use of social media and information technology in pharmacy

PE42 Key Canadian federal legislatives changes in a pharmacy law course

PE43 Finding legal decisions about pharmacy practice: an exploratory approach for pharmacy students and residents

PE44 Level of agreement of undergraduate pharmacy students for statements related to ethical issues in pharmacy practice from 2012 to 2016

PE45 Incorporating Assessment and Prescribing for Ambulatory Ailments Skills into Practice: An Environmental Scan of Continuing Education for Pharmacist Prescribing in Canada

PHARMACY PRACTICE

PP1 Early Childhood Antibiotics Exposure and the Risk of Autism Spectrum Disorders

PP2 Roles and impacts of pharmacists in chronic obstructive pulmonary disease: review of literature

PP3 Failure modes and effects analysis (FMEA) in pharmaceutical healthcare processes – A review

PP4 Knowledge translation in pharmacy practice: an exploration of KT+ database

PP5 Using Oculometry as a Data Capture Tool for a Simulated Drug Order Validation by Pharmacists

PP6 Canadian Pharmacogenomics Network for Drug Safety (CPNDS): 10 years of collaboration from CHU Sainte-Justine (CHUSJ)

PP7 Pharmacist-led interventions for the management of medication misuse and abuse: a systematic review

PP8 Healthcare practitioner prescribing: a scoping review about the confidence and competence of pharmacists and physicians

PP9 Descriptive outcomes of response to antiresorptive agents using bone biomarkers in a Fracture Liaison Service

PP10 Quality of life and disability of fractured patients in a Fracture Liaison Service; descriptive outcomes of a cohort study

PP11 Development of a graphical tool to measure medication adherence in asthma patients: a pilot study

PP12 The Effect of Health Media Reporting on Self-Medication Use

PP13 Use of smoking cessation products: a survey of clients of community pharmacies in Winnipeg

PP14 Readability and Suitability of COPD Inhaler Leaflets

PP15 PharmaZzz; feasibility and impact of pharmacist-delivered cognitive behavioural therapy for chronic insomnia (CBTi)

PP16 Increase in adverse events following three generic antihypertensive drugs commercialization: a population-based perspective

PP17 Learning from our mistakes: Perceptions and implementation of continuous quality improvement in Ontario community pharmacies

PP18 Is YouTube Useful as a Source of Health Information for Type 2 Diabetes?

PHARMACEUTICAL SCIENCES

PS1 Evaluation of Oxicam Derivatives as Amyloid Aggregation Inhibitors

PS2 Age-related BBB pathology does not impair TfR-mediated targeting of brain microvessel endothelial cells in the 3xTg-AD mouse

PS3 Modulation of branched-chain amino acids dietary intake affects survival, behavior and neuropathology of the 3xTg-AD mouse model

PS4 Impact of linoleic acid on the skin barrier formation of tissue engineered skin substitutes

PS5 Orally administered cannabinoids reduce tumor necrosis factor alpha (TNFα) gene and protein expression in an experimental autoimmune encephalomyelitis (EAE) animal model of multiple sclerosis (MS): implications in MS

PS6 Gap junctions regulate nociception and synaptic strength of afferent input to the spinal cord dorsal horn

PS7 Drug release and permeation of compounded topical gabapentin in different formulations

PS8 Potential Protective Effects and Bioavailability of Wild Blueberry Extracts

PS9 Modeling chronic psoriatic inflammation in a 3D reconstructed skin

PE1

Designing simulation tasks for undergraduates: A complex task?

Marie-Laurence Tremblay[1], B.Pharm, M.Sc., M.Sc., BCPS, Jimmie Leppink[2], PhD, Gilles Leclerc[3], B.Pharm, PhD, Jan-Joost Rethans[2], PhD, Diana DHJM Dolmans[2], PhD.

1. Laval University, Faculty of Pharmacy, 2. Maastricht University, Faculty of Health, Medicine, and Life Sciences, 3. University of Montreal, Faculty of Pharmacy.

Context: Among the various simulation modalities used in undergraduate healthcare programs, simulated clinical immersion (SCI) allows the learner to encounter real-life situations embedded in an authentic simulated clinical environment. To maximize the learning benefits associated with SCI, task complexity should be adapted to account for the learners' expertise level.

Aim: The purpose of this mixed-method study is to understand how variation of task complexity in SCI influences undergraduate healthcare students' cognitive load and task performance, and why.

Methods: 167 second-year undergraduate pharmacy students have experienced one simple and one complex learning tasks in SCI. Task complexity were regulated through clinical, social, and environmental features. Students' cognitive load after each learning task and debriefing period were collected, and task performance was assessed. As part of a sequential explanatory design, semi-structured interviews were conducted during which students' perception of task complexity in SCI was questioned.

Results: Quantitative results revealed significant differences between simple and complex tasks and between their debriefings in terms of intrinsic and extraneous cognitive loads, and self-perceived learning. Our qualitative findings explored these differences and confirmed that previous experience and prior knowledge are crucial determinants of students' perception of task complexity. We found that uncertainty in decision-making process is also an important factor that contributes to increase intrinsic cognitive load. Along with unfamiliar clinical environments, stress and elements of surprise influenced students' perception of task complexity.

Discussion: Our study confirms that designing SCI for undergraduate pharmacy students must take into account multiple factors to develop activities that are suited for their expertise level. More importantly, we reinforced the connections between cognitive and affective dimensions proper to simulation-based education.

PE2

Diabetes Content in Canadian Schools of Pharmacy: A Description of the amount provided and Students' Perceptions

Kerry D Mansell, Holly G Mansell, Wendell Neubeker, Haley A Drake
Affiliations: College of Pharmacy and Nutrition, University of Saskatchewan, Saskatoon, SK, Canada

Objectives: To determine the amount of diabetes content taught at Canadian schools of pharmacy, and students' perceptions of diabetes education.

Methods: In October 2015, faculty members at each Canadian school of pharmacy were contacted to ascertain the amount of didactic, interactive, and elective hours devoted to diabetes education. A SurveyMonkey® link was emailed twice to all 4th year pharmacy students who had completed their diabetes education to ascertain their perceptions of the amount of diabetes-related material they received, and comfort level pertaining to diabetes.

Results: All pharmacy schools (10/10; 100%) reported the amount of diabetes education provided in their curricula (range of 18hrs-43.5hrs; mean 25.3hrs). A total of 313/1216 (25.7%) students from 9/10 (90%) pharmacy schools completed the questionnaire. The majority of pharmacy students (53.2%; 166/313) reported feeling that the overall amount of diabetes content in their curriculum was just right while 46.2% (144/313) felt there was too little. 74.4% (67/90) of students from schools who received more content felt they received the right amount of diabetes content, vs. 44.6% (99/222) of all other students ($p<0.001$). Most students (81.8%; 256/313) indicated that they felt comfortable working with type 2 diabetes patients. The students who received more diabetes contact hours reported greater comfort with dealing with certain diabetes patients and situations, such as insulin initiation and type 1 diabetes patients. A higher percentage (71.1%; 64/90) of students who received more diabetes-specific content indicated that they planned on becoming a Certified Diabetes Educator compared to students who received lesser content hours (53.4%; 119/223; $p=0.005$).

Conclusions: Students who received more diabetes content generally reported greater comfort in dealing with diabetes patients. With an increasing global prevalence of diabetes and corresponding opportunities for pharmacist involvement in diabetes management, this information may be useful for all pharmacy schools looking to evaluate the amount of diabetes content in their curriculum.

PE3

An Assessment of Demand for a Combined Doctor of Pharmacy – Master of Business Administration Program, and Plans for Delivery

Authors and Affiliations: Kerry D Mansell[1], Antoine Bruneau-Bouchard[2], Vincent A Bruni-Bossio[2]
1. College of Pharmacy and Nutrition, University of Saskatchewan, Saskatoon, SK, Canada
2. Edwards School of Business, University of Saskatchewan, Saskatoon, SK, Canada

Objectives: Combined MBA programs are becoming increasingly popular, however there is no published literature describing the demand from stakeholders for such programs. We aimed to see if the pharmacy community supports the pursuit of combined PharmD-MBA programs.

Methods: A questionnaire was distributed to 1st, 2nd, and 3rd year pharmacy students at the University of Saskatchewan. A link to a SurveyMonkey® questionnaire was emailed to all practicing pharmacists in the province of Saskatchewan, Canada. In-person and phone interviews were conducted with key pharmacy stakeholders from across Canada.

Results: 193/265 (72.8%) University of Saskatchewan pharmacy students were present on the days the questionnaires were distributed, and they all completed the questionnaires. Only 6.2% (12/193) were aware of combined PharmD-MBA programs. When asked if they would have pursued a combined degree if it had been offered when they entered the pharmacy program, 16.6% (32/193) and 37.3% (72/193) either strongly agreed or agreed, and 29.0% (56/193) were unsure. 19.9% (304/1529) of practicing pharmacists in Saskatchewan completed the online questionnaire. 42.2% (128/303) agreed, and 13.9% (42/303) strongly agreed that an MBA would be valuable to their current job. 33.6% (100/298) strongly agreed and 55.4% (165/298) agreed that a combined degree would be at an advantage for certain job opportunities upon graduation. A total of 8 interviews were conducted with key stakeholders from across Canada. All of the stakeholders were in favour of the idea of a combined degree. Some felt it was important for the MBA program to have a clear value proposition and health-care related content would be desirable.

Conclusions: Overall, pharmacist, pharmacy student, and stakeholder input indicate that a combined program would be worth pursuing at the University of Saskatchewan. Further research is necessary to determine if this is true for all North American pharmacy schools.

PE4

A Team Lab Simulation for Integrating Pharmacy Practice Skills in a Second Year Skills Lab

Natalie R. Kennie-Kaulbach, College of Pharmacy, Dalhousie University, Halifax Nova Scotia

Objectives: To describe the development of a team simulation model to help students integrate a variety of pharmacy practice skills across practice settings.

Methods: The asthma team lab was first delivered in 2015. A simulated scenario was developed for students to complete pharmacy practice skills over two different practice settings. The model exposes students sequentially to 10 tasks, completed in teams of 7-8 learners over a period of 2 hours. Each student on the team takes the lead role on at least one assigned task. Teams are first situated in a collaborative primary healthcare team setting to review a mock electronic medical record and drug information system record, complete a best possible medication history and focused medication review for asthma, demonstrate respiratory physical assessment, discuss the case with a physician, answer a drug information and formulary question and complete a documentation note. Students then assume the community pharmacy setting to process prescriptions, complete a technical check, and a new prescription and OTC consultation. Lab demonstrators play the role of the patient and physician, and provide formative feedback and assessment. A voluntary online survey was sent to students following the completion of the lab in 2015 and 2017. Student feedback and coordinator reflections were used to inform revisions.

Results: A total of 87 students participated in 2015 and 87 in 2017. Twenty-five students completed the survey in 2015, and 24 in 2017. Students indicated that lab activities helped them to better understand how skills could be integrated in the practice settings; 4.08 on a 5 point Likert scale in 2015; and 4.29 in 2017. Students also indicated that they enjoyed working with team mates. A main challenge was lab demonstrator recall of all key facts for the complex case.

Conclusions: This team simulation model was helpful for students to integrate pharmacy practice skills in the collaborative primary care team and community pharmacy setting. The model presented here may be practical for other pharmacy programs.

PE5

Intraprofessional Workshop for Pharmacy and Technician Students Exploring Roles and Responsibilities

Natalie R. Kennie-Kaulbach^, Kim Sponagle^, Beverly Stotz*, Sonja Baettig*, Virgina Crawley*
^College of Pharmacy, Dalhousie University, Halifax Nova Scotia
*Nova Scotia Community College, Dartmouth, Nova Scotia

Objectives: To describe an intraprofessional workshop for pharmacy and technician students that explores roles, responsibilities and opportunities for workload distribution considering scopes of practice for both professions, and to describe students' experience in participating in the session.

Methods: Students were placed in teams of 7-8 second year pharmacy students from Dalhousie College of Pharmacy and 2-3 pharmacy technician students from Nova Scotia Community College for a 3-hour face-to-face session. Students individually completed a pre-workshop assignment that examined responsibilities of pharmacy personnel for common tasks in a community pharmacy setting. At the workshop, teams completed an icebreaker activity by discussing the pre-work assignment and finding consensus for which personnel could be responsible for the workload tasks. Teams were then presented with a description of a fictitious community pharmacy practice including staff members, practice environment, and workload summary. Each team developed a schematic of their proposed pharmacy workflow, designed to optimize pharmacy services and maximize the ability of personnel to work to their scope of practice. Workflows were displayed and students viewed other team models, followed by a final debriefing activity. Following the session students completed a brief written reflection. Reflections were examined to identify common themes.

Results: Twelve teams participated. Students indicated that they enjoyed session in their written reflections. Both pharmacy and pharmacy technician students identified scopes of practice for which they were previously unaware and how their roles complement each other to maximize pharmacy workflow. Pharmacy students reflected that with the support of pharmacy technicians, their clinical roles could be emphasized and technical roles deemphasized in their daily work.

Conclusions: Early exploration of roles and responsibilities of pharmacists and pharmacy technicians working as a team in community pharmacy setting is beneficial in identifying possible work flow strategies that allow each professional to practice to their full scope with the goal of providing the best possible medication outcomes for patients.

PE6

Impact of pharmacy students' projects in Non-Direct Patient Care Rotations

Isabelle Boisclair[1], Isabelle Lafleur[1], Pascale Bouthillier[1], Ema Ferreira[12], Nathalie Letarte[134]
[1]Faculty of Pharmacy - Université de Montréal, [2]Department of pharmacy – CHU Ste-Justine
[3]Department of pharmacy – Centre hospitalier de l'Université de Montréal, [4]Centre de recherche du CHUM,

At Université of Montréal, 4th-year Pharm.D. students have to complete a four-weeks Non-Direct Patient Care (NDPC) rotation where they have to elaborate a project in collaboration with a preceptor. The main objective of our study was to measure the long-term impact of students' projects from NDPC Rotations by asking preceptors if they and their team members were still using the results of the project after the end of the rotation. A second objective was to describe the types of projects developed by students.

In order to measure the impact of students' projects in NDPC Rotation, a survey was sent by email to 250 preceptors who had supervised at least one student in a NDPC Rotation in the last 3 years. These preceptors work in different health fields (governmental organizations, pharmaceutical industries, provincial professional organizations, universities, hospitals, pharmacy technical schools, international humanitarian organizations, European faculty exchange programs, dentistry and veterinary schools).

We received 127 answered surveys corresponding to a participation rate of 51%. The results of the student projects are appreciated by preceptors and are still being used as 83% of preceptors and 77% of team members are still using them after the end of the rotation. The most common types of projects that were elaborated were: participation on drug utilization reviews, studies on pharmacist remuneration for clinical services, data collection for case reports or case series, drug safety and treatment algorithm. The majority (98%) of preceptors were satisfied with their experience of NDPC Rotation.

NDPC rotations are greatly appreciated by preceptors and show reciprocal benefits to rotation sites and students. Student's participation has a lasting effect at rotation sites. The projects are diverse and help students realize the impact of pharmacists in the Health system. NDPC Rotations should remain in the curriculum of the Pharm.D. program. The perceptions of students should also be evaluated.

PE7

Teaching Geriatric Assessment in a Doctor of Pharmacy Assessment Course: Challenges and Successes

Cheryl A. Sadowski [1]
Rene Breault[1]

1 Faculty of Pharmacy & Pharmaceutical Sciences, University of Alberta

Objective: To describe the challenges and successes of integrating the specialty area of geriatrics assessment into a general assessment course in the Doctor of Pharmacy curriculum.

Methods: The Doctor of Pharmacy at the University of Alberta is a post-professional degree. There are 2 methods of delivery – in person on campus, and by distance part-time. Both programs involve an assessment course offered in the first term, first year. Geriatrics assessment was included from inception of the course, through an online lecture, student research on assigned assessment tools with guiding questions, application of the tools to a case study, and presentation/postings for their peers. Student feedback was obtained through focus groups and course evaluations. Faculty assessment was reviewed through meetings between the geriatrics instructor and the course coordinator each year, with input from the Director of Assessment at the Faculty.

Results: Over 3 years 22 online, and 46 classroom based students were enrolled. The lecture was initially viewed as redundant with the general course introduction, but after revision in second year, this was viewed positively with a focus on 2 features – comprehensive geriatric assessment (CGA) framework and domains (e.g. cognition, mobility), and medication assessment tools that could be used by pharmacists when caring for older adults (e.g. medication appropriateness, self-medication ability). The students appreciated breaking down the many domains of CGA, the guiding questions, and peer interaction with instructor feedback. However, the breadth of the content for geriatrics was viewed as daunting. The students appreciated dividing the work but noted that they did not feel like they had a solid grasp on all the tools available. Some students noted that many of the geriatric assessment tools were not specific for pharmacist use.

Conclusions: Multiple methods of learning resulted in effectively engaged students. However, the interprofessional nature of CGA was challenging to integrate into a pharmacy assessment course. The breadth of CGA may be too broad to incorporate into a general practice course.

PE8

The Integration of Critical Thinking Assignments into a Special Populations Course

Cheryl A. Sadowski, Professor, Faculty of Pharmacy & Pharmaceutical Sciences, University of Alberta
Marlene Gukert, Clinical Assistant Professor, Faculty of Pharmacy & Pharmaceutical Sciences, University of Alberta

Objectives: To describe the evolution of development and implementation of critical thinking assignments into a third year Special Populations course over a 12 year period.

Methods: Assignments were required for the course, and developed to enhance and assess critical thinking. The two course instructors initially designed unique pediatrics and geriatrics brief papers, then changed to a collaborative method of integrating the assignments. The instructors consulted with various centers at the University of Alberta, and assessed student feedback and course evaluations in redesigning the assignments.

Results: The first version of assignments involved 5 brief individual written assignments that focused on either pediatrics or geriatrics. Students were strongly opposed to the frequency of the assignments and workload. Consultation with the Centre for Writers resulted in a 3-tiered individual written assignment; a topic proposal, annotated bibliography, and position paper, with grading and feedback provided at the first two tiers. Student response was generally positive, although student performance on the essays indicated challenges. Finally, a debate activity was developed in consultation with the Centre for Teaching and Learning. The assignment involved student groups stating their position on an assigned topic, and submitting an annotated bibliography prior to the debates. Topics for the debates were chosen by the course coordinator and provided to the students the morning of the debates. These involved controversies for either the geriatric or pediatric population. Following the debate students wrote an individual reflection on a topic that resonated with them. Performance on the debates and reflection activities showed higher scores and resulted in very positive student feedback.

Conclusions: Using debates was engaging, balancing workload for students and professors, and eliciting critical thinking. The debate activities continued the tiered approach to assignments, and provided both individual and group activity. Overall the integration of debates has been very successful for a special populations course.

PE9

Geriatric Education in Schools of Pharmacy – Student and Educator Perspectives in Qatar and Canada

Cheryl A. Sadowski [1]
Monica Zolezzi[2]

1 Faculty of Pharmacy & Pharmaceutical Sciences, University of Alberta
2 College of Pharmacy, Qatar University

Objectives: To compare the content and approach to teaching geriatrics in pharmacy programs in Canada and Qatar.

Methods: In 2016 a questionnaire was developed by the research team, including questions about geriatrics content covered, methods of delivery, and preferences for learning about geriatrics. The questionnaire was distributed electronically to senior-level undergraduate pharmacy students at Qatar University and the University of Alberta. Preceptors at both institutions were also surveyed through the experiential education office. Faculty members across Canada were contacted through the Association of Faculties of Pharmacy of Canada to participate in the questionnaire. Research assistants also conducted curriculum mapping of geriatrics courses offered at Qatar University and University of Alberta through course syllabi.

Results: Forty-three students (22 Canada, 21 Qatar), and 41 educators (23 Canada, 18 Qatar) participated. The most common content across both settings was 'drug use in the elderly', followed by 'geriatric syndromes'. Both programs offered mostly didactic teaching, although Qatari respondents indicated significantly more use of small group discussions, student case presentations, problem-based learning and role playing than Canadian respondents. Fewer clerkship opportunities appear to be available in Qatar, although the difference in percent of responses for this question was not statistically significant. Students were most satisfied with content covered on osteoporosis. The number one barrier noted by students to incorporation of geriatrics was curriculum overload, followed by lack of faculty members with geriatrics expertise. The geriatrics curriculum mapping showed broad application to AFPC outcomes for Alberta, but no communicator or collaborator outcomes in Qatar.

Conclusions: There are some gaps in some of the topics covered in the current geriatrics courses offered in Canada and in Qatar, possibly due to density of the curriculum. Overall, there is a need for increasing practicum opportunities in both countries. The Qatar curriculum may benefit from an increase in experiential education that can help students achieve their communicator and collaborator competencies within a geriatric context.

PE10

Pharmacy Leadership in Interprofessional Education: Adapting a Pharmacy Medication Game into an Interprofessional Educational Activity

Cheryl A. Sadowski [1], Susan Sommerfeldt[2], Christopher Ward[3], Louisa Fricker[4], JoAnne Davies [4], Pamela Rock[4], Sharla King[4], Allyson Jones[5], Joohong Min[6]

1 Faculty of Pharmacy & Pharmaceutical Sciences, University of Alberta
2 Faculty of Nursing, University of Alberta
3 Faculty of Medicine & Dentistry, University of Alberta
4 Health Sciences Education and Research Commons, University of Alberta
5 Faculty of Rehabilitation Medicine, University of Alberta
6 Faculty of Agricultural, Life & Environmental Sciences, University of Alberta

Objectives: To describe the adaptation of an American pharmacy game focused on medication experience, to a game-based interprofessional educational experience for health sciences students in Canada.

Methods: The Geriatric Medication Game (GMG), developed by St. Louis College of Pharmacy, was obtained in 2011 by the Faculty of Pharmacy, University of Alberta. Permission was obtained to adapt the content to a Canadian context. After 2 years of use in pharmacy, the game was shared with the Health Sciences Education and Research Commons (HSERC) at the University of Alberta, a unit focused on interprofessional education for health sciences students. HSERC ran the GMG for 1 year, and suggested adaptation for a broader group of health professionals. A working group composed of representatives from several health professional programs at the University reviewed and adapted the content for an interprofessional student group.

Results: In the adaptation by Pharmacy, the patient profile form and characteristics, and points system were retained. The game was reduced from 6 stations to 5, and the challenge cards were adapted to Canadian terminology and context. The interprofessional adaptation involved adding more personal characteristics for the students to select, expansion to 8 stations to include a broader range of professional interactions, additional challenge cards at each station, representing general knowledge about older adults, and adding information challenges about the professions involved. Players were also given additional challenges to complete to improve their character's wellness.

Conclusions: A game activity that focused on pharmacy in another country was effectively adapted for a Canadian audience, and required significant alterations for interprofessional educational use.

PE11

Mapping health interprofessional education curriculum: Development of a Framework

Cheryl A. Sadowski [1], Damilola Adesanoye[1], Sharla King[2], M. Ken Cor [1]

1 Faculty of Pharmacy & Pharmaceutical Sciences, University of Alberta
2 Health Sciences Education and Research Commons, University of Alberta

Objective: To describe the development of an interprofessional education (IPE) competency framework.

Methods: An environmental scan revealed five leading international IPE frameworks. One IPE framework, the Canadian Interprofessional Health Collaborative (CIHC) National Interprofessional Competency Framework, was selected for its integrative IPE constructs, and relevance to the Canadian context. Two other resources used in developing the new IPE framework include the Functional Framework for Interprofessional Collaboration in the Health Professions developed by the Pharmacy Examining Board of Canada (PEBC) and the Interprofessional Learning Pathway Competency Framework developed by the Health Sciences Education and Research Commons (HSERC) at the University of Alberta. Our approach involved three major tasks: data extraction, competency matching and refinement. The competency domains or themes from the CIHC framework were extracted as level 1 of the proposed IPE taxonomy tree. The PEBC framework was reviewed to extract functional statements relevant to interprofessional education and practice as Level 2 competencies matched to the CIHC level 1 competency domains. Level 3 competency indicators of the taxonomy tree were developed from the HSERC competency document along a continuum of experience (exposure, immersion and integration). The resulting framework was refined through a collective iterative process to remove redundancies, split double-barreled items into separate competencies and simplify and standardize terminology used to describe the competencies. A color coded Excel spreadsheet was used for managing the data extraction, competency matching and refinement tasks. One research assistant prepared the initial tree, and each item was reviewed and consensus reached on any revisions between two faculty members with expertise in IPE.

Results: The research team developed an IPE taxonomy classifying interprofessional competencies into six level 1 competency domains, seventeen level 2 functions and seventy nine level 3 competency indicators.

Conclusions: A robust IPE taxonomic structure was developed with competencies defined for up to three hierarchical levels.

PE12

Adaptation of Gamification into the Pharmacy Curriculum

Phillip Kim and Annie WM Lee
Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto, Ontario

Objective: Gamification is the use of game elements in non-game content to engage and motivate students, promote learning, and solve problems. The applicability of gamification as a teaching strategy in the pharmacy curriculum was explored.

Methods: A literature search was done and an expert in the field was consulted to gather information on existing applications of gamification in pharmacy and other health science curriculums. The common types of gamification are structural gamification and content gamification. In structural gamification, game elements are used to alter the structure of how the content is delivered without altering the actual content (e.g. points, badges and leaderboards). In content gamification, game elements are incorporated into the actual content to make it more game like (e.g. story, narrative and characters). Structural gamification was selected as a teaching technique to pilot in the Teaching and Learning course using a multiple choice framework with teams of students. In the multiple choice framework, bonus points and chance components were incorporated to achieve high team scores. Achievement in knowledge acquisition, student engagement and perceived benefits of gamification were assessed.

Results: Student teams were successful in knowledge acquisition with all teams answering a majority of questions correct. Their cumulative score could be integrated into a global leaderboard for future sessions. The gamification pilot showed students were positively engaged to learn the content, aware of the benefits of gamification as a teaching technique and open to adapting gamification to other courses. The pilot results were similar to published papers. Limitations to implementing gamification include time, cost, and expertise in creating an immersive gaming platform.

Conclusion: Gamification, like all teaching techniques, has limitations so it is not meant to be incorporated into every aspect of the pharmacy curriculum. However, if used correctly, gamification can be a powerful teaching technique that can elevate student education in the pharmacy curriculum.

PE13

Perceptions of Near-Peer Teaching in a Pharmacy Practice Course

Jonas Mak and Annie WM Lee
Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto, Ontario

Objective: Near-peer teaching provides opportunities for growth in all participating parties. This study gathered perceptions from first year and third year pharmacy students and clinical teaching assistants (CTAs) on the impact of third year pharmacy student participation in a first year pharmacy practice course.

Methods: In 2016, third year pharmacy students enrolled in the Teaching and Learning course assisted in the facilitation of first year pharmacy practice labs on the topics of Topical Medications and MedsChecks. Post-lab online surveys were administered to first year and third year pharmacy students and CTAs to gather their perceptions of third year students' abilities to provide useful feedback and improve medication history gathering skills. Survey questions used a 5-point Likert scale and open-ended questions. Opportunity was provided for comments.

Results: Seventy-seven responders (62% first years, 20% third years, 18% CTAs) completed the survey. Seventy-four percent (74%) of responders agreed (4 of 5) or strongly agreed (5 of 5) that third year students provided individualized and organized feedback in the Topical Medications lab. A similar score of 83% agreement or strong agreement was seen with regards to provision of feedback in the MedsChecks lab. The mean rating across all cohorts was 4.1/5 for provision of feedback. In addition, 77% of first year students, 67% of third year students and 86% of CTAs agreed or strongly agreed that third year student involvement improved medication history gathering skills. Common themes included the provision of high quality and variety of feedback from third year students, while citing better preparation as an area for improvement.

Conclusion: Near-peer teaching performed by third year pharmacy students was perceived as a highly positive experience from all stakeholders. Near-peer teaching had a significant impact on student learning for pharmacy practice skills, with high potential for application in pharmacy education.

PE14

Changes in study-approaches during transition to a competency-based professional programme

George S. Pachev, Marion L. Pearson, Simon P. Albon and Natalie E. LeBlanc
Faculty of Pharmaceutical Sciences, University of British Columbia

Objective: UBC's new E2P Pharm D curriculum, employing learning-centered philosophy and competency-based education principles, represents a substantive change in design from individual discipline-based courses to team-taught integrated modules based on disease-states and/or body systems. The assessment program of the curriculum also differs from the usual mid-term-final schedule: there is an increased emphasis on formative assessment and the assessment load is spread over multiple low-stakes assessments, aiming at supporting as well as measuring learning. This study explores the changes in students' approaches to studying as they enter the curriculum from more traditional University programmes.

Methods: The first-year students were given a short survey to complete in the beginning of the school year and at the end of terms 1 and 2. The survey inquired about the amount of time devoted to studying and formative assessment within a typical week, time management throughout the term, preferred study context, and preferred study aids. For each question, students could choose from a few provided options and add narrative comments to clarify or complete their answers. The first survey enquired about students' study habits before being accepted in the program, the other two surveys asked students to estimate their study-approaches during the term preceding the survey.

Results: As the year progressed, the estimated time allotted to study increased. There was a decrease in the relative number of respondents who accumulated material to study only before the final. Students indicated they tried to "stay on top" of the material by studying daily but the heavy workload made them still accumulate work so they had to catch up during the weekend. Instructor-provided or student-kept notes, as well as organizing, re-writing, and comparing the notes, were the most relied upon study aids.

Conclusions: By gaining greater awareness about students' study styles and their dynamics, the Faculty was better able to monitor the program and plan for adjustments.

PE15

Implementation of an Academic Teaching Rotation within an Entry-to-Practice PharmD Program

Fong Chan, Katherine Seto, Tony Seet, Arun Verma, Sandra Jarvis-Selinger
The University of British Columbia, Faculty of Pharmaceutical Sciences, Vancouver, BC

Background: In September 2015, the Entry-to-Practice (E2P) PharmD program at the University of British Columbia (BC) served as a site for six-week elective academic teaching rotations for University of Toronto PharmD for Pharmacists program for graduate PharmD students. In September 2016, a one-week elective academic teaching rotation was offered for the BC Pharmacy Practice Residency Program. These non-clinical rotations align with Association of Faculties of Pharmacy (AFPC) Educational Outcomes. The residency rotation also aligns with standards for the Canadian Pharmacy Residency Board.

Objective: The implementation of an academic teaching rotation for graduate PharmD students and Pharmacy Residents is described.

Methods: An informal orientation was provided on day one of the six-week rotation for graduate PharmD students as an introduction to the teaching environment. Based on this experience, a formal academic half-day was developed and provided to 42 Pharmacy Residents to provide information on teaching perspectives and developing learning objectives. We piloted an elective academic teaching rotation for two residents. Both graduate PharmD students and residents were required to teach in a variety of settings and create teaching materials and assessments. Given the longer duration of the graduate PharmD rotation, additional opportunities were provided.

Results: We created an academic teaching rotation that serves the needs of graduate PharmD students and residents. Benefits to Faculty include: development of new teaching and learning materials and assessments, and increased teaching capacity. Benefits to graduate PharmD students and residents include improved teaching and communication skills; personal development while creating teaching materials; insight into academia as a career path; and opportunities to network with Faculty. Challenges include lack of available Faculty preceptors; time commitment; and short duration of the one-week rotation.

Conclusions: The implementation of an academic teaching rotation provided an opportunity for graduate PharmD students and residents to develop their knowledge and skills as an educator. Next steps will include expanding the academic half-day and lengthening the one-week rotation.

PE16

Expanding Physical Assessment Training in an Entry-to-Practice PharmD Program

Katherine Seto and Fong Chan
The University of British Columbia, Faculty of Pharmaceutical Sciences, Vancouver, BC

Background: The Blueprint for Pharmacy and Association of Faculties of Pharmacy of Canada (AFPC) Educational Outcomes have identified physical assessment as a fundamental skill enabling pharmacy students to properly assess patients and monitor drug therapy. Physical assessment training was introduced in the Entry-to-Practice (E2P) BSc(Pharm) Program at the UBC Faculty of Pharmaceutical Sciences, beginning with vital signs in 2010, and followed by pulmonary assessment in 2012. In September 2015, our Faculty implemented a new E2P PharmD Program. We expanded physical assessment training in Years 1 and 2 to include assessment of small joints; head, ears, eyes, nose, throat; dermatology; cardiovascular; and the neurological system.

Objective: The expansion of physical assessment training in an Entry-to-Practice PharmD Program is described.

Methods: Content experts were consulted to determine learning objectives for new physical assessment topics, and to ensure relevance to practice and integration across the program. They were also consulted regarding logistics and equipment. A variety of teaching strategies were utilized and standardized checklists were created for formative and summative assessments, evaluating both knowledge and skills. During implementation, accommodations for students with medical conditions or different cultural backgrounds were considered. Current students were utilized in the development of teaching and assessment materials for expanded topics.

Results: The largest benefit for the Faculty was the ability to fulfill AFPC Educational Outcomes to allow practical application to complement knowledge-based lectures. Students appeared engaged and enthusiastic about learning new physical assessment skills in a safe environment. Challenges to the expansion of physical assessment training included: lack of educators with physical assessment experience; student “buy in” (acceptance? Better word?) of this scope of practice; logistics, space, equipment, and time constraints; and large student-to-instructor ratios.

Conclusion: Informal feedback from students suggests that they feel positively about expanding their knowledge of physical assessment. Next steps include further expansion of physical assessment training into Year 3; integration with more complex clinical scenarios; and exploring other teaching methods and technologies for physical assessment training.

PE17

Mentoring master student in hospital pharmacy program for publication in a scientific journal

Louise Mallet[1, 2], Vincent Leclerc[3, 4], Christine Hamel[5, 6], Julie Méthot[7, 8]

[1]Professor, Faculty of Pharmacy, University of Montreal, Montréal, Qc
[2]Pharmacist in geriatrics, McGill University Health Center, Montréal, Qc
[3]Pharmacist, Institut universitaire de cardiologie et pneumologie de Québec, Québec, Qc
[4]Chargé d'enseignement clinique, Faculty of pharmacy, Université Laval, Québec, Qc
[5]Pharmacist, Centre de santé et de services sociaux La Pommeraie, Cowansville, Qc
[6]Clinicienne associée, Faculty of Pharmacy, University of Montreal, Montréal, Qc
[7]Pharmacist, Institut universitaire de cardiologie et de pneumologie de Québec, Québec, Qc
[8]Associate professor, Faculty of Pharmacy, Université Laval, Québec, Qc

Objective: In 2011, at the Faculty of pharmacy, University of Montreal, a one-credit communication course on writing a scientific publication was developed for the residents enrolled in the master's program in advanced pharmacotherapy. The goal of this course is to submit an article for publication in a peer-reviewed journal. The objective of this abstract is to present the content of this course and the results of the articles published between 2011 and 2015.

Methods: A one-day course is given to the residents describing the different steps to write a scientific article and the peer-review process. Residents were divided into groups of 2 to 3 residents and had to select a topic and a peer-reviewed journal for publication submission. Data pertaining to the communication course were compiled for the cohort of 2011 through 2015. Data regarding the number of teams, the journals to which the articles were submitted, the type and number of articles published are presented. The content of the course will be presented.

Results: Four cohorts of residents (n = 146) from 2011-2015 successfully completed the communication course. A number of 57 manuscripts were submitted to different scientific journals. Thirty-eight articles were published in seven different journals. The manuscripts were published in the following journals: *Canadian Journal of Hospital Pharmacy Journal (n=3), Critical Care Medicine (1), European Journal of Drugs Metabolism and Pharmacokinetics (1), Journal of Clinical Toxicology (1); Canadian Urological Association Journal (1); Canadian Pharmaceutical Journal (1); Pharmactuel (n=30).* The publication ratio for these four cohorts is 67%.

Conclusion: The pharmacy scientific communication course has enabled all the residents to experience writing a scientific article, to receive peer-review comments to improve their article, and to submit it to a peer-reviewed journal. We hope that this experience will inspire this new generation of pharmacists to publish in scientific journals.

PE18

Adaptation of learning model from Pharm.D. program to hospital pharmacy residency program at Laval University

Julie Méthot[1, 2], Julie Fortier[1, 3], Jean-Pierre Bernier[1, 3], Jean Lefebvre[1], Anne Dionne[1, 3]
[1]-Faculty of Pharmacy, Laval University, Quebec City, Canada
2-Institut universitaire de cardiologie et de pneumologie-Université Laval, Quebec City, Canada
3-CHU de Québec-Université Laval, Quebec City, Canada

Background: In the fall of 2011, Laval University launched the entry-to-practice Pharm.D. program in place of its bachelor's program. The new program is built around the development of five professional competencies: implementation of medication therapy, dissemination of pharmaceutical knowledge, handling medication, managing pharmacy operations and commitment to professionalism. In Pharm.D., the learning model involves four phases, each corresponding to one year of training, at the end of which, students have to achieve the *beginner*, *novice*, *intermediary* and *competent* levels, respectively. At the end of each phase, students have to demonstrate that they have reached the expected level in terms of the related competencies using an electronic learning portfolio. In the fall of 2017, our 16 months hospital residency program called Master in advanced pharmacotherapy will increase from 48 to 60 credits.

Objective: The objective is to share how we adapted the learning model from Pharm.D. to our new hospital residency program.

Method: The Pharm.D. curriculum and learning model were used to develop the new 60 credits hospital residency program.

Results: The new hospital residency program is organized by training units and will constitute the fifth phase of learning model. It will be professional competency-oriented program. At the end of their program, residents have to achieve the *Master* level. Diversified learning methods including theoretical, practical, simulation-base and professional experiential learning were involved in the new hospital residency. The *s*imulation-based learning is an innovative component of the education. Among the new courses we find: a self-assessment of competencies, drug delivery, sterile preparation, new contents regarding antibiotics and pharmacotherapy of intensive care.

Conclusion: In fall 2017, the new hospital residency program will increase to 60 credits. Adaptation of learning model from Pharm.D. program to hospital residency program includes development of training units, development of electronic portfolio and diversified learning methods.

PE19

Integrating assignments across courses to enhance therapeutic knowledge and communication

Professor D Elaine Lillie, Dr. Nardine Nakhla
University of Waterloo (UW) School of Pharmacy

Study Objectives: "A Vision for a Health Literate Canada" cites numerous examples of how low health literacy leads to poor patient outcomes, increased system cost and patients' inability to effectively manage their own care.[1] To address the need for improved patient communication, two course instructors at UW collaborated to create an assignment that simultaneously develops self-care knowledge and presentation skill. Instructors wanted to evaluate assignment effectiveness.

Statement of Methods: 120 first-year Pharmacy students at UW are required to take PHARM127, a communication basics course, and PHARM129, a Professional Practice course focused on patient self-care. Prompted by modification to the PharmD curriculum with its emphasis on the pharmacist's expanded role, beginning in 2014 Dr. Nakhla and Professor Lillie created an assignment that asked groups of six students to create 20-minute patient workshops.

Teams select from a defined topic list. Using a variety of credible sources, teams research topics and summarize pertinent points in a template intended for pharmacy students and professionals. Accuracy of the content is verified by a pharmacist TA and the course coordinator and then distributed to the class as "testable" therapeutic content. That same content is then distilled for patients and translated into patient-friendly language for the 20-minute in-class presentation to a "group of patients". On presentation day, students are marked on both the accuracy of therapeutic content (PHARM129) and communication skills (PHARM127).

Summary of Results: Course evaluations over the past three years have prompted minor changes but the assignment has received positive feedback and has succeeded in building both therapeutic knowledge and communication skill. One student wrote "I loved learning about different ailments each week and how we, as pharmacists, could help inform patients' treatment decisions."

Statement of Conclusions: Integrating communication skill-building with therapeutic knowledge acquisition enhances aptitude in both.

[1] Rootman I, Gordon-El_Bihbety D. A Vision for a Health Literate Canada: Report of the Expert Panel on Health Literacy. *Canadian Public Health Association*. 2008. Accessed Feb 23, 2017. http://www.cpha.ca/uploads/portals/h-l/report_e.pdf.

PE20

Development of an *Outside the Big Box* situated-learning hospital/ambulatory care standardized patient skills lab

Kimberly A. Sponagle[1], Heidi J. Deal[1], Julia Belliveau[2], Tessa E. M. Lambourne[2]
1. *College of Pharmacy, Dalhousie University, Halifax, Nova Scotia*
2. *Queen Elizabeth II Health Sciences Centre, Halifax, Nova Scotia*

Objectives: To describe the development of situated, simulated learning activities in hospital, ambulatory and clinic practice settings in conjunction with hospital pharmacy residents. Content of the lab and preliminary feedback from students, residents and faculty will be described.

Methods: A blended learning model with standardized patient encounters that simulate pharmacy practice activities associated with hospital and ambulatory settings was offered at the Collaborative Center for Clinical Learning and Research at Dalhousie University. Students were provided an opportunity to interact with a standardized patient (SP) in one of the following four activities: (1) hospital bedside best possible medication history (BPMH, (2) bedside discharge prescription counselling, (3) clinic visit consultation supporting drug therapy decision-making, and (4) home-based medication assessment. Students observed a peer interact in the remaining three scenarios. Each lab session was facilitated by a pharmacist lab demonstrator who provided formative feedback along with the SP. Hospital pharmacy residents completing their teaching requirement as skills lab demonstrators assisted with authoring the cases and case discussion guides for the lab. Students were provided an overview to the skills expected in lecture format and provided online resources and case materials for review in advance of the session.

Results: Informal feedback from students and residents suggest this is a useful learning experience that should be repeated and formally evaluated in subsequent years. Challenges exist with respect to timing in the curriculum and access to the facility, which should be resolved for subsequent iterations.

Conclusions: Faculty believe this to be a valuable learning opportunity and will formally assess student experience in subsequent iterations to maximize learning benefit.

PE21

Curriculum mapping using a new online tool: Applications in mapping competencies and content

Ken Cor[1], Cheryl Sadowski[1], Sharla King[2], Marlene Gukert[1]
1 Faculty of Pharmacy & Pharmaceutical Sciences, University of Alberta
2 Health Sciences Education and Research Commons, University of Alberta

Goals/Intent: To demonstrate an approach to curriculum mapping of information contained in course syllabi using an online tool developed for the university's Learning Management System (LMS). Applications with a new Interprofessional Education competency framework and in the context of geriatric and pediatric content are presented.

Project Description: One of the most common sources of information for curriculum mapping are individual course syllabi. However, syllabi are typically produced as static documents whose format varies from one instructor to the next and are difficult to search. Supported by the University of Alberta Teaching and Learning Enhancement Fund (TLEF) and working with computing science students and University LMS programmers, a syllabus creation/mapping tool was developed to standardize course syllabi production and create a searchable database of program information.

A research assistant used the tool to enter information contained in each syllabus from official University course web pages. Using the administrator side of the tool, an IPE framework was uploaded and used to tag entered course outcomes. Using the tags and the database of course information, reports of how the IPE outcomes and geriatric and pediatric content is covered across the curriculum were generated.

Information from 42 course syllabi, 189 individual assessments, and approximately 1054 individual sessions were entered using the tool. A total of 1105 course outcomes were extracted as a part of the process.

Relevance to Pharmacy Education and Research: Mapping curriculum is a standard that all faculties of pharmacy in Canada are required to meet as a part of ongoing program evaluation efforts. The present session demonstrates an approach to mapping using an online tool that should be of interest to other faculties.

PE22

Does peer review of teaching impact teaching practice and perceptions in pharmacy?

Cynthia Richard[1], Elaine Lillie[1], Kaitlin Mathias[2], Thomas McFarlane[1], Mary Power[2]
School of Pharmacy[1] and Centre for Teaching Excellence[2], University of Waterloo

Background and Objectives: The University of Waterloo School of Pharmacy has initiated a formal process for peer review of teaching. The purpose of this project was to investigate whether the process impacted teaching practices or perceptions.

Methods: Instructors were invited to complete an online survey and participate in semi-structured interviews to gather information on the impact of the process on teaching practices, attitudes toward teaching, and attitudes toward peer review.

Results: The survey was completed by 26 of 34 (76%) eligible instructors. Of the respondents, 73% were comfortable with the idea of being reviewed by a peer, although 31% indicated they felt nervous with a peer reviewer present. Nearly all participants (96%) agreed that peer reviews of teaching are a development opportunity, although there was little indication that the process changed attitudes toward teaching. Over half of participants indicated they planned to make changes to their use of classroom time based on the peer review. Most instructors found the feedback to be clear and understandable (96%) and specific (92%), with 77% indicating the feedback would improve their teaching. At the time of survey completion, 23% of participants had sought professional development opportunities or consulted teaching-specific resources as a result of the peer review of teaching.

Eight instructors participated in semi-structured interviews. Themes that emerged indicated that the peer review met their expectations, faculty were generally comfortable with the process, and it reinforced the value that the School of Pharmacy placed on teaching. The interviews also elicited suggestions for revision and refinement of the review process such as establishing the review as part of annual performance reviews, identified others who could act as reviewers, and established that instructors would value additional critical feedback.

Conclusions: Results from this study indicated that the peer review of teaching process was well-received and led to changes in teaching practice. Attitudes toward teaching did not appear to be affected.

PE23

Mapping Interprofessional Global Health Competencies and Pharmacy Educational Outcomes across Global Health Curriculum

Erin A. Cicinelli, Sunny H. M. Wang, Doret K. F. Cheng
Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto

Objectives: To determine the extent to which the global health courses offered in the entry-to-practice Doctor of Pharmacy program at the Leslie Dan Faculty of Pharmacy (LDFP) address the Consortium of Universities for Global Health (CUGH) interprofessional global health competencies and how these competencies align with Association of Faculties of Pharmacy of Canada (AFPC) Educational Outcomes for pharmacy graduates.

Methods: The CUGH competencies were aligned with AFPC Educational Outcomes by comparing their descriptions. Where there was overlap in objectives and expectations, a competency domain was deemed to relate to an outcome. To map the global health curriculum, authors reviewed course documents (e.g., syllabi, assignment guidelines, texts, and lecture notes) and documented whether each competency was addressed in learning objectives, readings, lectures, or evaluation strategies.

Results: The CUGH competencies aligned well with the AFPC Educational Outcomes with a higher number of competencies related to the Manager outcome. The International/Global Health Advanced Pharmacy Practice Experiences (APPE) addressed the greatest number (25, 64%) of the 39 CUGH competencies, followed by PHM387: Global Health (20, 51%) and PHM320: Global Pharmaceutical Policy (12, 31%). Didactic courses addressed more knowledge and attitudes competencies, while the APPE allowed students to develop and apply practical skills through projects and partnering with community programs.

Conclusions: Determining the extent to which pharmacy curricula address global health issues is a critical step toward ensuring pharmacy graduates' competence to practice in an increasingly globalized world. The global health curriculum at the LDFP enables students to go beyond the level of Global Citizenship (Level I) to the level of Basic Operational Program Oriented (Level III) once students engage in International/Global Health APPEs. Mapping of the entire undergraduate pharmacy curriculum will reveal if competencies are addressed in other courses and areas where further integration of global perspectives is needed. A set of global health competencies specific to the pharmacy profession would enable curricula development and implementation to ensure graduates are prepared to face the global health challenges of our time.

PE24

Development of community practice site accreditation process

Geneviève Brunet[1], Isabelle Boisclair[1], Véronique Dorion[1], Nirvishi Jawaheer[1], Isabelle Lafleur[1], Johanne Vinet[1], Nathalie Letarte[123], Ema Ferreira[14]
[1]Faculty of Pharmacy - Université de Montréal, [2]Department of pharmacy – Centre hospitalier de l'Université de Montréal, [3]Centre de recherche du CHUM, [4]Department of pharmacy – CHU Ste-Justine

The main objective is to structure the accreditation process of community pharmacy practice sites in order to provide optimal environment for student competencies development. Using a survey and a decision tree, we expect a 70% accreditation based only on the survey; 20% of accreditation that will require a telephone validation and 10% of accreditation that will require an on-site visit.

In 2009 and 2010, 450 community pharmacy practice sites were visited by the Faculty of Pharmacy of the Université de Montréal. These sites needed to be renewed. After eliminating sites without active preceptors, 250 sites remained. A first group of 142 preceptors received the survey. The second group of surveys will be sent later on. The results apply to the first group. We sent a survey based on a pre-determined set of standards divided in three categories: practice sites resources, pharmaceutical care and supervision of students. Some standards are considered critical and have a higher score; other standards carry a lesser weight. A decision tree was used to identify the extent and conditions of the accreditation.

We received 110 completed surveys and 2 were incomplete giving a response rate of 79%. The preceptors that did not complete the survey (30) will be included again in the next group. The final results are 69 accreditations based on the survey (63%), 25 accreditations with telephone validation (23%) and 16 accreditations with an on-site visit (14%).

This new process has allowed accreditation in a fast timeframe with minimum visits, financial and human resources. In addition, the decision tree identifies the community pharmacy practice sites that do not meet our quality criteria.

PE25

Blending Hospital and Community placements: Describing the student and preceptor experience

Marlene Gukert, Clinical Assistant Professor[1], Ken Cor, Clinical Associate Professor[1], Renette Bertholet, Clinical Assistant Professor [1]
Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta

Background: Some fourth year students at the University of Alberta who are placed in rural locations for their experiential education are offered to participate in a blended placement which involves completing 16 weeks in one town where their time is evenly split between practice settings. Students start at a primary placement site, either a hospital or community practice, and spend at least one day each week at their second placement site. The purpose of the blended placement is to immerse students in rural healthcare settings that provide collaboration and maximize opportunities to experience continuity of care.

Objectives: To describe student and preceptor experiences regarding involvement in blended placements according to two areas of evaluation including: Preceptor Collaboration and Student Learning. Descriptions are used to identify areas of strength and weakness.

Methods: A semi-structured focus group with students and interviews with preceptors were used to generate qualitative descriptions of experience. These were transcribed and coded as a basis to identify emerging themes. Students and preceptors were prompted to describe community engagement, cross-setting collaboration, and optimization of student learning. Students were asked specific questions about their experience with 'crossover' patients. Preceptors were asked to describe their experience collaborating with the other preceptors to coordinate activities, communicate and evaluate student performance.

Results: Based on preliminary analyses, students indicated that blended placements were effective at promoting inter-professional collaboration and providing authentic continuity of care experiences. Students also indicated uncertainty regarding community integration as well as concern over timing of evaluations. Preceptors indicated blended placements provided strong continuity of care opportunities as well as a more authentic learning experience. Preceptors also indicated no difficulty collaborating but relied on students to facilitate communication.

Conclusion: Students and preceptors describe positive learning benefits for inter-professional collaboration and continuity of care. Community integration, evaluation timing, and preceptor collaboration are potential areas for improvement.

PE26

A 12 question-and-answer guide to help pharmacy students with their preparation for pharmacy clerkships

Émilie Mégrourèche, Ema Ferreira, Gilles Leclerc
Faculty of Pharmacy, University of Montreal, Montreal, Quebec, Canada

Objectives: Pharmacy students ask many questions about the last year of their Pharm.D. curriculum consisting of five mandatory clerkships, which are a great source of stress for them. However, there is no academic tool developed *by students for students* to help them prepare for their clerkships. The aim of this study is to describe the development of a question-and-answer guide to help students prepare for their fourth year community pharmacy clerkships.

Methods: A 25-question survey was send to 391 fourth-year pharmacy students and recent graduates from the Université de Montréal. A second survey consisting of eight questions was sent to 870 community pharmacists. Survey questions addressed topics such as student concerns, type and amount of preparation needed, difficulties encountered by students during clerkships, expectations of preceptors and tips on how to meet those expectations. Answers were compiled and analyzed and a Q & A guide was developed. The guide was then presented during an information session and student feedback was collected.

Results: A total of 100 students and 63 preceptors answered the surveys. A 22-page guide was produced, answering 12 questions asked by students prior to their fourth year. The main concern of the students was to be able to meet all the requirements to pass the clerkship and the main difficulty encountered was the lack of efficiency in carrying out pharmaceutical interventions. Students and preceptors also gave twelve tips and strategies to ensure successful clerkships. The guide was presented to faculty professors, preceptors and pharmacy students during an information session. In the feedback survey, 98.9% (n=86) of students indicated that they felt this guide was a useful tool and that it answered most of their questions.

Conclusion: Pharmacy students will be using this guide as an additional tool for their preparation for community clerkships. It would be interesting to measure the impact of such an initiative on student's preparation and stress regarding community pharmacy clerkships.

Le lien vers le guide https://drive.google.com/file/d/0BxdxTor9X3cWTzJnNTQwVVpkbFE/view

PE27

Accreditation of experiential learning sites at the Faculté de pharmacie de l'Université de Montréal

Nathalie Letarte[1,2], B.Pharm., M.Sc., DESG, BCOP, Johanne Vinet[1], B. Pharm., M.Sc., Marc Perreault[1,3], B. Pharm. M.Sc., BCPS

1: Université de Montréal, Faculté de pharmacie
2: Centre hospitalier de l'Université de Montréal, Département de pharmacie
3: Centre hospitalier unisersitaire de santé McGill, Département de pharmacie

Background and objectives: Our faculty accreditation committee has been in existence since mid-1990. However, with the implementation of the entry-level Pharm.D. (ELPD) in 2007, it became clear that actualisation of this committee was essential to provide and maintain quality of our experiential training to our undergraduate (ELPD) and graduate students (residency program).

Methods: The committee, composed of Pharm. D., *Qualification en pharmacie* and residency programs' directors, pharmacists from community and hospital practices, professors, and a coordinator, meets monthly. The committee elaborates methodology and criteria for accreditation, oversees its processes and presents recommendations to the Faculty counsel. In 2012, methods of evaluation were updated and an accreditation protocol was specifically elaborated for site accreditation (teaching hospitals involved in the residency program) and for individual rotations from both community and hospital environment. Criteria are based on standards of practice from various entities (CHPRB, *Ordre des pharmaciens du Québec*, NAPRA, CCAPP) and include some mandatory standards to receive full accreditation.

Results: Since 2012, six out of eight residency training sites were visited and have been re-accredited. A new residency-training site has undergone a first accreditation process. More than fifty new hospital rotations for introductory and advanced experiential learning for the Pharm D. Program were visited and accredited. Nonconformity to two mandatory criteria have ben identified: lack of pharmacists' documentation in medical records and pharmacists' workload. Evaluators were recruited amongst committee members and other experienced pharmacists. A residency site accreditation process takes more than 9 to 12 months to complete, from the planning of the visit to the publication of the final report. Rotation accreditations generally are completed within 2 months.

Conclusion: A formal accreditation process is labour and time intensive. Results are encouraging and tend to enhance the quality of pharmaceutical care and preceptorship.

PE28

Recognizing the role of collaboration in interprofessional curriculum planning: a one-year post-implementation reflection

Dana A. Turcotte, Amanda J.S. Condon, Moni W. Fricke, Fiona M. Jensen, Laura L. MacDonald, Katarina Popovic-Maroti
Office of Interprofessional Collaboration, Rady Faculty of Health Sciences, University of Manitoba.

Objectives: 1. Discuss challenges of implementing a two-year longitudinal curriculum in interprofessional collaboration. 2. Describe population health as a learning common for early level health professional students as a means to learn about interprofessional collaboration. 3. Identify opportunities for improvement when creating a curriculum in interprofessional collaboration.

Background/Method: In 2015, the Rady Faculty of Health Sciences was created at the University of Manitoba, combining the Colleges of Dentistry & School of Dental Hygiene, Medicine, Nursing, Pharmacy and Rehabilitation Sciences. With that came the establishment of the Office of Interprofessional Collaboration (OIPC) with representation from each College. The OIPC was tasked with creating a longitudinal curriculum in interprofessional collaboration for students in the health profession programs. After 1 year of preparatory work, the interprofessional collaborative care curriculum was launched in September 2016. Students (n= 361) were placed into interprofessional cohorts that will be maintained throughout their training. Population health promotion, focusing on the social determinants of health, was the learning commons for the first year. In-person sessions were supplemented with online discussion forums; a group assignment was submitted at the end of each term. Interprofessional communication, team functioning and community-centred care were assessed among student cohorts.

Evaluation & Outcomes: Student and faculty evaluation occurred throughout the curriculum implementation. Students expressed interest in more face-to-face time, challenges with online learning management software, need for streamlined communication and a "roadmap" of where the curriculum was going and "why" they were doing it.

Conclusions: We identified several areas for ongoing consideration: student expectation of focus on role clarity and clinical care, ensuring appropriate content to the level of training, streamlining communication with students, optimal use of learning management software and embedding content within existing program curricula. Establishing true outcome measures, (i.e. How do we assess that our students are in fact better collaborators after having participated in this content?), is an important next step.

PE29

Pre-requisites Associated with Academic Success in the BSP and planned Pharm D program (2017) at the University of Saskatchewan

Roy Dobson[1], Ed Krol[1], Kunmi Adesina[2]
College of Pharmacy and Nutrition, University of Saskatchewan, Saskatoon

1. Associate Professor 2. Undergraduate Student

Objective: To identify pre-requisites associated with academic success in the current BSP and anticipated academic success in the planned Pharm D program at the University of Saskatchewan.

Methods: Statistical analysis was conducted on retrospective data of the grades of 1236 pharmacy students admitted from 2002 to 2015. BSP success was calculated using a weighted average of all required courses within the BSP program. Anticipated success in the Pharm D program was calculated from the BSP grades after excluding Pharm D prerequisites currently part of the BSP. Models of factors contributing to academic success were constructed using stepwise and forced linear regression.

Results: For the BSP program, modelling explained more than half of academic success in Year 1 (R Square 0.559). Explained variance declined each year, explaining less than 20 percent in Year 4 (R Square 0.184). Organic Chemistry was the only BSP prerequisite associated with academic success in all four years of the program. Biology was found to be associated in Years 1, 2 and 3 and Humanities in Year 2. For the proposed Pharm D, modelling explained nearly three-quarters of variance in Year 1 (R Squared 0.734). Explained variance increased to 0.784 in Year 2, declined to 0.681 in Year 3 and 0.515 in Year 4. Nutrition was associated with academic success in all 4 years. Microbiology was associated with academic success in 3 of the 4 years, with Bio-Organic Chemistry in Year 1 and 2 and Biochemistry in Year 3 and 4.

Conclusions: BSP pre-requisites explained half of variance in academic success early in the pharmacy program but were much less associated with academic success in the latter years of the program. Performance in the new Pharm D pre-requisites appeared much more to be associated with academic success across all years of the program. Course content and instructional design may explain these stronger associations for the Pharm D.

PE30

Development of an Evaluation Plan for the Dalhousie College of Pharmacy Entry to Practice Doctor of Pharmacy Program

Dr. Anne Marie Whelan, Dr. Tannis Jurgens, Kaleigh MacIsaac,
College of Pharmacy, Dalhousie University, Halifax, NS

Objectives: The Dalhousie College of Pharmacy's Bachelor of Science in Pharmacy program has prepared its graduates to practice pharmacy since 1961. Although curricular modifications have been made over the years, recent advances in drug therapy together with the expansion of the scope of pharmacy practice have led to the need for major changes to the College's program. The College will implement an entry to practice Doctor of Pharmacy (PharmD) program to provide opportunities for acquiring the depth and breadth of knowledge, skills and abilities that pharmacists require to meet practice needs. The objective of this project was to develop an evaluation plan for the new PharmD program to ensure that desired outcomes are achieved.

Methods: A literature review of program and evaluation theory was conducted. Using a program theory foundation, a logic model, narrative of the logic model, and a theory of change were developed, in consultation with the Curriculum Committee. An evaluation matrix consisting of evaluation questions, indicators, data sources and data collection methods was developed. Key evaluation questions were derived using the outcomes from the logic model as well as Hollander's framework for conducting evaluation. The evaluation matrix informed the construction of the data collection tools. An implementation plan that describes tool administration, data analysis and dissemination of findings was completed.

Results: The program theory was developed that describes the 6 major components of the PharmD curriculum and how they work to achieve the overall outcomes of the program. This was presented visually as a logic model. The evaluation matrix was completed and data collection tools for a range of stakeholders were developed. The implementation plan was created.

Conclusion: Using the program theory approach the College of Pharmacy developed a comprehensive and transparent evaluation plan for the PharmD program.

PE31

Are Characteristics of Success Integrated into Pharmacy School Admissions?

Theresa Charrois, Vincent Spurrell, Carly Maxwell, Ken Cor, Jill Hall
Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta

Admission into pharmacy programs is determined based on some combination of grades, assessments of general knowledge (e.g., Pharmacy College Admission Test (PCAT)), personal interviews, and materials such as references and letters of intent. While the approach appears to be multifaceted, there remain questions about whether important predictors of professional success are measured and used to make admissions decisions. Previously, qualitative interviews with nominated successful pharmacists were used to identify personal characteristics linked to their success. The present research builds off of the qualitative inquiry to answer the question of whether and where schools of pharmacy measure the identified personal characteristics in their admissions process.

Objective: To describe the admissions processes of top pharmacy faculties in North America and to identify the extent to which characteristics associated with professional success are measured.

Methods: The admissions processes of the 10 pharmacy schools in Canada and the top 50 schools in the United States were summarized from information accessed online. A survey was created to verify and supplement information collected from school of pharmacy websites. The survey included sections to collect standard information about each element used as a basis for admission and determined if and how characteristics associated with successful pharmacists were evaluated.

Results: Preliminary results describe utilization of different components of the admissions processes for the pharmacy schools including: MMI interview (27%), other interview types (73%), both MMI and other interview (7%), inclusion of PCAT (75%), prerequisite courses (100%), requirement for letters of reference (80%), and any supplemental application materials (85%), as well as any required minimum GPA (80%). Results from the developed survey provide a more comprehensive understanding of each school's admissions processes and the characteristics screened for.

Conclusions: Pharmacy schools consider a variety of elements when determining student admission, however, few directly assess personal characteristics. Admissions processes for schools of pharmacy may be enhanced by including characteristics that have been associated with successful pharmacists who practice to their full scope.

PE32

Relationship of admission scores and student characteristics to performance within a pharmacy program and on national licensure examinations

Andrea J Cameron, Robert P Bonin, Sara JT Guilcher
Leslie Dan Faculty of Pharmacy, University of Toronto, ON, Canada

Objectives: To describe admission scores, including multiple mini-interview (MMI), pre-pharmacy average (PPA) and Pharmacy College Admission Test (PCAT), and covariates (age, prior degree, re-application, gender, and year 1 grade point average (GPA)), in the 2011 admitted cohort of the 4-year PharmD at the University of Toronto.

To analyze predictive validity of admission scores and covariates, with respect to annual GPA in year 3 (aGPA), scores in year 4 advanced pharmacy practice experience (APPE) rotations, and scores on Pharmacy Examining Board of Canada (PEBC) Qualifying Examination multiple choice question (MCQ) and objective structured clinical examination (OSCE).

Methods: Admission scores and covariates were described and correlations were determined. Multiple linear regression analyses were conducted with PPA, PCAT composite, and MMI scores as predictor variables, and the covariates. Dependent variables were Year 3 aGPA, APPE rotation scores (community and institutional), PEBC–MCQ and OSCE scores.

Results: The cohort comprised 214 students (57.5% female), with a mean age at admission of 21.8 years (SD=1.9), mean PPA 79.9 (SD=4.3), PCAT composite 421.8 (SD=8.2), MMI score 62.8 (SD=10.4), prior degree 51.4%, and re-applicants 51.9%. PPA, MMI, and being female were all significant predictors of Year 3 aGPA, For APPE rotations, the MMI was a positive significant predictor for both community and institutional practice. PPA was a negative predictor for community APPE score, while being female was a positive predictor for institutional APPE. For PEBC, MMI was significantly predictive for both MCQ and OSCE; PPA, PCAT and younger age also showed significance in the MCQ model. Adding Year 1 GPA to the models had varying effects.

Conclusions: Findings showed the MMI was a significant predictor for all 5 outcome variables. PPA, PCAT, age and gender were also significant in some models. Since this cohort was the first to experience a new PharmD curriculum, continued analysis of individual course performance and comparison with 2010 cohort is planned.

PE33

Examining the impact of formative assessment question-generation on student learning

Natalie E. LeBlanc, George S. Pachev, Simon P. Albon
The University of British Columbia, Faculty of Pharmaceutical Sciences, Vancouver, BC

Study Objectives: The Faculty of Pharmaceutical Sciences at UBC is transitioning from a 1+4 BSc(Pharm) to a 2+4 E2P PharmD program. Planning and development of the PharmD program includes revision of existing assessment systems from traditional course-based to programmatic approaches to assessment. This study, funded by a two-year UBC Teaching and Learning Enhancement Fund grant, explores the experiences of advanced pharmacy students, hired as undergraduate academic assistants (UAAs) to write and develop questions for a new curriculum-wide formative assessment program. Subject areas included respirology, cardiology, nephrology, endocrinology and neurology. The objective is to examine the pedagogical potential of question-generation by tracing its impact on UAAs' learning.

Statement of Methods: Four UAAs were individually interviewed and asked a combination of structured and open-ended questions. After which they completed a short survey, using a 5-point Likert scale. Analysis included data summarization, transcript coding, and content and document analyses in which themes, patterns and clusters were extracted from interview and survey responses. A second cycle of coding was applied to develop a conceptual and theoretical organization of the UAAs' experiences and perceptions.

Summary of Results: Question generation had multiple benefits for UAAs including opportunities to: 1) review previously learned material, add to existing knowledge, and develop deeper understanding, and; 2) develop higher order thinking skills, generate more diverse and flexible approaches to thinking and problem-solving, and become more involved in (and in control of) their own learning. UAAs also developed greater appreciation for the challenges professors face regarding question creation. UAAs were anxious about how their lack of understanding in certain areas (e.g., nephrology) impacted their ability to create suitable questions and the importance of expert knowledge.

Statement of Conclusions: The project helped UAAs to construct personal knowledge through the employment of various cognitive and metacognitive learning strategies. Furthermore, by engaging in reflective and reflexive processes of learning, UAAs acquired some of the skills that we feel are necessary to become life-long learners.

PE34

Evaluating the function and impact of formative assessments in UBC's E2P PharmD program

Natalie E. LeBlanc, George S. Pachev, Arun Verma, Simon P. Albon
The University of British Columbia, Faculty of Pharmaceutical Sciences, Vancouver, BC

Study Objectives: This study examines the first of a two-year project initiated to develop a formative assessment program for UBC's new PharmD curriculum. Along with faculty experts, advanced students contributed to low-stakes, 10-20 question formative assessments called Check-Points (CPs), created to support students' learning through regular practice, feedback for self-assessment, and study guidance. Focused on Year 2 (PY2), the objective is to explore the degree to which CPs fulfilled their intended functions and impacted student learning.

Statement of Methods: The PY2 formative assessment program will be evaluated through program evaluation surveys administered in the five medication management modules. Using a 5-point Likert scale, students rate the CPs on assessment for learning questions related to practice, self-assessment and study guidance; written responses identify strengths and improvements. Learning impacts are studied through student CP usage patterns and correlations between usage patterns and performance on summative assessments. Web-analytics for identifying usage patterns include frequency and duration of access to the CPs; correlations are calculated using Excel and narrative comments are analyzed for themes.

Summary of Results: In two of the five modules evaluated, student respondents agreed that the CPs have enhanced their learning and fulfilled their functions The majority of respondents either strongly agreed or agreed that the formative assessments covered the relevant material, provided effective practice, and helped them keep-up and identify learning gaps. Analysis of the narrative comments identify a number of ways that the CPs can be improved including adding more questions, increasing their difficulty, broadening questions formats from mostly multiple choice formats to case-based scenarios, and providing better feedback and alignment of CPs with summative assessments. Analysis and analytics of all five modules will be compiled and examined at the close of PY2.

Statement of Conclusions: The formative assessment program is currently being implemented in PY2 of the PharmD curriculum. Future iterations of the formative assessment program will respond to students' suggestions for improvements.

PE35

Assessment of the education and skill needs of community pharmacists concerning addiction

Sarah A. Fatani, Daniel Bakke, Roy Dobson and Anas El-Aneed
College of Pharmacy and Nutrition, University of Saskatchewan

Goals of the presentation: Describing the skills and educational needs for pharmacy students and community pharmacists concerning drug addiction in order to improve the services provided for People Who Suffer from Addiction Disease (PWSAD).

Description of the project: 11 one-to-one semi-structured interviews were conducted with community pharmacists practicing in the Saskatoon Health Region. In addition, four focus groups with PWSAD were conducted (24 participants in total). The goals are to assess what pharmacists need to enhance their role as health providers when caring for PWSAD and to recognize what PWSAD need from community pharmacists. The data were recorded and transcribed verbatim. Thematic analysis was employed to analyse the interviews/focus groups. Data saturation was achieved.

Results: Four major themes were identified from the interviews: (1) Effect of the work environment on pharmacists encounters with PWSAD; (2) Limited knowledge of key aspects related to addiction; (3) Lack of support from the health care system; (4) Educational and training needs. PWSAD opinions mirrored those mentioned by pharmacists to a large extent.

Relevance to pharmacy education: Data from the study suggested educational interventions at two levels: undergraduate and continuous education. *At the undergraduate level*, the concept of addiction as a chronic disease with multifactorial nature (physical and psychological) should be emphasized. Students should also be familiarized with the social aspects of the disease, and incorporating the concept of harm reduction in caring for PWSAD.

At the continuous education level, recommendations reveled three main elements; 1) implementing addiction protocol to guide community pharmacists through their encounters with clients suffering from addition; 2) designing referral guide with updated information about the available services (e.g. social, rehabilitation, counselling); 3) introducing continuous education hours that include inter-professional interactive directive learning sessions, where community pharmacists get the opportunity to be part of a holistic care plan for PWSAD and listen to different experiences from other health care providers in the field of addiction like, physicians, social workers, and nurses.

PE36

Evaluating modifications in calculations curriculum in response to 100% benchmark

Courtney D. Quiring, University of Saskatchewan

Study Objectives: This project aims to evaluate changes made in the calculations portion of a course (PHAR 303 - Pharmaceutical Dosage Forms and Dispensing II), in order to inform of impact of these changes and to improve the competency of pharmacy graduates in Calculations.

Statement of Methods: In response to this recent increase in benchmark for passing calculations, a formative assessment tool and multiple tutorial sessions were added in an effort to improve learning and support achievement.

Summary of Results: There was a significant difference between the redesigned and previous course as determined by the number of students who achieved 100% on the first attempt of the final exam. (Chi-square (1) = 17.81, $p < 0.001$). Survey results indicated that the most helpful tools were the practice final exam experience (97.6% found somewhat to very helpful) and the ability to use the practice final as study material (100% found somewhat to very helpful).

Statement of Conclusions: In their comments, students claimed that rounding errors and incorrect units are a simple mistake due to a "trick" question rather than viewing it as a gap in learning and a skillset they need to develop. Focus going forward will to be introduce clarity on types of errors and additional types of formative assessment.

PE37

Reconciliation in Canadian pharmacy education: content is just the beginning

Jaris P. Swidrovich

College of Pharmacy and Nutrition, University of Saskatchewan

The Truth and Reconciliation Commission (TRC) of Canada released 94 Calls to Action, including items specific to health, education, and education for reconciliation. While faculties of pharmacy across Canada may explore a number of avenues in their responses to the Calls to Action, this poster focuses not only on actions at the curricular level, but also ways of responding to the Calls to Action that go beyond Indigenous content in pharmacy curricula. This poster proposes strategies to indigenize Canadian pharmacy programs such as indigenizing delivery methods, assessment and evaluation practices, as well as staff and faculty development. Opportunities to indigenize faculties of pharmacy in Canada outside of the classroom are also proposed.

The College of Pharmacy and Nutrition, specifically, has moved forward in a number of ways, including the development of Indigenous learning outcomes to be incorporated into the entry-to-practice Doctor of Pharmacy (PharmD) program, the creation and support of a student-run Indigenous engagement committee, and faculty and staff development. Such advances in pharmacy education are critical considering the current state of health of Indigenous Canadians.

The United Nation's Human Development Index ranks Canadians as number six on the global scale of health and quality of life. When this same rating scale is applied to only the Indigenous people of Canada, the number falls to 68 – consistent with rankings seen in third-world countries. Faculties of pharmacy across Canada have an incredible opportunity to indigenize their programs, especially as we prepare for entry-to-practice PharmD programs, as pharmacists are ideally present in the Canadian health care system to respond to inequities in Indigenous health, given their high level of accessibility and frequent rating as the most trusted health care professional.

PE38

The Art of Pharmacy: Pharmacy and Art Collaborating to Facilitate Learning

Bradley W Necyk[1], Candace M Necyk[2], Cheryl Cox[2]
[1] Department of Art and Design, University of Alberta and Faculty of Fine Arts, MacEwan University
[2] Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta

Study Objectives: Our objective was to utilize photovoice, an arts-based research approach, as a critical reflection tool within a first-year service learning course, to provide the opportunity to more deeply explore the meaning of person-centred care and citizenship as part of one's professional identity.

Statement of Methods: Arts-based research is a qualitative methodology utilized to identify gaps in understanding, promote dialogue, give voice to subjugated perspectives, and engage social change. We employed photovoice as the framework for the culminating group assignment of the service learning course for first-year pharmacy students. Photovoice is a community-based participatory research method used to create or collect information; participants use photos to document, create dialog, and reflect on the needs and assets of their community. Over the course of the winter semester 2017, we ran three seminars that introduced arts-based research and photovoice to the students, provided a short technical class on photography, and met individually with each student group of 4-5 students. Each student group was expected to create a photograph and accompanying artist statement for presentation.

Summary of Results: 34 photographs and artist statements were curated to produce a 2x3-foot work of art which the students exhibited. The combined strengths within the groups led to thoughtful and inspiring results. During the exhibit, students proudly shared their work and sought out their classmates' stories.

Statement of Conclusions: The goal of our photovoice project was to further enhance the students' understanding of the meaning of their volunteer experiences and its connection to their future practice, while also advancing a broader connection to the meaning of citizenship and community engagement. The students' art captured themes such as vulnerability, the tensions between the provision of person-centred care and funding, and the passions they recognized in the residents. To the delight of their volunteer coordinators, students could gift their art to their volunteer site.

PE39

Pharmacy students' reactions to the implementation of a code of good pharmaceutical practices online and in social media: follow-up after 2 years

Jean-François Bussières[1, 2], Émilie Mégrourèche[1, 2]
[1] Faculty of Pharmacy, University of Montreal, Montreal, Quebec, Canada
[2] Department of Pharmacy and Pharmaceutical Practice Research Unit, CHU Sainte-Justine, Montreal, Quebec, Canada

Objectives: All citizens have a digital footprint. Pharmacy students and pharmacists need to be aware of their digital footprint as well as opportunities and risks associated with online behaviors. To describe the reactions of pharmacy students to the use of a code of good pharmaceutical online practices (CGPOP).

Methods: This is a cross-sectional descriptive study. As part of the course "Pharmacist and the Law" given in the 1st year of Pharm.D. in a Faculty of Pharmacy, students were exposed to a pivotal article on optimal online behaviors and appropriate use of social medias. They were invited to sign the code as a formal commitment for their whole curriculum. Four weeks after the code was and signed, students were asked to answer seven questions about their perceptions of this activity. A 4 item Likert scale (totally agree/partially agree/partially disagree/totally disagree) and a dichotomous scale (yes/no) were used according to the type of questions.

Results: In total, 198 students (100% response rate) signed the CGPOP in August 2016 and 192 students (97% response rate) answered the seven questions four weeks later. Overall, 95% of the students agreed that reading the pivotal article has made them aware them to the risks associated with online activities. The majority (76%) felt that this article exposed them to the opportunities of online tools and social media in pharmacy. A total of 86% of respondents confirmed that reading the CGPOP made them questioned some of their practices. A total of 59% changed some access settings in their online accounts and 9% dropped some platforms. In addition, 76% expressed an interest for a structured workshop on the responsible use of social media.

Conclusion: The use of a CGPOP is feasible and contributes to the awareness and some behavioral changes of undergraduate pharmacy students.

PE40

Development of a web blog to support the teaching of management in hospital pharmacy residency curriculum

Céline Porteils[1], Eleonore Holscher[1], Jean-François Bussières[1,2]
[1] Department of Pharmacy, CHU Sainte-Justine, Montreal, Quebec, Canada
[2] Faculty of Pharmacy, University of Montreal, Montreal, Quebec, Canada

Objectives: To describe the development of a web blog to support the teaching of management in hospital pharmacy residency curriculum.

Methods: This is a descriptive study. A three credit mandatory hospital pharmacy management course is offered annually in the context of an advance pharmacotherapy master degree in two faculties of pharmacy in Quebec. Hospital pharmacy residents are exposed to knowledge (e.g. a 270-page book + suggested readings) during traditional interactive lectures but also during their rotations. A brainstorm was conducted to develop the form, the content and the rules of redaction of a blog to insure a continuous exposure to management readings during their rotations. A pre-test was done with four pharmacy residents to confirm the clarity and the utility of the tool. No statistical analysis was performed.

Results: A mock-up of the blog was developed on Wordpress. Forty-eight key readings from international, local and provincial sources were selected for a one-year blog including publications from regulatory authorities, professional societies and other relevant sources. Two key readings were selected to develop different summary types for the blog. One summary type (e.g. ~400 words) was selected by consensus and 25 rules of redaction were adopted. The pre-test was conclusive about form and content. The weekly blog was launched in early 2017 and all hospital pharmacy residents and hospital pharmacists involved in their supervision were invited to subscribe. Readers' comments were not public. While the blog targets pharmacy residents, it is public and can be consulted by anyone including hospital pharmacists involved in the supervision of the residents. All selected documents were summarized and pre-published for one year. The blog was also designed to publish other relevant information including the annual management seminar of pharmacy residents.

Conclusion: It is feasible to develop a weekly web blog to support the teaching of management in hospital pharmacy residency curriculum.

PE41

Development of 25 web vignettes about the use of social media and information technology in pharmacy

Denis Lebel[1], Émilie Mégrourèche[1, 2], Nicolas St-Onge[1, 2], Mélissa Coutu[1, 2], Jean-François Bussières[1, 2]
[1]Department of Pharmacy and Pharmaceutical Practice Research Unit, CHU Sainte-Justine, Montreal, Quebec, Canada
[2]Faculty of Pharmacy, University of Montreal, Montreal, Quebec, Canada

Objectives: There are opportunities and threats associated with the use of social media and information technology. The aim of this study was to describe the development of web vignettes about social media and information technology in pharmacy for teaching purpose.

Methods: This is a descriptive study. Following a literature search and a Youtube.com scan about the use of social media and information technology by healthcare professionals, we identified key topics, potential behaviors and current opportunities and threats. For each topic, the following elements were elaborated through a brainstorm: environment, theme, information technology used, key script elements for scenario, opportunities, threats.

Results: A total of 25 web vignettes (~ 20-160 seconds) were filmed in December 2016 in retail pharmacy settings (n=12), hospital settings (n=4) and teaching settings (n=8). Actors were provided a short scenario per vignette before filming. For example, scenarios illustrated themes like patient-pharmacist relationship, pharmacy student-professor relationship, confidentiality, professional responsibility, freedom of expression, scientific publication, ethics, plagiarism, conflicts of interests. One vignette illustrated the "making of the project" while the 24 other vignettes illustrated seven traditional communication situations, 19 electronical communication situations, 20 opportunities and 23 threats. Each vignette was filmed up to three times by a cameraman (one pharmacist) with one to four actors (one pharmacist and three pharmacy students) and the best result for each was published on Youtube.com. Short sequences were selected to keep viewers' attention. A discussion of key opportunities and threats about each vignette was written by the research team as a foot note of each vignette on the web to support future discussions.

Conclusion: It is feasible to develop and film 25 web vignettes about social media and information technology in pharmacy. The vignettes will be used as a support tool in the context of Pharm.D. and M.Sc. pharmacy curriculum.

PE42

Key Canadian federal legislatives changes in a pharmacy law course

Philippe Labrosse[1, 2], Céline Porteils[1], Jean-François Bussières[1, 2]
[1] Faculty of Pharmacy, University of Montreal, Montreal, Quebec, Canada
[2] Department of Pharmacy and Pharmaceutical Practice Research Unit, CHU Sainte-Justine, Montreal, Quebec, Canada

Objectives: To identify key Canadian federal legislative changes related to pharmacy practice in a law course.

Methods: Potential key changes were identified from three different sources: Statutes of Canada, Canada Gazette and "Législation/système de soins" reference book. A change is defined as key if it is a first enactment or a significant change within an active law/regulation. Seven variables were entered in a working table including current status, date of enactment/adoption, date of repeal, title, references, relevant comments. The frequency of the words entered in the comments' section was illustrated with WordClouds. A narrative analysis of the key changes was proposed.

Results: A total of 100 key Canadian federal legislative changes were identified from 1867 to November 2016. A total of 51 different texts were identified; 36 of them were laws, 12 were regulations and 3 were policies/guidelines. Six texts were repealed but their content was added to new legislative piece. It appeared that the Food and Drug regulation was the most quoted and modified text with a total of 15 key changes. The Marihuana for Medical Purposes Regulations and the Food and Drug Act were second and third in importance. A higher number of changes were observed in the most recent decades (e.g. 51 changes identified since 1990 versus 8 between 1867 and 1890). A total of 4889 terms was illustrated from the comments' section. These results will be published in a weekly legislation blog used for teaching pharmacy students and pharmacy residents in their respective curriculum.

Conclusion: This study describes a practical approach to identify 100 key Canadian federal legislative changes related to pharmacy practice. Pharmacy practice is highly regulated and there is a growing body of legislative texts that pharmacists must know and use in its practice. This approach helps identify efficiently these changes with an historical and contemporary perspective.

PE43

Finding legal decisions about pharmacy practice: an exploratory approach for pharmacy students and residents

Philippe Labrosse[1, 2], Céline Porteils[1], Jean-François Bussières[1, 2]
[1] Faculty of Pharmacy, University of Montreal, Montreal, Quebec, Canada
[2] Department of Pharmacy, CHU Sainte-Justine, Montreal, Quebec, Canada

Objectives: To identify and compare the content of legal databases for decisions regarding pharmacy practice.

Methods: This was a descriptive study. We searched the web to identify and compare current Canadian accessible legal databases. Six descriptive criteria were used: editor, date of creation, pricing structure for access, content, search engine, functionalities. An exploratory search of each database was performed by two pharmacy students. Systematic searches with pre-determined chain of characters were performed with ''pharmac*'', ''pharmacie'', ''pharmacien'', ''pharmaceutique'' and ''médicament''. Decisions from two Federal Courts (Supreme Court (SC), Federal Court (FC)) and three Provincial Courts (Quebec Superior Court QSC, Tribunal des Professions TP, Conseil de discipline de l'Ordre des Pharmaciens du Québec CD) were extracted. Numbers of retrieved decisions per chain of characters were summed to describe the relative prevalence of each term.

Results: Four databases were identified: Canlii (Lexum, 2000, free), Soquij (Justice Québec, 1976, $), Quicklaw (Reed Elsevier, 2002, $), LaRéférence (Y.Blais,$). All identified databases provided court decisions from SC, FC and QSC. Some databases provided additional court coverages (e.g. CD, TP). Canlli appears to offer the optimal coverage of court decisions at no charge. The following number of decisions were retrieved per database: pharmac* (Canlii, 9129; LaRéférence, 5214; Soquij, 6661; Quicklaw, 7037), pharmacien (Canlii, 3511; LaRéférence, 2421; Soquij, 3334; Quicklaw, 2452), pharmacie (Canlii, 2669; LaRéférence, 1500; Soquij, 2039; Quicklaw, 1713), pharmaceutique (Canlii, 2332; LaRéférence, 1311; Soquij, 1905; Quicklaw, 2327), médicament (Canlii, 17736; LaRéférence, 9175; Soquij, 10023; Quicklaw, 9020).

Conclusion: The results of study indicated that Canlli is our first choice a court decision database. The searched strategies used should be refined to increase the relevance of court decisions relevant to pharmacy practice. Pharmacy students and residents will be formally exposed to Canlii and search strategies in a Pharm.D. law course and a post-grad management course to increase their ability to retrieve relevant decision relative to their professional activity.

PE44

Level of agreement of undergraduate pharmacy students for statements related to ethical issues in pharmacy practice from 2012 to 2016

Céline Porteils[2], Nadia Akliouat[1, 2], Jean-François Bussières[1, 2]
[1] Faculty of Pharmacy, University of Montreal, Montreal, Quebec, Canada
[2] Department of Pharmacy, CHU Sainte-Justine, Montreal, Quebec, Canada

Objectives: To describe the level of agreement of undergraduate pharmacy students for statements related to ethical issues in pharmacy practice over a period of five years.

Methods: This is a cross-sectional study. An online survey was conducted during a third year pharmacy ethical lecture from 2012 to 2016. The main issue was the proportion of students in agreement with a given statement. A questionnaire of eight themes and 43 statements was developed and pre-tested including: training and studies (n=5), clinical research (7), marketing and advertising (5), evaluation and conclusive findings (5), delivery (4), pharmaceutical care (9), economic aspects (6) and deontology (2). A 4-item Likert scale was used to measure the level of agreement (totally agree, partially agree, partially disagree, totally disagree).

Results: A total (participation rate) of 165 (83%), 182 (92%), 125 (64%), 170 (87%) and 170 (88%) students responded respectively to the survey from 2012 to 2016. The average proportion of respondents that totally/partially agreed with all statements did not change over year with respectively 72.1±24.3, 71.9±25.0, 72.3±24.9, 72.0±23.8 and 74.1±22.1%. There were seventeen statements for which there were a more than 10% difference between the lowest and the highest level of agreement in five years. However, there were only four items for which such difference occurred between 2012 and 2016. While respondents believed ethics must be an integral part of pharmacy education, they were not so inclined to prohibit funding from the industry for training or recreational activities. A large majority of respondents believed the pharmaceutical industry should be obliged to support vulnerable populations and that only evidence-based products should be used. A minority of respondents supported online pharmacies.

Conclusion: The level of agreement of undergraduate pharmacy students for statements related to ethical issues in pharmacy practice did not change over a five year period.

PE45

Incorporating Assessment and Prescribing for Ambulatory Ailments Skills into Practice: An Environmental Scan of Continuing Education for Pharmacist Prescribing in Canada

Dana Habicht, BSc (Pharmacy) Candidate,[1] Sheila Ng, BSc (Pharmacy), PharmD Candidate,[1,2] Drena Dunford, BSc(Hons) BSc (Pharmacy), CDE, PharmD Candidate[1,2], Brenna Shearer, BMR (OT), MSA(HSA), PhD,[1, 3] I Fan Kuo, BSc (Pharmacy), ACPR, MSc, PharmD.[1]

1. College of Pharmacy, University of Manitoba, Winnipeg, MB
2. Pharm D Candidates at the University of Colorado
3. Pharmacists Manitoba, Winnipeg, MB

Objectives: Pharmacists in Canadian provinces are at different stages of applying prescribing legislation into practice. The purpose of this environmental scan was to examine differences in legislation, remuneration, professional uptake, continuing education requirements and continuing education resources relating to pharmacist prescribing for ambulatory ailments, with a focus on continuing education.

Methods: Data was collected between May and December 2016 using websites and communication with provincial professional regulatory bodies, advocacy bodies, drug coverage programs and other organizations which offer continuing education for pharmacists.

Results: Training requirements to prescribe for ambulatory ailments vary provincially including no training requirements, online tutorials and a comprehensive application process. Government- funded remuneration for prescribing services is absent in most provinces. Pharmacist uptake of the training required to obtain prescribing authority ranges from 30% to100% of pharmacists. Continuing education programs on the topic of prescribing across the country include online courses, in-person courses, webinars, panel discussions and preparation courses.

Conclusions: Many aspects of pharmacist prescribing for ambulatory ailments, including the style and content of continuing education resources, vary from province to province. Further research on this topic would help to determine the effect of these differences on the success of incorporating pharmacist prescribing into practice.

PP1

Early Childhood Antibiotics Exposure and the Risk of Autism Spectrum Disorders

Amani F. Hamad[1], I fan Kuo[1], Silvia Alessi-Severini[1], Salah Mahmud[1,2], Marni Brownell[2]. Winnipeg- Manitoba [1]College of Pharmacy, University of Manitoba, Winnipeg, MB, Canada, [2]Department of Community Health Sciences, University of Manitoba, Winnipeg, MB, Canada.

Background: Autism spectrum disorders (ASD) are a leading cause of disabilities in children and adults. Changes in microbiota composition induced by antibiotics use in early life can impair the gut-brain axis and thus, have been proposed as a possible etiology of ASD.

Objectives: We examined the association between antibiotic use during the first year of life and the risk of ASD.

Methods: A population-based cohort study was conducted using the Manitoba Population Research Data Repository. Children born in Manitoba between 1998 and 2015 were followed until migration, death, age 18, or end of study period. Antibiotics use to age 1 was identified using the Drug Program Information Network. Standard diagnostic algorithm was used to identify ASD diagnoses from hospital abstracts, medical claims and educational special needs database. Logistic regression was used to examine the association between antibiotic use and ASD diagnosis while adjusting for potential confounding by infections, maternal and child characteristics in addition to factors previously reported to have an association with ASD or with microbiota colonization.

Results: Compared to children who did not use antibiotics during infancy, those who received one antibiotic course or more did not have higher rates of ASD: Odd ratios (OR) 0.99 (95% CI 0.90-1.09). This estimate did not change appreciably after adjusting for confounding (0.89; 95% CI 0.80-1.00). Types of antibiotic and number of antibiotic courses also showed no statistically significant association with ASD diagnosis. Several covariates including sex, receipt of income assistance, region (rural versus urban), gestational age, mothers age at delivery, and maternal psychiatric disorders were found to be significant predictors of ASD.

Conclusion: Preliminary results suggest that antibiotics use during the first year of life is not associated with increased risk of ASD. Sensitivity analysis will be conducted to test the robustness of study estimates. Additional analysis using a sibling control group will be conducted to limit residual confounding.

PP2

Roles and impacts of pharmacists in chronic obstructive pulmonary disease: review of literature

Soraya Mamoun[1, 2], Éléonore Ferrand[1], Jean-François Bussières[1, 2].
[1] Faculty of Pharmacy, University of Montreal, Montreal, Quebec, Canada
[2] Department of Pharmacy and Pharmaceutical Practice Research Unit, CHU Sainte-Justine, Montreal, Quebec, Canada

Objective: In 2004, the World Health Organisation estimated that 64 million people were affected by chronic obstructive pulmonary disease (COPD) and predicted it would become the third leading cause of death worldwide by 2030. The objective of this study is to identify the roles and impacts of the pharmacists in COPD.

Methods: This is a literature review. A literature search was conducted using PubMed and the following terms: pharmacist OR clinical pharmacy OR pharmaceutical care AND pulmonary disease, chronic obstructive pulmonary disease, CPOD, lung diseases OR obstructive from January 2006 to August 2016 and manual search was also conducted. Selected articles were reviewed, analysed and entered in Impactpharmacie.org website according a standard operating procedure. Relevant key data were extracted for each article including the type and the description of pharmaceutical interventions and descriptive and outcomes indicators with their results. Only descriptive statistics were performed.

Results: A total of 25 articles were included. Described pharmaceutical interventions included patient follow-up (19), knowledge transfer (16), drug therapy assessment (13), patient-pharmacist relationship (12), preparation and management of medications (10), patient care needs assessment (8), interdisciplinary work (7), medication reconciliation (4) and competences maintenance (2). Pharmacist's activities were associated with an increase of adherence and a decrease of morbidity. Pharmacist interventions did lower patient's COPD exacerbations and improved patient's COPD quality of life. Pharmacists did improve the use of device inhaler. Impacts of pharmacists interventions were studied using a total of 138 indicators from which 73 (62%) had outcome measures. Of these 73 outcome indicators, 35 (48%) were positive, 37 (51%) neutral and 1 (1%) negative. Pharmacy students were exposed to the roles and the impacts of pharmacists' activity through the web platform Impact Pharmacie for COPD.

Conclusions: Pharmacists can have a positive impact in the management of chronic obstructive pulmonary disease with almost half of the indicators measured being positive.

PP3

Failure modes and effects analysis (FMEA) in pharmaceutical healthcare processes – A review

Demers E[1, 2], Collin-Lévesque L[1, 2], Boulé M[1, 2], Lachapelle S[1, 2], Nguyen C[1], Lebel D[1], Bussières JF[1, 2]
[1]Department of Pharmacy and Pharmaceutical Practice Research Unit, CHU Sainte-Justine, Montreal, Quebec, Canada
[2]Faculty of Pharmacy, University of Montreal, Montreal, Quebec, Canada

Objectives: To review published failure modes and effects analyses (FMEA) and healthcare FMEAs (HFMEA) of pharmaceutical healthcare processes. FMEA and HFMEA are proactive risk assessment tools whose ability to prioritize potential failures before they happen rely on systematic process mapping and criticality ratings.

Methods: This is a literature review. A PubMed search strategy encompassing FMEAs and HFMEAs in the field of pharmaceutical healthcare processes published from January 1990 to January 2017 was made. Studies focusing on industrial medication processes were excluded. Decisions on article inclusion were made according to title, then abstract, then full text relevance. Inclusion decisions were validated by two reviewers.

Results: A total of 171 citations were obtained through the PubMed search. After title screening, 82 abstracts were selected for further read. Of those, 56 articles were selected for full read and 37 articles were included. Two additional articles were included through a manual search. Of the 39 included articles, 32 were FMEAs and seven were HFMEAs. Countries with the highest number of studies published were the United States (11), Canada (five) and Spain (five). Settings most often studied were oncology (12) and pediatrics (12). Eight studies were made on a pre-post intervention basis. Failure modes consistently ranked as critical by work teams comprised insufficient training, wrong dose prescribed and wrong drug selected, amongst others. The mean number of different roles and professions in multidisciplinary teams was five, ranging from two to eight.

Conclusion: FMEA methodologies are highly inconsistent from one study to another, despite published guidelines by national organizations. FMEAs and HFMEAs have led to theoretical risk reductions in complex pharmaceutical healthcare processes and remain an important tool for patient safety.

PP4

Knowledge translation in pharmacy practice: an exploration of KT+ database

Apolline Adé[1], Denis Lebel[1], Maxime Thibault[1], Jean-François Bussières[1, 2]
[1]Department of Pharmacy and Pharmaceutical Practice Research Unit, CHU Sainte-Justine, Montreal, Quebec, Canada
[2]Faculty of Pharmacy, University of Montreal, Montreal, Quebec, Canada

Objectives: To review the published literature about knowledge translation (KT) studies in pharmacy practice.

Methods: This is a retrospective study and a literature review. A search strategy using the term "pharmacist" was conducted in KT+ database from McMaster University Health Information Research Unit from January 2010 until December 2016. Articles describing pharmaceutical interventions with the perspective of knowledge translation were included. For each article, we extracted design, location of pharmacy practice, objectives, interventions, participants, targeted disease, main outcomes, main results and comments.

Results: A total of 114 articles were identified and included. Published articles involved systematic reviews (22%), randomised controlled trials (39%), pre-post intervention studies (9%), prospective studies (11%) and retrospective studies (18%). 69% of the original studies were included at least in one systematic review. In original studies, pharmaceutical interventions occurred in healthcare facilities, including nursing homes and community clinics, (74%) and in retail pharmacies (26%). Knowledge producers/brokers were pharmacists (94%) or other healthcare workers (HCW) (6%). Knowledge users were patients (74%) or HCW (26%). The majority of interventions targeted diabetes mellitus (19%) and hypertension (15%). Main outcomes included clinical issues (60%), prescription (29%) and resources utilisation (28%). 74% of studies reported positive effects on main outcomes. All pharmacists 'interventions were multiple. They were classified according nine criteria from the Impact Pharmacie database: trust relationship (76%), medication reconciliation (8%), assessment of patient or HCW needs (76%), review appropriateness of medications (70%), drug management and preparation (4%), patient counseling (65%), interdisciplinary (96%), knowledge transfer (96%), remained skilled (18%). A typical intervention involved the pharmacist who created a trust relationship with the patient, optimized medication therapy, assessed patient's needs and organized patient follow-up in collaboration with other HCW.

Conclusion: This study explored knowledge translation interventions in pharmacy practice. KT encompasses all aspects of pharmacy practice. Pharmacists should be aware that they are KT actors in their daily practice.

PP5

Using Oculometry as a Data Capture Tool for a Simulated Drug Order Validation by Pharmacists

Sophie Dubois[1], Maxime Thibault[1], Denis Lebel[1], Marie-Kim Héraut[1], Minh-Thu Duong[1], Clara Elchebly, Wen Ting Yu[1], Arielle Lévy[2], Jean-François Bussières[1, 3]
[1]Department of Pharmacy and Pharmaceutical Practice Research Unit, CHU Sainte-Justine, Montreal, Quebec, Canada
[2]Department of pediatrics, CHU Sainte-Justine, Montreal, Quebec, Canada
[3]Faculty of Pharmacy, University of Montreal, Montreal, Quebec, Canada

Objectives: To evaluate the feasibility of using oculometry as a data capture tool during simulated drug order validations by pharmacists. Oculometry is a biometric measurement of the condition and movements of the eye which may contribute to monitoring visual search behaviors.

Methods: This is a descriptive pilot study. A web search of available oculometry technologies was performed to identify a potential solution. A commercially available oculometer solution was selected and we ran a pre-test using a power-point presentation to confirm its precision. A realistic scenario of drug orders was developed following consensus of experts by the research team. Simulations were conducted on a single day in the simulation center of a large tertiary care mother-child facility.

Results: 80 hours were required to develop the protocol and the scenarios. 16 orders were simulated in three anonymized patient records as a basis for drug order validation by pharmacists. The oculometer was run without interruption during each simulation. Direct observation was also conducted by two research assistants to identify potential difficulties and corrective actions. A debriefing session was conducted with pharmacist participants for each simulation to identify all relevant issues. The oculometer enabled identification of eye movements of pharmacist participants and enabled observers to assess the conformity of drug order validation processes (e.g. is the pharmacist omitting key fields). Data were extracted and could be processed to identify time spent per data field used for drug order in pharmacy information system.

Conclusion: It is feasible to use an oculometer during simulated drug order validations by pharmacists as a measuring tool for eye behavior. Further studies are required to explore the potential use of this technology at a larger scale for pharmacist training in drug order validation. Implementing this technology in actual settings may contribute quality assurance and potentially impact patient safety and outcome.

PP6

Canadian Pharmacogenomics Network for Drug Safety (CPNDS): 10 years of collaboration from CHU Sainte-Justine (CHUSJ)

Marine Aussedat[1], Jennifer Jean-Louis[1], Denis Lebel[1], Jean-François Bussières[1, 2], CPNDS Consortium
[1] CHU Sainte-Justine, Département de pharmacie et URPP, Montréal, Qc, Canada
[2] Université de Montréal, Faculté de pharmacie, Montréal, Qc, Canada

Objectives: To describe the long-term contribution of a mother-child teaching hospital in the Canadian Pharmacogenomics Network for Drug Safety (CPNDS).

Methods: Retrospective descriptive study. A profile of pharmacovigilance support services, patient recruitment and research perspectives is proposed.

Results: The CPNDS is a multi-disciplinary team consisting of clinicians, researchers, core support staff and trainees including 13 adult and 13 pediatric Canadian hospitals. As of December 31st 2016, 8066 children were enrolled across Canada (443 in CHUSJ - 6%). A total of 9313 adverse drug reactions (1215 in CHUSJ – 13%) were reported and these events were associated with 12136 medication orders (1653 in CHUSJ – 14%) across the country. Children were on average 9.8 year old in CHUSJ. The top three most frequent events were ototoxicity (4% across Canada - 19% in CHUSJ), neurotoxicity (9% across Canada - 15% in CHUSJ) and cardiotoxicity (6% across Canada - 11% in CHUSJ). Over the past five years, the CPNDS consortium published a total of 72 articles which 69 indexed in Pubmed. Anthracyclines cardiotoxicity and cisplatin ototoxicity were identified as research targets. The participation to the CPNDS consortium led to the implementation of a sustained pharmacovigilance support service with the participation of six pharmacovigilance coordinators since 2006. The support service guides pharmacists, physicians, and nurses to offer better patient care. The CHUSJ-CPNDS collaboration could eventually contribute to a local genetic testing program for targeted populations.

Conclusion: The CPNDS network is an important player in the Canadian healthcare network and supports the development of personalized medicine. The CHUSJ is also an active player in this network with a contribution of 6% of patients recruited and 13% of adverse drug reactions reported since 2006.

PP7

Pharmacist-led interventions for the management of medication misuse and abuse: a systematic review

Lindsay Baum, Grace Badejo, Kevin Chaboyer, Christine Leong
College of Pharmacy, Rady Faculty of Health Sciences, University of Manitoba, Winnipeg, Manitoba

Background: Medication misuse and abuse (MM/A) is a prevalent problem in the community setting and a formidable obstacle in providing safe, effective drug therapy.

Study Objective: To review studies that examine interventions executed by community pharmacists for identifying and intervening on patients at risk of medication misuse/abuse (MM/A), and to bring to light some of the common themes currently observed in MM/A management.

Statement of Methods: A systematic review of original English-language studies was conducted in PUBMED, MEDLINE, EMBASE, PsychINFO, and International Pharmaceutical Abstracts from inception to July 2016 to examine existing literature on pharmacist-led measures for management of prescription and over-the-counter (OTC) MM/A.

Summary of Results: Of 308 studies identified, only one met inclusion criteria. This study included patients from six community pharmacies in Northern Ireland with intent to purchase opioid, antihistamine, or laxative-containing OTC products. The study examined a pharmacist-led harm-minimization model with three core elements: (1) *Client identification/recruitment* by documenting excessive OTC requests; (2) *Treatment/referrals* to the general practitioner or community addiction team; and (3) *Follow-up*. Of the 196 patients identified, only 70 were approached. Of those approached, only 14 were deemed to have had a successful intervention, where the patient agreed to discontinue or use a safer alternative. No patients were willing to participate in follow-up, and therefore patient-specific outcomes could not be evaluated.

Statement of Conclusions: Pharmacists can play an integral role in preventing and identifying MM/A; however, current outcomes research on effective and feasible methods is lacking. In order to effectively reduce the incidence of MM/A, more research into effects measures must be conducted, and pharmacists must be trained and willing to participate in effective methods of MM/A intervention and prevention.

Previous Presentations of the Work: A previous version of this study was presented as a research poster at the *Canadian Society for Pharmaceutical Science* Conference. May 27-29, 2015. Toronto, ON, Canada (CSPS_110). The study has since been updated.

PP8

Healthcare practitioner prescribing: a scoping review about the confidence and competence of pharmacists and physicians

Cassandra R Woit, B.Sc. Pharm, Theresa L Charrois, B.Sc. Pharm, ACPR, M.Sc.
Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta, Edmonton, Alberta, Canada

Study objectives: Prescribing is an expected activity for physicians, however it is a relatively new role for pharmacists. The scope of pharmacists in Canada is rapidly expanding to include both supplemental and independent prescribing. Supplemental prescribing is in partnership with physicians and independent prescribing, specifically in Alberta for pharmacists with Additional Prescribing Authorization, includes initial access prescribing and managing ongoing therapy. Both forms of prescribing have been used in many countries including the United States of America, the United Kingdom and Australia. While there are studies investigating the confidence and/or competence of medical students and physicians, there are few investigating the same for pharmacy students or pharmacist prescribers. It is even less well known how the two professions compare in prescribing.

Methods: Sources: Medline from inception to January 2017; reference lists of included studies will also be reviewed. Inclusion criteria: Studies describing either the confidence and/or competence of pharmacist and physician prescribing, including students and recent graduates. Studies describing the views of pharmacists or physicians on prescribing were also included. Two reviewers independently screened titles and abstracts. Two independent reviewers also did full review of potential papers. Included studies were reviewed qualitatively for themes.

Results: Out of 1611 unique records, 132 articles were reviewed in full for eligibility. Initial review of data shows the majority of research has been done with the medical profession. In addition, confidence and competence are not always well linked; i.e. high confidence can occur with low competence. The pharmacy-related research shows that confidence is generally low.

Conclusions: Preliminary data shows a majority of articles focusing on physician prescribing, often including prescribing errors. This emphasizes the gap in literature surrounding pharmacist prescribing, and the need to evaluate the confidence and competence of new prescribers.

PP9

Descriptive outcomes of response to antiresorptive agents using bone biomarkers in a Fracture Liaison Service

Andréa Senay[1], PhD student; Sylvie Perreault[1], BPharm, PhD; Josée Delisle[2], BScN, MSc; Clara Scattolin[1], BA student; Andreea Banica[2], BScN; Yves Troyanov[2], MD; Pierre Beaumont[2], MD; Mario Giroux[3], MD; Alain Jodoin[2], MD; GYves Laflamme[2], MD; Stéphane Leduc[2], MD; Jean-Marc MacThiong[2], MD; Michel Malo[2], MD; Gilles Maurais[2], MD; Hai Nguyen[3], MD; Stefan Parent[2], MD; Pierre Ranger[2], MD; Dominique Rouleau[2], MD; Julio C Fernandes[2], MD, PhD

[1]Faculté de pharmacie, Université de Montréal, Montreal, Canada
[2]Hôpital du Sacré-Coeur de Montréal, Montreal, Canada
[3]Hôpital Jean-Talon, Montreal, Canada

Objective: We aimed to describe treatment response to antiresorptive agents using two bone biomarkers in a Fracture Liaison Service (FLS) after 24 months of follow-up.

Methods: In June 2010, a FLS was implemented in two hospitals in Montreal (Canada) as a cohort study. Recruitment ended in June 2013 and 543 fragility fracture patients (women and men, 40 years and older) were followed over 24 months. Serum osteocalcin bone formation marker, C-telopeptide of type I collagen (CTX-1) resorption marker, and 25hydroxyvitamin D (25OHD) levels were measured. Least significant change (LSC) was defined as 40% and 35-55% decrease for osteocalcin and CTX-1, respectively. We aimed for 25OHD levels $\geq$80nmol/L. Wilcoxon tests and McNemar X^2 test for paired outcomes were used to compare baseline and 24-month results.

Results: Of the 535 seen at baseline, (85.6% female, mean(±SD) age 63.4±11.2 years) 35.9% had a prior fracture, 36.5% had osteoporosis and 52.5% had osteopenia. From baseline to 24 months, osteocalcin levels had a 27.8% decrease (median(IQR) T0=18.0(10.0), 24mo=13.0(9.0)ng/ml, $p<0.01$). CTX-1 levels had a 48% decrease (median (IQR) T0=0.327(0.254), 24mo=0.170(0.179)ng/ml, $p<0.01$). The proportion of patients with 25OHD levels $\geq$80nmol/L changed from 52.5% to 84.9% (median(IQR) at T0=84.0(32.2), 24mo=103.0(40.0)nmol/L, $p<0.01$).

Conclusion: The decrease of both bone markers and increase of serum vitamin D suggested appropriate treatment response from treated subjects. Only CTX reached the LSC. Multilevel models will be applied to the longitudinal data in order to obtain a robust assessment of the FLS's impact on patients.

PP10

Quality of life and disability of fractured patients in a Fracture Liaison Service; descriptive outcomes of a cohort study

Andréa Senay[1], PhD student; Sylvie Perreault[1], BPharm, PhD; Josée Delisle[2], BScN, MSc; Clara Scattolin[1], BA student; Andreea Banica[2], BScN; Jean-Pierre Raynauld[3], MD; Yves Troyanov[2], MD; Pierre Beaumont[2], MD; Mario Giroux[4], MD; Alain Jodoin[2], MD; GYves Laflamme[2], MD; Stéphane Leduc[2], MD; Jean-Marc MacThiong[2], MD; Michel Malo[2], MD; Gilles Maurais[2], MD; Hai Nguyen[4], MD; Stefan Parent[2], MD; Pierre Ranger[2], MD; Dominique Rouleau[2], MD; Julio C Fernandes[2], MD, PhD

[1]Faculté de pharmacie, Université de Montréal, Montreal, Canada
[2]Hôpital du Sacré-Coeur de Montréal, Montreal, Canada
[3]Institut de Rhumatologie de Montréal, Montreal, Canada
[4]Hôpital Jean-Talon, Montreal, Canada

Objectives: We aimed to describe disability of fractured limb, quality of life (QoL) and pain outcomes at baseline and two years in a Fracture Liaison Service (FLS).

Methods: A FLS was implemented in two hospitals in Montreal, Canada in 2010. Women and men of $\geq$40 years with a fragility fracture were enrolled and followed over 24 months (n=543). LEM (lower extremity), DASH (higher extremity) and Oswestry (lower back) forms were used to assess disability, and QoL was assessed using the SF-12 (score 0-100). An increase of SF-12 and LEM scores, and a decrease of DASH and Oswestry scores corresponded to improvement. VAS was used to assess the level of pain (0-10). T tests/Wilcoxon tests and McNemar X^2 test for paired outcomes were used to compare results from baseline and 2 years.

Results: Baseline assessment was achieved for 535 subjects (85.6% female). Mean age was 63.4±11.2 years, 35.9% had a prior fracture, >85% had bone fragility. Between T0 and 24 months, DASH changed from 68.2(35.2) to 34.1(31.8), Oswestry decreased from 44.0(38.0) to 24.6(18.1), and LEM increased from 60.2(45.4) to 86.6(26.5) ($p<0.05$). The SF-12 mental score went from 48.6(17.4) to 50.9(12.7), and physical score changed from 37.9(13.4) to 44.6(16.2) ($p<0,05$). The proportion of patients achieving a VAS score <4 increased by 19.4% ($p<0.01$).

Conclusion: Functional capacity of fractured limbs, QoL and pain of patients improved in the FLS in time. Exhaustive analyses (multilevel models) are ongoing to validate these observations.

PP11

Development of a graphical tool to measure medication adherence in asthma patients: a pilot study

Alia Yousif [1], MSc; Catherine Lemière[1, 2], MD, MSc; Amélie Forget[1, 3], MSc; Lucie Blais[1, 3], PhD

1. *Faculty of Pharmacy, Université de Montréal, Montréal, QC*
2. *Department of Medicine, Université de Montreal, Montreal, QC*
3. *Hôpital du Sacré-Cœur de Montréal, Montréal, QC*

Background: In the clinical setting, the use of prescription refills may constitute a non-invasive and objective measure of medication adherence, while aiding in treatment decisions.

Objectives: 1) To develop Med-Resp, a graphical tool based on prescription refills to measure adherence and use of asthma medications; 2) To test the feasibility of implementing Med-Resp in the clinical practice.

Methods: A sequential exploratory design with a user-centred approach was used: 1) *Prototype design* in collaboration with respirologists and patients via focus groups; 2) *Med-Resp creation* based on algorithms developed and applied to prescription refills data recorded in the drug claims database reMed; 3) *Implementation* of Med-RESP in an outpatient asthma clinic; and 4) *Feasibility assessment* in which user experiences were captured with questionnaires.

Results: A total of 26 patients and 6 respirologists participated in this pilot study, of whom 6 patients and 6 respirologists also took part in the focus group discussions. In the focus groups, patients were open to the idea of their physicians having access to data on their medication use. Respirologists also agreed that Med-Resp should contain the following information: asthma controller medications dispensed at community pharmacies; inhaled corticosteroids daily dose; and number of oral corticosteroids prescriptions purchased in the last 12 months. In the feasibility assessment, nearly all respirologists (83.3%) consulted Med-Resp during medical visits. For the majority of patients (70%), the treating respirologist shared the information presented in Med-Resp. The majority of participants believed that Med-Resp can help enhance physician-patient communication.

Conclusion: Med-Resp has the potential to become a large scale implementable tool in the coming years, if integrated in electronic medical records. This study highlights the importance of providing health care professionals with objective and easily interpretable measures of medication adherence for use in routine clinical practice.

PP12

The Effect of Health Media Reporting on Self-Medication Use

I fan Kuo[1], Jennifer Wiebe[2], Amanda Church[1], Brenna Shearer[1], Christopher Louizos[1]

[1] College of Pharmacy, Rady Faculty of Healthy Sciences, University of Manitoba
[2] Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta

Objective: The news media serves the crucial role of conveying complex scientific findings and health issues to the general public. However, health news coverage has suffered criticisms of misinforming society through inaccurate and unbalanced reporting, potentially leading to poor health decisions and detrimental outcomes. The main objectives of this study are 1) to describe the public's perception of health-related content in the news media and their dependence on the media in decision-making surrounding self-medication use, and 2) to examine potential factors, both individual and media-related that influence self-medication behaviour.

Method: Twenty-Nine adult volunteers participated in five focus group interviews that were conducted at the College of Pharmacy, University of Manitoba in Winnipeg. Each 90 min interviews was moderated by the study coordinator, audio-recorded and transcribed. Two study team members independently analyzed the transcripts.

Results: The general public expressed varying degree of uncertainty towards the reliability of health reporting in news media. Most felt overwhelmed and frustrated by the excess of sources in information, and the often mixed and transient messages in health news reports. Trusting relationship with a pharmacist or physician was identified as the most important factor in self-medication decision, but not all individuals had the access to health care providers due to a variety of reasons. Other influences on over-the-counter products use include education background, previous experience, upbringing, credentials of the sources, and the individual's social circle.

Conclusion: Decision-making surrounding the use of over-the-counter products is a complex process, which is often implicitly influenced by health news reporting in the media. Trusting interaction with health care providers, especially pharmacists is an important component in choosing non-prescription product use, but one that is not always readily accessible. Pharmacists are yet to maximize the opportunity in filling this health care gap.

PP13

Use of smoking cessation products: a survey of clients of community pharmacies in Winnipeg
Smoking Cessation products in Winnipeg

Alan Phung, Lauren Luo, Noor Breik and Silvia Alessi-Severini
College of Pharmacy, Rady Faculty of Healtth Sciences, University of Manitoba, Winnipeg, Manitoba R3E 0T5

OBJECTIVES: At 17.3%, smoking rates in Manitoba continue to exceed the national average. In this province, a total healthcare spending over $200 million per year has been attributed to smoking. This study examined the use of smoking cessation agents, including nicotine replacement products and prescription medications, in a sample of smokers in the city of Winnipeg.

METHODS: A simple multiple-choice questionnaire was administered to willing clients of two community pharmacies in Winnipeg (Manitoba). Data on demographics, smoking habits, previous attempts of smoking cessation, previous and current use of OTC and prescription smoking cessation products were collected anonymously.

RESULTS: Of the 2,237 individuals who were approached, 586 were smokers (26.2%) and 180 responded to the survey (30.7%): 48.9% were female. A majority of smokers (32.8%) reported smoking 16-25 cigarettes per day. Over 90% had smoked for more than 5 years; 27.2% had over 5 previous quit attempts; 82.1 % used smoking cessation products with the intention to quit. Self-motivation (44.4%) and family/friend advice (28.3%) were major reasons for quitting. Impact of health care practitioners' advice was low (6.4%). Over 80% of respondents reported that they had no means of insurance coverage for their smoking cessation products. Despite having the highest rate of use, nicotine gum (33.3%) and patches (24.4%), were both reported to have lower rates of perceived efficacy. Electronic cigarette (97.9%) and varenicline (70.6%) had the highest rates of reported effectiveness.

CONCLUSION: Smokers wanting to quit undergo many attempts. Pharmacists should assume a key role in reaching out to smokers.

PP14

Readability and Suitability of COPD Inhaler Leaflets

Kathryn Fullman[1], Dave Blackburn[1], Mark Fenton[2], Holly Mansell[1]

[1]College of Pharmacy and Nutrition, University of Saskatchewan
[2]Division of Respirology Critical Care and Sleep Medicine, Department of Medicine, University of Saskatchewan

Background: Information leaflets are considered an important facet of patient education for all types of prescription medications and can positively or negatively impact adherence, depending on their content. Guidelines have been suggested on how to write patient friendly information appropriate for the general public. Nevertheless, the readability of patient leaflets often exceeds the recommended grade level, and has been criticized for the potential to increase patient fears over drug safety.

Objective: The purpose of this study was to conduct an appraisal of the quality of information provided in the product monographs of COPD inhalers available in Canada.

Methods: COPD inhalers were identified from the Health Canada Drug Product Database. Medication information and instructions for inhaler use were analyzed for readability by seven formulas (the Flesch Reading Ease formula, the Flesch-Kincaid Grade Level readability formula, the Gunning Fog Index, the SMOG Index , the Automated Readability Index, the Coleman-Liau Index, and the Linsear Write Formula), with an acceptability threshold of grade 6-8. Three researchers rated suitability using a modified Suitability Assessment of Materials (SAM) tool, and assessed leaflets for explicit warnings.

Results: Twenty-seven inhalers with a COPD indication were evaluated. Medication information sections were rated as 'difficult to read' or 'hard', and 85% (22/27) had a reading level above grade 8. The instructions for inhaler use were rated as 'easy' or 'fairly easy' to read and 63% (17/27) met the threshold by all formulas, and all leaflets achieved superior suitability ratings. None of the monographs contained a section dedicated to the benefits of the medication but all contained extreme warnings included risk of premature death (n=12), risks of serious injury (n=27), serious interactions (n=27), and statements that convey a serious consequence to therapy (n=27).

Conclusion: Consumer information intended to educate patients on medications for COPD provide adequate instructions for use; however, the main messages contained in the documents were negative, severe, and sometimes inappropriate. Previous calls to improve the design of educational materials have not been acted upon.

PP15

TITLE: PharmaZzz: feasibility and impact of pharmacist-delivered cognitive behavioural therapy for chronic insomnia (CBTi)

A. J. (Fred) Remillard[1], Karen Jensen[1], Loren Regier[3], Janelle Trifa[1], Lindsay Edgington[1]
[1]College of Pharmacy and Nutrition, University of Saskatchewan; [2]RxFiles Academic Detailing Program, Saskatoon SK

OBJECTIVES: CBTi is first line treatment for insomnia but is widely underutilized due to lack of education, awareness and especially trained providers. Recent research reports CBTi can be effectively provided by non-sleep experts with relevant training. The objectives of this study were to investigate the feasibility of pharmacists delivering CBTi and the impact of this service on patients' sleep patterns and use of hypnotics.

METHODS: This observational cohort study was conducted in two phases. In Phase 1, a pharmacist training manual and accompanying patient workbook were developed by our student researcher, reviewed and revised by selected community pharmacists and the project steering committee. (AFPC 2015 conference abstract) In Phase 2, interested community and primary healthcare pharmacists were recruited to attend a one day workshop to train for CBTi, then asked to recruit and provide CBTi to five patients with chronic insomnia between August 1st, 2015 and July 31st, 2016. Pharmacists collected and recorded de-identified patient participant data on the PharmaZzz webpage.

RESULTS: The workshop was attended by 13 community and 3 primary healthcare pharmacists; of these 6 (38%) were able to recruit patients during the 1 year study period. A total of 27 patients were recruited (34% of the target number) and 11 (41%) attended all 6 CBTi sessions. After completing the program, 8 patients (73%) demonstrated improved sleep behaviours and 9 (82%) reported an average sleep efficiency of ≥ 89%. Of the 7 patients taking hypnotics initially, 5 were able to decrease use including 2 who were able to stop completely.

CONCLUSION: Pharmacists, with focused training, are able to effectively deliver CBTi in both community and primary healthcare settings. Potential barriers are time constraints, lack of reimbursement and difficulty recruiting and retaining patients. Next steps include offering more workshops to practicing pharmacists and potentially incorporating CBTI into the new PharmD program skills lab.

PP16

Increase in adverse events following three generic antihypertensive drugs commercialization: a population-based perspective

Jacinthe Leclerc[1, 2,3], Claudia Blais[1, 2], Louis Rochette[1], Denis Hamel[1], Line Guénette[2, 4] and Paul Poirier[2, 5]

1. Institut National de Santé Publique du Québec
2. Faculty of pharmacy, Université Laval
3. Université du Québec à Trois-Rivières, Nursing department
4. CHU de Québec Research Center, Axe Santé des populations et pratiques optimales en santé
5. Research Center, Institut universitaire de cardiologie et de pneumologie de Québec

Objectives: Generic drugs are licensed through comparative bioavailability studies. A variation up to 20% is generally accepted compared to the brand-name drug (bioequivalence). No systematic post-commercialization surveillance studies are conducted once generic drugs are available. This study assessed the impact of generic losartan, valsartan and candesartan (angiotensin II receptor blockers (ARBs)) commercialization on rates of adverse events (AE: hospitalizations and emergency room [ER] consultations) in Quebec's population.

Description of the project: These 3-year interrupted time series analyses used data from the Quebec Integrated Chronic Disease Surveillance System. All users of selected ARBs, either brand-names or generics, aged ≥ 66 years were included. Monthly rates of AE 24-months before and 12 months after generics commercialization were compared by segmented regression models, including a specific variable for generic or brand-name exposition, a contrast test and a stratification for patients at high or low cardiovascular risk.

Results: During the 3-year time series (28,539 to 59,500 citizens per analysis), there was an approximated monthly mean rate of 100 AE for 1000 person-months at risk. Generic vs. brand-name losartan, valsartan and candesartan users showed an immediate difference of 8% vs. 0% ($p=0.06$), 12% vs. -5% ($p<0.0001$) and 14% vs. -3% ($p<0.0001$) in rates of AE the month of generics commercialization. There was a difference up to 1 year for generic vs. brand-name losartan users (0% vs. -2%, $p=0.003$). Stratification for high and low cardiovascular risk yielded similar results.

Relevance to pharmacy research: Generics commercialization was significantly associated with immediate or delayed increases in AE for three ARBs. Differences in bioavailability between generic and brand-name drugs could explain these results, suggesting the need to further investigate generic drugs licensing processes.

Summary of the session: This research program assessed the impact of generic losartan, valsartan and candesartan commercialization and substitution on the rates of hospitalizations and emergency room consultations in Quebec's population at risk. Time series analysis revealed a clinically and statistically significant increase of 8% to 14% of adverse events for first users of generic versions. The effect is similar for high and low cardiovascular risk patients. This could be explained by differences in bioavailability and health cares between generic and brand-name users, suggesting the need for stricter generic drugs licensing processes and enforced clinical surveillance of between-brand substitution at pharmacy level.

Author Disclosure Statement: Jacinthe Leclerc received a studentship from a pharmaceutical company, AbbVie in 2015-2016. Jacinthe Leclerc was an employee of Novartis Pharmaceuticals Canada Inc. at the beginning of this project and until June 2015. AbbVie and Novartis Pharmaceuticals Canada had no regard/power in decisions made through this project. Paul Poirier has received honorary for continuing medical education/consultants/experts event from Abbott Vascular, Amgen, AstraZeneca, Boehringer Ingelheim, Bristol-Myers Squibb, Eli Lilly, Janssen, Merck, Novartis, NovoNordisk, Pfizer, Roche, Sanofi-Aventis, Servier, and Valeant.

PP17

Learning from our mistakes: Perceptions and implementation of continuous quality improvement in Ontario community pharmacies

Certina Ho[1], Janice Law[1], Mi Qi Liu[2]
[1]Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto, Ontario
[2]School of Pharmacy, University of Waterloo, Waterloo, Ontario

Objectives: Despite the potential and significant benefits to overall patient care associated with continuous quality improvement (CQI) programs, the only Canadian province that has successfully implemented a standardized community pharmacy CQI program is Nova Scotia. The objective of this study was to explore the current perceptions and implementation of CQI programs in Ontario community pharmacies.

Methods: We administered a 28-item online questionnaire to community pharmacists and pharmacy technicians in Ontario who have provided consent to the Ontario College of Pharmacists to be contacted for research purposes during their annual registration. We conducted descriptive statistics and qualitative thematic analysis, accordingly, on the responses collected.

Results: We collected 299 responses. Pharmacy professionals had an overall fairly positive perceptions of CQI programs and the associated benefits to patient care and safety. However, the concern of blame and shame associated with medication incident reporting and discussion was still dominant. With respect to CQI program implementation, time was considered to be the greatest challenge. Respondents shared a wide range of experiences regarding CQI implementation, time taken for CQI program adoption, and the specific CQI elements that were being executed at their pharmacy practice sites.

Conclusions: The great variations in the responses imply that individual pharmacy is currently at different stages with respect to CQI implementation and there is a lack of a standardized, formal CQI process in place. Although the benefits of CQI programs are resonated with the pharmacy professionals, the current landscape is a reminder that there is still a long way to go for implementing a standardized CQI program across the province, which would ultimately contribute to the delivery of safe and quality patient care.

PP18

Is YouTube Useful as a Source of Health Information for Type 2 Diabetes?

Amanda Leong[1], Ravina Sanghera[1], Bikram Jammu[1], Mark Makowsky[1]
[1]Faculty of Pharmacy & Pharmaceutical Sciences, University of Alberta, Edmonton, AB

Background: Members of the South Asian community are at higher risk of developing type 2 diabetes compared to the general population. YouTube is a commonly used and easily accessible resource for video based health information and could be used as a resource to improve diabetes prevention and self-management.

Objective: To rate the quality of available patient-targeted diabetes information available on YouTube.

Methods: Five distinct YouTube searches were used to identify videos containing information on epidemiology, risk factors, symptoms, diagnosis, treatment, and other information regarding type 2 diabetes. "Diabetes", "Diabetes type 2" "Diabetes South Asians", "Diabetes Punjabi" and "Diabetes Hindi." Two health care providers independently classified the first 20 videos in each as useful, misleading, or patient experiences, rated them on a 5-point Global Quality Scale (GQS: 1 point poor quality, 5 = excellent quality) and categorized their content. Useful videos were rated for reliability according to a modified DISCERN score (higher scores represent higher quality videos).

Results: To date, 88 out of 100 videos have been evaluated and 59 met the inclusion criteria. Thirty-eight of the included videos (64.4%) were rated as useful (mean GQS: 3.16 ± 0.823), 20 (33.9%) were deemed misleading (mean GQS: 1.35 ± 0.587) and 1 (1.7%) as patient experiences (GQS: 1.0). The mean DISCERN reliability score for useful videos was 2.50 ± 0.984 out of five, and only 4 videos scored "Yes" to at least 4 out of 5 criteria. Misleading videos promoted non-evidence based diets, home remedies, Ayurvedic treatments, or promoted natural products/diets as "cures" for diabetes. A similar proportion of videos were rated misleading (8/24; 33%) for non-South Asian targeted search vs. (12/35; 34%) for South Asian targeted search.

Conclusion: Our review will be the first to evaluate the quality of diabetes related health information on YouTube. Our analysis suggests large variability in quality and patients require adequate e-Health literacy to distinguish high from low quality videos. Further creation of culturally tailored video resources is required for members of the South Asian community.

PS1

Evaluation of Oxicam Derivatives as Amyloid Aggregation Inhibitors

Selina A. Manji and Praveen P. N. Rao
School of Pharmacy, Health Sciences Campus, University of Waterloo, Ontario, N2L 3G1, Canada

Introduction: Alzheimer's disease (AD) is a neurodegenerative disorder that is becoming increasingly prevalent in Canada and other parts of the world. Amyloid β (Aβ) proteins form neurotoxic aggregates which end up as senile plaques, a classic hallmark of AD. The Aβ mediated toxicity leads to brain cell degeneration and atrophy, ultimately affecting cognitive or functional abilities, emotion, mood, behaviour and physical abilities. Treatment of AD is currently limited to cholinesterase inhibitors and NMDA receptor antagonists. Recent studies have indicated that inflammation in the neuronal cells can accelerate neurodegeneration and can contribute to AD progression. This project investigates the role of oxicam class of non-steroidal anti-inflammatory drugs (NSAIDs) as potential anti-AD agents.

Objectives: (i) To evaluate the anti-aggregation properties of meloxicam, piroxicam, sudoxicam and tenoxicam against Aβ40 aggregation; (ii) Carry out computational studies on the interactions of oxicams with Aβ40 aggregates.

Methods: The anti-aggregation properties of oxicam based NSAIDs toward Aβ40 aggregation was evaluated in vitro by fluorescence spectroscopy using thioflavin T (ThT) as a fluorescent dye. The Discovery Studio (DS) software, *Structure-Based-Design* program (4.0), BIOVIA Inc. was used to determine the key binding interactions of oxicam-based derivatives with anti-aggregation activity.

Results: Our results indicate that meloxicam, piroxicam, sudoxicam, and tenoxicam have the ability to prevent Aβ aggregation. They exhibit various degrees of Aβ40 inhibition, ranging from 17-53% inhibition. Initial screening showed that oxicam derivatives did not exhibit inhibition at lower concentrations of 1-10 µM. However, when tested at higher concentrations (25, 50, 75 and 100 µM), they were able to prevent Aβ aggregation. Compared to the reference agent orange G, the oxicam derivatives were less effective as anti-Aβ aggregation inhibitors.

Conclusion: This study shows that oxicam derivatives exhibit anti-Aβ activity, suggesting their potential benefits in treating AD patients. Among them, piroxicam at 50 µM exhibits superior inhibition of Aβ aggregation. In summary, bicyclic hydroxybenzothiadiazine-carboxamide scaffold present in oxicams can be further optimized in the design and development of potential anti-AD treatments.

PS2

Age-related BBB pathology does not impair TfR-mediated targeting of brain microvessel endothelial cells in the 3xTg-AD mouse

Philippe Bourassa[1, 2], Wael Alata[1, 2], Sarah Paris-Robidas[1, 2], Marie-Thérèse Traversy[1, 2], Cyntia Tremblay[1, 2], Vincent Émond[1, 2] and Frédéric Calon[1, 2]
1. Faculté de pharmacie, Université Laval; 2. Centre de recherche du CHUL, Québec, Québec, Canada

Objectives: The transferrin receptor (TfR) is highly expressed by brain capillary endothelial cells (BCEC) forming the blood-brain barrier (BBB) and is thereby considered as a potential target for brain drug delivery. We and others have previously shown that antibodies binding the TfR, such as clone Ri7, are internalized into BCEC in vivo. However, BBB dysfunction is suspected to occur in Alzheimer's disease (AD) raising concerns about whether TfR-mediated transport is inefficient in this disease. In this study, we characterized BBB pathology and investigated whether TfR-mediated endocytosis into BCEC is altered in the 3xTg-AD mouse model.

Methods: Characterization of AD-relevant BBB pathology was performed by western blot on isolated brain capillaries from 12 and 18-month 3xTg-AD or non-transgenic mice. Analysis of TfR-mediated endocytosis of Ri7 was performed using in situ brain perfusion (ISBP) and immunofluorescence.

Results: Tau phosphorylation status was more pronounced in capillaries from 3xTg-AD mice compared to wild-type mice. 18-month-old mice had higher levels of PECAM and ABCB1, and lower levels of Mfsd2a compared with 12-month-old mice, with no significant effect of genotype. TfR levels in capillary extracts were not altered by older age or AD-like neuropathology. ISBP data revealed similar uptake coefficient values for Ri7 between ages and genotypes. Immunofluorescence results confirmed a thorough distribution of fluorolabeled Ri7 into BCEC following systemic administration.

Conclusion: Older age and 3xTg-AD transgenes induced pathological changes in brain microvessels, that are not associated with defects in TfR-dependent endocytosis, suggesting that TfR targeting of BCEC is feasible in AD.

This abstract has been presented at the 13th International Conference on Alzheimer's and Parkinson's Diseases held in Vienna, Austria on March 29 - April 2, 2017.

PS3

Modulation of branched-chain amino acids dietary intake affects survival, behavior and neuropathology of the 3xTg-AD mouse model of Alzheimer's disease

Marine Tournissac[1,2,3,4], Milène Vandal[1,2,3,4], Cyntia Tremblay[2,4], Philippe Bourassa[1,2,3,4], Sylvie Vancassel[2,5], Anne Gangloff[6], Frédéric Calon[1,2,3,4]

[1]Université Laval, Faculty of pharmacy, Québec, Canada
[2]International Associated Laboratory OptiNutriBrain, Université Laval, Québec, Canada
[3]Institute on Nutrition and Functional Foods, Université Laval, Québec, Canada
[4]CHU de Québec, Neurosciences Axis, Québec, Canada
[5]INRA, Laboratoire NutriNeurO, Bordeaux, France
[6]CHU de Québec, Lipid Research Center, Québec, Canada

Objectives: Branched-chain amino acids (BCAA) are commonly used as dietary supplements to increase muscular mass. However, high levels of circulating BCAA have been linked with obesity, type 2 diabetes, cardiovascular diseases and anxiety, all of which are known risks factors for Alzheimer's disease (AD). BCAA directly influence brain function by modifying large neutral amino acid transport at the blood-brain barrier and thereby levels of neurotransmitters. We thus investigated the impact of dietary BCAA on object recognition and neuropathological hallmarks of AD in an animal model.

Methods: 3xTg-AD mice were fed either a control (CD) or a high-fat diet (HFD) from 6 to 16 months and then exposed to diets with high (+50%), normal (+0%) or low (-50%) BCAA content from 16 to 18 months.

Results: Only 33% of mice fed HFD supplemented in BCAA survived the 2-month treatment, with signs of hepatic and muscle injury. Dietary intake of BCAA was reflected in the plasma and led to altered levels of threonine, tryptophan and serotonin in the cortex. Surprisingly, mice on the low BCAA diets performed better at the novel object recognition task. Conversely, HFD-high-BCAA aggravated cortical tau pathology (insoluble tau pSer202: +151%; soluble tau pSer202: +94%; pSer202/Thr205: +271%; pThr231: +680%; pThr181: +93%), without affecting amyloid levels.

Conclusion: These results indicate that BCAA, in synergy with HFD, induced systemic toxicity and worsening of AD-like pathology in 3xTg-AD mice, whereas reducing BCAA levels improved memory performance. These preclinical data underscore a potential risk of combining high-fat and high-BCAA consumption and potential benefits from BCAA restriction in AD.

Results presented at the International Conference on Alzheimer's and Parkinson's Diseases, Vienna, Austria, March 29th 2017.

PS4

Impact of linoleic acid on the skin barrier formation of tissue engineered skin substitutes

Mélissa Simard [1, 2]; Geneviève Rioux [1]; Roxane Pouliot [1, 2]

[1] Centre LOEX de l'Université Laval, Génie tissulaire et régénération: LOEX - Centre hospitalier universitaire de Québec, Aile-R, 1401 18e rue, Québec, Québec, Canada, G1J 1Z4.
[2] Faculté de Pharmacie, Université Laval, Québec, Québec, Canada, G1V 0A6.

Skin substitutes produced *in vitro* have a reduced impermeability compared to normal human skin. This suboptimal barrier function may be caused by an alteration of the lipid metabolism such as the ceramide metabolism, which has a role of great interest in the organisation of the *stratum corneum*. In fact, ceramide 1 synthesis could be reduced by the essential fatty acid deficient growth condition.

In this study, we investigated the impact of linoleic acid in the formation of the skin barrier. To this end, healthy and psoriatic skin substitutes have been produced according to the self-assembly method of tissue engineering. Modulations of the culture conditions, precisely the addition of 10 µM of linoleic acid has been performed along with the appropriate controls.

Our results show that the macroscopic aspect of the epidermis differs greatly between supplemented psoriatic skin substitutes and their respective counterparts while no differences are observed for the epidermis of healthy skin substitutes. Linoleic acid supplementation has no effect on the epidermis thickness. Moreover, Ki67 immunofluorescence shows that linoleic acid causes an augmentation of the proliferation of basal layer keratinocytes in both models. The 10 µM linoleic acid supplementation induce an augmentation of the expression of the involucrin and filaggrin in healthy skin substitutes. According to gas chromatography, an increase in linoleic acid is observed in the epidermis phospholipid fraction after the fatty acid incorporation.

These results suggest that a supplementation with linoleic acid can improve the skin barrier formation of our 3D tissue engineered skin models.

PS5

Orally administered cannabinoids reduce tumor necrosis factor alpha (TNFα) gene and protein expression in an experimental autoimmune encephalomyelitis (EAE) animal model of multiple sclerosis (MS): implications in MS

Kiana Gozda[1], Tina Khorshid Ahmad[1], Ting Zhou[1, 2], and Michael Namaka[1, 2]
750 McDermot Avenue Winnipeg, Manitoba R3E O25
[1]Faculty of Health Sciences, College of Pharmacy, University of Manitoba, Winnipeg, Manitoba, Canada
[2]Department of Human Anatomy and Cell Science, College of Medicine, University of Manitoba

Purpose: Multiple sclerosis (MS) is a chronic, neurological disease that targets destruction of central nervous system (CNS) myelin.

Hypothesis: Cannabinoid treatment will reduce EAE-induced production of pathogenic molecular markers, such as TNFα and its receptor tumor necrosis factor receptor 1 (TNFR1) along with chemokines such as fractalkine (CX3CL1) and the fractalkine receptor (CX3CR1). The reduction of these inflammatory markers will improve neurological disability scoring (NDS) and delay peak onset/severity of disease.

Methods: EAE Lewis rats will be used to assess comparative changes in TNFα, TNFR1, CX3CL1, CX3CR1 expression at the protein and transcript levels. Expression changes of these molecular targets will be correlated against the time-dependent NDS. All animals will be randomly assigned to one of three experimental groups: naïve control (NC), active control (AC), and EAE + cannabinoid extract #1 (10:10 THC/CBD) or EAE + cannabinoid #2 (1:18 THC/CBD). EAE-induction involves the subcutaneous (s.c) injection of cocktail that includes myelin basic protein *via* commercially available induction kits from Hooke Laboratories. EAE and ACs will be sacrificed at 3, 6, 9, 12, 15, and 18 days post-induction (dpi) and their spinal cords (SC), brain tissue, and dorsal root ganglia (DRG) will be collected for analysis.

Results: Real-time polymerase chain reaction (RT-PCR) analysis of SC tissue obtained from EAE-cannabinoid (10:10) treated animals revealed significant reductions in TNFα mRNA expression at 15dpi compared to EAE-untreated groups. Statistical analysis also revealed significant reductions in severity of NDS on day 11, 12, and 13dpi between EAE-cannabinoid treated and EAE-untreated groups. Results also revealed a 1 day delay in onset of peak NDS in cannabinoid-treated EAE animals.

Conclusion: Results confirm that cannabinoid-treatment reduces TNFα expression resulting in significant time-dependent improvements in NDS along with a reduction/delay in peak onset of disease.

PS6

Gap junctions regulate nociception and synaptic strength of afferent input to the spinal cord dorsal horn

Xxx (Virginia) Yini1, Yu-Feng Xie1, Yves De Koninck2 & Robert P Bonin1
1Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto, Ontario, Canada.
2Department of Psychiatry and Neuroscience, Université Laval, Québec, Canada.

Background: Neuronal networks within the spinal cord dorsal horn regulate the transmission of sensory information. Gap junctions (GJs), particularly those expressed by astrocytes, allow rapid transmission of ions and small molecules between cells and regulate neuronal activity. GJs containing the connexin subunits CX43 are expressed by astrocytes in the superficial dorsal horn and have been implicated in the regulation of nociception. Here, we explored the contribution of CX43-containing GJs in the spinal cord to synaptic activity and plasticity and in the modulation of nociception and pain sensitization.

Methods: Synaptic plasticity was studied using ex vivo spinal cord explants to measure Extracellular postsynaptic field potentials (fPSPs) evoked by activation of dorsal (sensory) roots. Miniature excitatory synaptic currents (mEPSCs) were studied in acutely-isolated spinal slices from mice using whole-cell patch clamp. In behavioural studies of nociception, we tested the effects of spinally-applied (intrathecal) GJ blockers on baseline mechanical nociception and capsaicin-induced mechanical hypersensitivity.

Results: fPSPs were evoked in the superficial dorsal horn by stimulation of dorsal roots in an in vitro preparation. At concentrations that inhibit CX43-containing GJs, mefloquine (40 µM) and meclofenamate (100 µM) produced a pronounced inhibition of fPSPs at all stimulus intensities tested. Long term potentiation (LTP) of fPSPs was induced using low-frequency (2 Hz) stimulation of dorsal roots. Following application of either mefloquine or meclofenamate, this stimulation induced long term depression of fPSPs. In contrast, mefloquine appeared to enhance mEPSCs in whole cell recordings. However in behavioural studies, intrathecal administration of GJ blockers didn't modify the mechanical nociception and hypersensitivity.

Conclusions: These results demonstrate a role of CX43-containing GJs in regulating the strength and plasticity of primary afferent input to the superficial dorsal horn that may be distinct from their role in the modulation of excitatory synaptic transmission, and may not underlie the behavioural effects of GJ blockers on nociception.

PS7

Drug release and permeation of compounded topical gabapentin in different formulations

Ayah E. Shakshuki, Demilade Onifade, and Remigius U. Agu College of Pharmacy, Dalhousie University*

Objectives: Topical gabapentin formulations offer an alternative or adjunctive therapeutic option with a lower potential for adverse effects for neuropathic pain. Currently, topical gabapentin formulations must be compounded by specialized pharmacies, as no commercial product exists. This research aims to characterize and evaluate drug release patterns and dermal penetration potential of topical gabapentin in Versabase® gel (VG), emollient cream (EC) and Lipoderm® base (LB).

Methods: Drug release and transdermal permeation studies were conducted using the in vitro Franz finite dose model. Gabapentin 1, 5 and 10% in VG, EC and LB were compounded and applied on cellulose membranes for drug release studies, and Strat-M®, simulated human skin for drug permeation studies. Samples of receptor fluid were drawn over a 6-hour or 24-hour time frame for drug release and permeation experiments, respectively.

Results: There was no statistically significant difference in mean gabapentin drug release from VG, EC and LB. When drug release data was entered into the zero order, first order, Higuchi, and Hixon-Crowell kinetic models, it was found that all compounds most closely followed the Higuchi model. For drug permeation studies, flux at steady state for VG, LB and EC were found to be 0.269 mg/cm^2/h, 0.184 mg/cm^2/h, 0.545 mg/cm^2/h, respectively. Lag time was 5.5 minutes for gabapentin 10% in emollient cream and zero for the other two formulations. Mean percent permeation of topical gabapentin 10% through Strat-M® over 24 hours (n=3) was 23.3 ± 5.2% for the gel formulation, 14.8 ± 6% for Lipoderm® base and 9.6 ± 3.7% for emollient cream. Mean percent permeation of topical gabapentin 10% through Strat-M® over 24 hours (n=3) was 23.3 ± 5.2% for the gel formulation, 14.8 ± 6% for Lipoderm® base and 9.6 ± 3.7% for emollient cream.

Conclusions: This study demonstrates the ability of gabapentin to penetrate through Strat-M® in three different formulations and provides some information on the clinical potential of dispensed topical gabapentin formulations.

PS8

Potential Protective Effects and Bioavailability of Wild Blueberry Extracts

Scott Unruh[1], Michelle Debnath-Canning[1], Poorva Vyas[2], Andrei Igamberdiev[2] and John T. Weber[1]
School of Pharmacy[1] and Department of Biology[2], Memorial University of Newfoundland

Introduction: Antioxidants such as polyphenols and ascorbate present in *Vaccinium* berry species (e.g. blueberries and lingonberries) have been shown to prevent age-related neurodegenerative diseases. These compounds are also capable of modulating signal pathways involved in inflammation, neurotransmission, and enhancing neuroplasticity. We have conducted a detailed chemical analysis of compounds isolated in *Vaccinium* species native to Newfoundland. We sought to determine if there was an increase in catalytic activity of oxygen scavenging enzymes (e.g. catalase) involved in neuroprotection after supplementation with blueberry extracts.

Materials and Methods: Berries were collected from several locations in the St. John's, Newfoundland area, and extracts were produced using a variety of solvents. Biochemical assays were performed to determine the phenolic content of extracts, including total phenolics, tannins, flavonoids and antioxidant capacity. Comparisons of ascorbic acid levels between wild lingonberry and blueberry was also determined. To quantify and identify major anthocyanins detected in berries, High-Performance Liquid Chromatography Mass-Spectroscopy (HPLC-MS) analysis was performed on extracts. 8 mice (C75bl/6), 7 week old male and females (4 controls and 4 cases each) were acclimatized for 5 days, and given 0.1 ml fruit extract via oral gavage for 7 days. Blood samples were drawn every other day and assayed to determine overall catalytic activity.

Results: The biochemical assays showed that leaves have a significantly higher content of polyphenols and ascorbate in comparison to fruits. Blueberries had a higher level of ascorbate present in both the leaf and fruit extract in comparison to wild lingonberries. More anthocyanins were identified and detected in blueberry fruit extracts than leaves, but anthocyanins in leaf extracts were present in higher quantity. Mice supplemented with fruit extracts demonstrated a trend in increasing catalase activity, while long-term supplementation failed to show any further increase.

Conclusion: Overall, results show that leaves have a significantly higher level of antioxidants compared to the fruits in *Vaccinium* species, and suggests potential use as nutraceutical products. Fruit supplementation increased catalytic activity, but our small sample size limits the validity of this result. Work is still ongoing in order to determine the extent to which polyphenols can enter the brain and other enzymes influenced by nutraceutical exposure.

PS9

Modeling chronic psoriatic inflammation in a 3D reconstructed skin

Isabelle Lorthois[1], Roxane Pouliot[1, 2]
[1] Centre LOEX de l'Université Laval, Génie Tissulaire et Régénération, Centre de Recherche FRQS du CHU de Québec, Axe Médecine Régénératrice, Québec, QC, Canada
[2] Faculté de Pharmacie, Université Laval, Québec, QC, Canada

Macrophages and Th17 lymphocytes play a key role in inducing psoriasis-like skin disease. However, the specific role of each component for the activation of epithelial cells remains to be clarified. Here, we aimed to define the specific involvement of macrophages and lymphocytes in a 3D reconstructed skin model to better understand the complex link between psoriatic epithelial cells and immune cells that underlies the typical inflammatory vicious circle of psoriasis. Monocyte-derived macrophages and T cells were isolated from human blood and seeded on the dermal compartment of healthy or psoriatic tissues reconstructed according to the self-assembly approach. Immunolabeling analyses of involucrin, filaggrin, loricrin, transglutaminase were performed to identify which cells were responsible for the abnormal differentiation of keratinocytes. The presence and the migration of leucocytes through skin substitutes were examined thanks to anti-CD163 and CD3 stainings. The expression level of specific cytokines and chemokines, such as MCP-1, IL-6, and IL-1β, were further assessed by ELISA.

Our results showed that both macrophages and T cells were homogeneously dispersed throughout the dermis. Macrophages incorporated into healthy substitutes appeared to modify the expression of early epidermal differentiation markers toward an inflammatory phenotype, such as observed with psoriatic cells. T cells affected early and late keratinocyte differentiation markers toward a psoriatic phenotype. Moreover, expression levels of pro-inflammatory cytokines increased in healthy immunocompetent substitutes over the air-liquid culture time frame compared to immunodeficient models. Both innate and adaptive immune cells contribute to keratinocyte deregulation and these results strongly suggest that this unique immunocompetent model would be useful in the discovery of new therapeutic targets for the treatment of inflammatory chronic skin diseases, such as psoriasis.

Abstract presented at the Society for Investigative Dermatology (SID) – April 26-29 2017