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The Canadian Pharmacists Conference is an excellent opportunity for pharmacists from across Canada to network with colleagues and to share new and exciting ideas, research and innovation. Our oral and poster pharmacy practice research presentations provide an opportunity for members of the pharmacy community to engage in sessions that promote evidence-based practice and decision-making.

This year's conference research program was built on past successes and explored emerging trends that could enable delegates to apply best practices from dozens of top pharmacy practice research leaders across Canada.

To help promote and disseminate pharmacy practice research, CPhA publishes the abstracts of the research presented at the conference in this special supplement of the *Canadian Pharmacists Journal*.

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Proximity work of pharmacists in family medicine groups: Integration and impact on interprofessional collaboration

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OBJECTIVES: Pharmacists work in family medicine groups (FMGs) and their role in the management of clients with complex needs is an innovation in Quebec province whose impacts have hardly been studied. The objectives were to assess the integration of pharmacists working in these multidisciplinary care teams and its impact on interprofessional collaboration.

METHODS: A mixed-method study was conducted using semi-structured interviews and questionnaires (Pharmacist-Physician Collaborative Index (PPCI) and Team Climate Inventory [ICE]) with doctors (MDs), pharmacists and other professionals inside and outside four FMGs in Quebec City. A thematic content analysis was performed for the interviews. Statistical analyses describing collaboration, team climate and comparing different backgrounds and professionals were also carried out.

RESULTS: We met 45 professionals (6 pharmacists [inside FMGs], 13 MDs, 11 others, 15 pharmacists [outside FMGs]). Pharmacists were working in FMGs for a mean of 3.75 years. Interviews indicate that the successful integration of the pharmacist into FMGs requires time and effort from the organization, pharmacists and other professionals, particularly with respect to understanding roles. The level of collaboration between doctors and pharmacists is high (mean PPCI=78.8 for pharmacist and 82.5 for doctors) with lower scores on two dimensions (i.e., definition of roles and working relationships). Team climate is generally good (mean ICE= 77.4) with higher scores for FMGs having a focus on training (university affiliated).

CONCLUSIONS: These results allow a better understanding of the integration of the pharmacist into family medicine groups and on the organizational impacts that these health professionals can have in primary care teams

Enhancing client medication experience program: A pilot project of the pharmacist's role in supporting community mental health patients

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- OBJECTIVES:** Mental health patients in supported community housing often face tremendous challenges in the area of medication management. Is there an opportunity for community pharmacists to support these patients?
- METHODS:** The project involved collaboration between Coast Mental Health and Wilson Pharmacy. The pharmacy would provide clinical support to clients and staff involved in the medication program in the form of comprehensive medication management and education for front line staff.
- RESULTS:** Pharmacist onsite visits with clients and staff yielded numerous clinical interventions, consisting of: education, treatment optimization and polypharmacy reduction. From client survey data: 79% of clients (from 39%) were comfortable in how their medication was helping them, 86% of clients (from 46%) were aware of/knew how to use resources to find information about their medications and 79% of clients (from 39%) agreed to knowing when/how to take medications without support. An increasing number of clients transitioned from Level 3 (daily witnessed ingestion), to level 2 (self-administration) medication support. From 2014 to 2016, 10 clients transitioned from Level 3 to Level 2 support needs and 2 clients successfully transitioned to independent living. Staff surveys indicated an average confidence level of over 75% on a 5 item Likert scale, in all tasks related to medication administration.
- CONCLUSIONS:** The project demonstrated that clients who were previously not engaged with their medications found value in connecting with a pharmacist about the subject. This was demonstrated with client surveys indicating that program clients had become more interested in managing their own medications and the transition of more clients to administering their own medications. For staff, pharmacy-led educational workshops and clinical support led to an increase in confidence in administering medications. With a growing issue of mental illness in the country, this is a cost-effective model that optimizes existing resources to deal with a challenging issue.

Incorporating assessment and prescribing for ambulatory ailments skills into practice: An environmental scan of continuing education for pharmacist prescribing in Canada

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- 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% to 100% 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.

The Alberta Vascular Risk Reduction Community Pharmacy Project in patients with CKD (Rx EACH-CKD)

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OBJECTIVES: Chronic kidney disease (CKD) is common (affecting about 10% of the Canadian population) and is considered a strong risk factor for cardiovascular (CV) events. Patients with CKD are underserved in terms of CV risk reduction efforts. Objective: To evaluate the effect of a community pharmacy-based case finding and intervention program on estimated CV risk in patients with CKD.

METHODS: This pre-specified sub-group analysis was conducted as part of the Rx EACH study, a randomized trial of a pharmacist-led CV risk reduction intervention vs. control. Setting: 56 community pharmacies across Alberta. Intervention: Pharmacists provided participants with: 1) Physical and laboratory assessments, 2) Individualized CV risk assessment and education, 3) Pharmacists prescribed where appropriate to achieve treatment targets and 4) Regular monthly follow-ups for 3 months. Control: Usual pharmacist and physician care with no specific intervention for 3 months. Primary outcome: The difference in change in estimated CV risk between intervention and control groups.

RESULTS: We enrolled 723 patients in Rx EACH, of whom 290 had CKD. In those with CKD, after adjusting for baseline values, the difference in change in CV risk was 20% ($p < 0.001$). Changes of 0.23 mmol/L in LDL-c ($p = 0.004$), 10.5 mmHg in systolic blood pressure ($p < 0.001$), 0.7% in HbA1c ($p < 0.001$), 19.6% in tobacco cessation ($p = 0.037$) and 27% in end stage renal disease (ESRD) risk ($p = 0.375$) were observed when comparing intervention and control groups. We observed non-significant trends in greater CV risk reduction in patients with CKD vs. those without, rural vs. urban patients and in patients with previously unrecognized CKD vs. those with known CKD.

CONCLUSIONS: This is the first randomized trial of CV risk reduction in patients with CKD in a community pharmacy setting. Our findings provide evidence for the benefit of pharmacist care on global CV reduction and individual risk factors. This suggests a potential public health benefit and represents a promising approach for identification and management of patients with CKD.

Service d'initiation et de suivi de l'insulinothérapie sur le contrôle du diabète de patients référés au pharmacien d'un groupe de médecine de famille (GMF)

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OBJECTIFS: Plusieurs patients diabétiques éprouvent des difficultés à contrôler leur maladie. L'objectif était d'évaluer l'effet d'un service d'initiation et de suivi de l'insulinothérapie sur le contrôle du diabète de patients référés au pharmacien d'un groupe de médecine de famille (GMF).

METHODOLOGIE: Une étude avant-après sans groupe de contrôle a été effectuée chez des patients diabétiques référés au pharmacien d'un GMF de Québec. L'intervention du pharmacien, qui s'est déroulée entre décembre 2008 et février 2013, consistait à suivre l'efficacité du traitement et à faire les ajustements posologiques nécessaires. Les informations sur les caractéristiques démographiques et cliniques ont été colligées avant l'intervention, au cours et à la fin du suivi. Des différences de moyennes ont été calculées entre le début et la fin du suivi.

RESULTANTS: Au total, 67 patients ont été référés: 59 (88,1%) souffraient de diabète de type 2, 56/65 (86,2%) avaient une hémoglobine glyquée (HbA1c) >7% et 23/55 patients (41,8%) avaient un ratio albumine/créatinine élevé (RAC>2). La majorité était des hommes (56,7%) ayant un âge et une durée du diabète médians de 70,0 et 16,7 ans respectivement. À la fin du suivi, 25 patients (38,5%) avaient une HbA1c ≤7%. La différence moyenne d'HbA1c entre la fin et le début du suivi était de -1,24% (écart type: 1,41%); 51/65 (78,5%) avaient une diminution d'HbA1c dont 32 (49,2%) avaient une diminution >1%. Une diminution du RAC était notée pour 7 des 23 patients (30,4%) ayant un RAC élevé au début. Le pourcentage de patients ayant eu au moins une hypoglycémie par semaine était de 25,4% (16/63 patients) au début et de 39,1% (25/64 patients) à la fin du suivi.

CONCLUSION: Les résultats suggèrent une efficacité de l'intervention pour la réduction de l'HbA1c, l'amélioration du contrôle du diabète et la diminution du RAC, bien que faible. L'intervention semble cependant accroître les hypoglycémies.

Determining the clinical effectiveness and patient satisfaction of a pharmacist-managed travel medicine clinic under an expanded scope of practice

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OBJECTIVES: Pharmacists' expanding scope has created a number of unique opportunities for patient care – including providing travel consultations. The aim of this study was to conduct the first known study of a pharmacist-led travel clinic under an expanded scope, which includes prescribing and administering injections.

METHODS: A convenience sample of patients seeking pre-travel consultations from an Alberta-based pharmacist-managed travel medicine clinic were enrolled. Chart review was performed to determine patients' destinations, itineraries and preventive therapy needs, as well as overall health and demographics. Following travel, a survey was sent electronically to study participants to assess overall satisfaction with the service, adherence to recommended therapies and any health issues encountered during travel.

RESULTS: 103 patients were enrolled, of which 46% were male and had an average age of 36. Patients were generally healthy, with 73% not on any chronic medications. 7% of patients reported a fear of needles or history of fainting during vaccinations. Over 10% of travellers had complex itineraries spanning more than 1 geographic region, with the most common travel consultations sought for trips to Southeast Asia and Mexico/Caribbean. Travel to remote areas, snorkelling and trekking were the most frequent itinerary-related risks encountered. Typhoid, hepatitis and yellow fever were the most commonly indicated vaccinations, with 270 total vaccinations recommended, 80% of which were administered in clinic. Rabies was most commonly declined due to cost and low perceived risk. 90% of patients were satisfied with the experience, citing an average consultation length of 26 minutes. 1 in 5 patients reported gastrointestinal illness while travelling and all felt adequately prepared to address it with drug therapy and advice provided from the consultation.

CONCLUSIONS: Patients are satisfied with travel consultations performed by a specialty-trained pharmacist and demonstrate high adherence to recommended therapies and positive travel health experiences.

Influenza- and pharmacy-specific factors of vaccine hesitancy: A web 2.0 analysis

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OBJECTIVES: Along with impressive uptake in influenza immunizations delivered in community pharmacies across Canada, pharmacists are now increasingly faced with individuals who are hesitant to receive the vaccine. Evidence suggests that vaccine hesitancy is both vaccine- and provider-specific, yet there is limited research exploring influenza- and pharmacy-specific factors. Identifying these factors requires innovative approaches. Fortuitously, increased engagement with data-rich Web 2.0 platforms and user generated content has transformed shares, likes and user comments into measures of popular discourse and public opinion. The objective of this study is to explore the ways in which consumers engage in Web 2.0 around seasonal influenza immunization and administration by community pharmacists.

METHODS: A comprehensive search of news reports published on CBC.ca between September 2015 and October 2016 was conducted. Reports were included if they were a text-based news report, mentioned the flu vaccine either as product or service and were open for user comments. Data was extracted using Scraper v1.7 Chrome data mining extension and analyzed by inductive thematic analysis.

RESULTS: Our search resulted in more than 1200 online news reports, of which 33 met the inclusion criteria. In total, 2042 user comments were analyzed. Thematic analysis suggests general public support for expanded scope of practice, public trust in pharmacists to administer vaccines and recognition of pharmacists as convenient points of access for immunization. Beyond general skepticism around the vaccine, pharmacy-specific hesitancy themes include misgivings about pharmacist training and competency, perceived pharmaceutical industry ties, concerns about retail profit and remuneration for service provision.

CONCLUSIONS: Web 2.0 is the contemporary around the water cooler. It is important for pharmacists to be aware of how consumers express vaccine concerns outside of the patient/provider context. Armed with this insight, pharmacists can more effectively engage with patients to foster positive vaccine conversations and support shared decision making in the community pharmacy.

Antimicrobial stewardship in rural continuing care: Impact of interprofessional education and clinical decision tool implementation on urinary tract infection treatment

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- OBJECTIVES:** Antibiotic use is a common response in long-term care facilities (LTCF) to subtle clinical or behaviour changes in older adults often blamed on urinary tract infection (UTI), resulting in the development of unintended consequences (e.g., allergic reactions, Clostridium difficile infection, antimicrobial resistance). The primary objectives of this project were to measure the impact of interprofessional education and a clinical decision tool on the prescriptions for UTI, antibiotics dispensed for UTI and urine cultures performed between treatment and control sites. Secondary objectives included an evaluation of potential harms of reducing antibiotic use (including hospital admissions, mortality).
- METHODS:** A cluster randomized trial at 42 LTCFs in rural Alberta (21 intervention, 21 control). Intervention sites received a multimodal antimicrobial stewardship (AS) intervention including onsite education for nursing staff, physician academic detailing (conducted by Drug Stewardship Pharmacist, supported by onsite pharmacists), integration of a clinical decision making tool, workplace reminders and periodic feedback on measures. Data was collected for 6 months prior to and 12 months after the intervention. Using the facility as the unit of analysis, difference in the rates of the outcomes using paired t-tests weighted by the facility number of beds was calculated.
- RESULTS:** In the control group, facilities averaged 41 beds (range 15-112), had baseline antibiotic prescription rate of 0.30/100 resident days (RD), 3.28 antibiotic defined daily doses (DDD)/100 RD and 0.48 urine cultures (UC)/100 RD. The intervention group averaged 47 beds (range 15-107), a baseline prescription rate of 0.33/100 RD, 2.49 DDD/100 RD and 0.55 UC/100 RD. Following the intervention, there were 0.08 fewer antibiotic prescriptions/100 RD ($p=0.0001$ [0.05-0.12]), 0.83 fewer DDD/100 RD ($p=0.00001$ [0.52-1.13]) and a decrease of 0.15 UC/100 RD ($p=0.002$ [0.12-0.34]). No differences were observed in hospital admissions or mortality between groups.
- CONCLUSIONS:** A multimodal, interprofessional AS intervention significantly reduced prescriptions rates, antibiotics dispensed and urine cultures performed.

Pharmacist-led pharmacogenomics services in primary care: Preliminary findings from the PRIME study

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OBJECTIVES: To describe the characteristics of patients, the types of recommendations made by pharmacists and acceptance rates by patients and prescribers participating in Ontario's ongoing PRIME (Pharmacists as Personalized Medicine Experts in Primary Care) study.

METHODS: PRIME is a multiphase study consisting of Phase 1 (training community and family health team pharmacists to use pharmacogenomics in practice) and Phase 2 (supporting them while they implemented testing services in their practices). To receive the service, patients aged > 18 years were starting or switching to a new antipsychotic or antidepressant medication, demonstrating poor response or experiencing significant and repeated side effects to these agents. Patient recruitment began in Feb 2016 and is ongoing.

RESULTS: Twenty-one pharmacists successfully completed the training program (Phase 1) and were eligible to identify patients for the study (Phase 2). As of December 2016, 15 pharmacists had identified 124 patients eligible for the study, 85 of whom consented to participate. Reasons for inclusion were: poor response to an antidepressant (60%) or antipsychotic (8%), switching (26%) or starting (18%) a new antidepressant and/or significant and repeated side effects to an antidepressant (21%) or antipsychotic (6%). Most subjects were female (61%), mean age 47±13 years (min 18; max 75 years). Many were new to the pharmacist and practice site (55%), although pharmacists reported established relationships with the prescribers for 89% of patients. Pharmacists recommended a medication change for 40% of participants, dose increase for 29% and decrease for 5%. Patients accepted 89% of pharmacist recommendations while prescribers accepted 68% at the time of this analysis.

CONCLUSIONS: Pharmacists in PRIME recruited patients for pharmacogenetics testing primarily related to antidepressant therapy. Patients and prescribers were generally accepting of pharmacist recommendations for changes to medication therapy based on pharmacogenomics testing.

Ensuring safe and effective communication with physicians in pharmacy practice

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- OBJECTIVES:** Learning about the elements of good interprofessional communications and the barriers. Identifying and then classifying all health or drug-related problems (DRPs) that should be reported to physicians. Designing a tool to facilitate communicating with physicians for resolving problems.
- METHODS:** More than 500 pharmacist-physician communication cases (occurred between 2006 and 2012, in 3 different community pharmacies, in Ontario) were reviewed. All common classifications of drug therapy problems being used in Canada, US and Europe reviewed for a comparison, to find out if they have listed all reported problems. A pharmacy communication toolkit was designed (2013-2016) after reviewing all reported cases and selecting 100 case scenarios with the most significant pharmaceutical care and patient outcomes.
- RESULTS:** A new management process (named 12 Rs, including Review, Recognize, Report, Recommend, Resolve, Record, Reassess) was suggested for reporting problems to physicians. A communication-facilitating tool named Pharmacist-Physician Communication Toolkit was developed to be used in pharmacy practice. This practical toolkit provides a mnemonic checklist (of differently classified DRPs), simple strategies and useful reporting forms. A simple and concise documentation method defined as Pharmacist SHORT Notes was introduced for documenting communications.
- CONCLUSIONS:** To ensure optimal drug therapy and better patient outcomes, good communication between pharmacists and physicians is essential. This important skill is making pharmacists an integral part of the health systems circle of care. There are a number of communication tools developed to facilitate communications between providers. The results of this pilot study suggest that simplified and structured approaches such as checklists and reporting forms can be useful for efficient and timely interprofessional communications. The author encourages other members to use reliable model forms or other communication tools in their daily practice, or to design their own format which suits them based on the practice setting. This will help pharmacists for professional communications with clarity, confidence and style.

What types of pharmacies provide better pharmacists' care?

Nancy Winslade, BScPharm, PharmD, MHPE; Robyn Tamblyn, BScN, MSc, PhD

OBJECTIVES: Previous research has documented the use of pharmacy administrative claims data to evaluate pharmacists services and identify pharmacies with high and low performance on standardized quality of care measures. The objective of this project was to determine if characteristics of pharmacy performance level could be identified using pharmacy administrative claims data.

METHODS: We evaluated 8 months of pharmacy claims data from 1,742 community pharmacies in Quebec. As management of adherence is a primary pharmacist responsibility, dispensing of antihypertensive medications to non-adherent patients was the primary quality of care outcome. Measured dispensing, patient and pharmacy factors included those known to influence non-adherence (e.g., type of antihypertensive, age, sex, multiple prescribers/pharmacies) and factors hypothesized to influence quality of care (e.g., pharmacy workload, number of professional services, pharmacists overlap and continuity of care). Multivariate alternating logistic regression estimated predictors of the primary outcome, accounting for patient and pharmacy clustering.

RESULTS: Of 8,655,348 dispensings, 9.2% were provided to non-adherent patients. Male sex, younger age, beta-blockers, prescribing by multiple physicians and dispensing by multiple pharmacies were confirmed as risk factors for increased non-adherence. Patients new to treatment or on single antihypertensive medications were also at higher risk of non-adherence. Pharmacies with better Within-Pharmacy Continuity of Care Index scores were at lower risk of dispensing to non-adherent patients as were pharmacies with increased provision of professional services (OR: 0.60; 95% CI: 0.57-0.62). Neither increased pharmaceutical opinions for antihypertensive non-adherence nor increased Pharmacist Overlap Index scores impacted the odds and the latter was strongly correlated with dispensing workload.

CONCLUSIONS: Improved quality of care in pharmacies with higher professional service rates and better within-pharmacy continuity of care supports the influence of professional culture and relationships on patient use of medications. Pharmacy administrative claims data can be used to identify the characteristics of pharmacies that provide high versus low quality of care.

A qualitative study exploring the clinical reasoning processes of pharmacist and nurse independent prescribers in the United Kingdom

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OBJECTIVES: Clinical reasoning is a central component of prescribers competence when reaching a clinically appropriate decision. Like doctors, pharmacist and nurse independent prescribers in the United Kingdom have extensive prescribing rights, but little is known about their clinical reasoning. This study explores the process and influences of clinical reasoning by secondary care pharmacist and nurse independent prescribers in the United Kingdom.

METHODS: A constructivist approach using think-aloud methodology immediately followed by semi-structured interviews was conducted with 11 nurse and 10 pharmacist independent prescribers working in secondary care between March and December 2015. Each participant was presented with validated clinical vignettes for the think-aloud stage, based on clinical therapeutic areas they chose. Data were analyzed using a constant-comparative approach.

RESULTS: Clinical knowledge and experience heavily influenced the process of clinical reasoning. Despite prescribers approaching the clinical vignettes holistically, their focus varied according to professional background and job role. Nurses were more likely to describe interacting with patients, compared to pharmacists who were more focused on medical notes and laboratory results. Think-aloud protocol analysis revealed a distinct pattern in the process undertaken to reach a clinical decision. This is presented as a prescribing model, encompassing case familiarization, generating hypotheses, case assessment, final hypotheses and decision-making stages. Influences on clinical reasoning were broadly categorised into themes: individual influences, context and interactions. For example, prescribers were aware of treatment pathways but chose to refer patient cases to avoid making the final prescribing decision. Exploration of this behaviour revealed that experience and attitudes such as confidence and cautiousness associated with responsibility were strong influencers within the decision-making process.

CONCLUSIONS: The resultant prescribing model shows clinical reasoning as a complex and dynamic process. Findings from this study could inform the training of independent prescribers to improve their professional development, clinical reasoning skills and subsequently improve patient care.

Factors affecting pharmacist prescribing adoption

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- OBJECTIVES:** Pharmacists in Canada are authorized to prescribe as part of expanded scopes of practice with the expectation of reduced physicians burden and enhanced patient access to health care services. Legislative approval of prescribing authority does not assure its adoption in practice. Understanding the mode of adoption and factors facilitating the adoption process is important to translate prescribing into practice. Therefore, our objective was to explore the factors affecting pharmacists' adoption of prescribing guided by the Diffusion of Innovation (DoI) Theory, self-efficacy theory and cognitive role theory.
- METHODS:** A cross-sectional survey was tested for validity and reliability in 3 stages and administered among random 700 practicing registered pharmacists in Alberta in 2013 to explore adoption of pharmacist prescribing. We measured the participants demographic information using descriptive statistics. We ran hierarchical multivariate regression analysis to predict the frequency of pharmacist prescribing. We removed dependent variables having correlation > 0.4 to avoid multicollinearity. We entered variables in 3 blocks using 3 characteristics of DoI theory. First block (system readiness): practice setting and extent of support from practice environment; Second block (pharmacists as adopter): care intensity, level of self-efficacy, level of role beliefs and length of experience; Third block (prescribing as innovation): Perceived impact of prescribing on patient care.
- RESULTS:** Response rate was 54%. In this sample, 6.7% had Additional Prescribing Authority (APA), 71.2% were female participants and 77% were in community practice. Practice setting, support from practice environment, pharmacists' self-efficacy belief in prescribing, pharmacists' prescribing role belief and length of experience in practice significantly predicted pharmacists' extent of prescribing adoption ($R^2=0.153$, $p<0.05$).
- CONCLUSIONS:** Our study suggests system readiness and pharmacist characteristics were major factors that influenced the extent of pharmacist prescribing. Interventions could be developed to explore the effectiveness of supportive practice environments and strategies to motivate pharmacists to adopt prescribing.

D-PRESCRIBE: A randomized cluster controlled trial to reduce inappropriate prescriptions in seniors

Philippe Martin, BSc; Cara Tannenbaum, MD, MSc; Robyn Tamblyn, PhD; Andrea Benedetti, PhD; Sara Ahmed, PhD

- OBJECTIVES:** The effect of direct patient education to drive a reduction in chronic benzodiazepine use among community-dwelling older adults was evaluated in the EMPOWER trial, yielding a 27% discontinuation rate at 6 months and a NNT of 4. A barrier to deprescribing was discouragement from a physician or pharmacist. An objective of the follow-up D-PRESCRIBE trial was to test the added value of a pharmacist-led knowledge transfer strategy to both patients and prescribers on the discontinuation of benzodiazepines compared to the EMPOWER intervention alone.
- METHODS:** A pragmatic cluster randomized trial (D-PRESCRIBE) randomly allocated community pharmacists in Montreal, Canada, to the intervention (EMPOWER brochure plus an evidence-based pharmaceutical opinion sent by the pharmacist to the prescribing physician) or wait-list arm. Participants aged 65-95 years, long-term users of benzodiazepine medication, were screened and enrolled prior to randomization. Participants, physicians, pharmacists and evaluators were blinded to outcome assessment. Main outcome was benzodiazepine discontinuation at 6 months after randomization (sustained, 3 months), ascertained by pharmacy renewal profiles. Analysis consisted of an intent to treat approach using a marginal model estimated via generalized estimating equations with a binary outcome.
- RESULTS:** At interim analysis, outcome data was obtained from 23 pharmacies randomized to the intervention (92 participants) and 23 pharmacies randomized to the “wait list” group (85 participants). 82% of participants in the D-PRESCRIBE group, versus 62% in EMPOWER, initiated a conversation about benzodiazepine therapy cessation with a physician and/or pharmacist. Discontinuation rates at 6 months were 44.6% in the intervention group in comparison to 5.9% in the control group for a risk difference of 38% (27-47%). The odds of patients discontinuing benzodiazepines in D-PRESCRIBE compared to EMPOWER was 2.17 (95% CI 1.21-3.67%).
- CONCLUSIONS:** The D-PRESCRIBE intervention is twice as likely to lead to benzodiazepine deprescribing compared to the EMPOWER intervention alone.

Community pharmacist role of naloxone emergency kit education and distribution

Laura Bron, BScPharm; Bryan Gray, BScPharm

OBJECTIVES: Thunder Bay, ON and surrounding area has the highest rate of overdose in Ontario, with 13.9 deaths per 100,000 people. This is related to the all-time high use of opiate medications (codeine, fentanyl, methadone) and illicit drugs such as heroin. Naloxone is the antidote to these opiates, so in June 2016 Ontario launched the Naloxone Program for Pharmacies. Oak Medical Pharmacists, along with Elevate NWO Clinic, developed a program aimed at naloxone distribution to patients according to the Ontario Ministry of Health's eligibility criteria. The primary goal is to provide adequate training to individuals to administer naloxone; the secondary goal is providing 5000 kits into the community within 3 years.

METHODS: Using the guidelines provided by the Ontario College of Pharmacists and the Ontario Pharmacists Association, the pharmacist and social worker from Oak and Elevate individually trained people at Oak Pharmacy, along with providing offsite group sessions to agencies in the community. The session was informal and interactive; a pre and post quiz was used to measure the knowledge outcomes.

RESULTS: Pre-training, 7% of the Oak and Elevate participants had rated themselves as very knowledgeable about naloxone, 18.6% said they were comfortable using syringes and 14% stated very confident using naloxone on someone; post-training those numbers rose to 60%, 18.6% and 67%, respectively. The questionnaire also asked specific technical questions, such as where do you administer naloxone, what substances can naloxone reverse, why should you stay with a person until emergency personnel arrive and what are the signs of opioid overdose. Post-training, almost all of the participants correctly answered all of the questions. In the first month of program implementation, over 100 kits were distributed by Oak Pharmacy and Elevate Clinic.

CONCLUSIONS: These results illustrate that a training program is needed for distributing naloxone into the community. Most people were not knowledgeable about naloxone nor were they comfortable with administering to a person experiencing an overdose. The number of overdoses is not expected to decrease soon in our community so it is important that pharmacists are training everyone who is either using opiates or in a position to help with reversing an overdose. The pharmacist role is expanding and this is another way our profession puts us in an excellent position to help the community.

Evaluation of prescription adaptation due to Pharmacare's modernized reference drug program

Robert Pammett, BSc, BSP, MSc

- OBJECTIVES:** As of December 1, 2016, British Columbia's provincial drug insurance program changed which medications would be eligible for full benefit in an attempt to reduce drug expenditures, as the drugs within these classes are considered equally safe and effective. As part of the modernization, statins, ACEi, ARBs and dihydropyridine CCBs were affected. Providers had 6 months to discuss the program with their patients and make any required changes. Community pharmacists are able to adapt these prescriptions if deemed appropriate. The purpose of this study was to determine the extent to which community pharmacists adapted prescriptions to respond to the Modernized Reference Drug Program.
- METHODS:** A retrospective chart review in 2 primary care practices was conducted in Prince George, British Columbia. Charts were reviewed for patients prescribed statins ACEi, ARBs and dihydropyridine CCBs. Charts were also reviewed to determine if there was a compelling reason to continue a non-reference drug, or if the drug had been adapted by a pharmacist.
- RESULTS:** 234 patients were prescribed a statin, 241 prescribed an ACEi, 108 prescribed an ARB and 83 prescribed a dihydropyridine CCB. Modernized RDP drugs were the most commonly prescribed drugs within their classes; prescribed for 84% to 92% of patients taking drugs from these classes. No pharmacist adaptations occurred to adjust to the modernized RDP within the timeline, leaving a total of 68 individual drug changes outstanding.
- CONCLUSIONS:** Within the 2 studied practices, no patients were switched to the modernized reference drugs by their community pharmacist. Pharmacists working in primary care are unable to independently adapt prescriptions and must rely on prescriber collaboration to substitute these medications. Changes in legislation allowing primary care pharmacists to practice to their full scope could have facilitated the substitution of drugs through this program resulting in greater efficiency and reduced drug expenditures.

Clinical guide for community pharmacists to evaluate risks and manage QTc prolongation drug-drug interactions

Tracy (Yifan) He, PharmD candidate; Certina Ho, RPh, BScPharm, MSt, MEd, PhD

OBJECTIVES: There is an increasing number of medications with potential QTc prolongation risks and the subsequent degeneration into torsades de pointes (TdP), a devastatingly fatal ventricular tachyarrhythmia. Our primary objectives were to identify recommendations posed by clinicians in evaluating QTc prolongation risks and to create a clinical algorithm or thought process aimed to help community pharmacists in assessing and managing these drug-drug interactions.

METHODS: We focused on 3 commonly prescribed medications that were known to be associated with QTc prolongation risks (citalopram, domperidone and ciprofloxacin). We conducted an environmental scan of recommendations made by national regulatory bodies and clinical guidelines; and performed a systematic review of primary literature between 2006 and 2016, with a primary focus on randomized controlled trials, systematic reviews and meta-analyses.

RESULTS: We reviewed 7 articles. The primary literature, current recommendations from national regulatory authorities and clinical guidelines consensually state that the evaluation of QTc prolongation risks requires a risk-benefit analysis of the drug combination. This analysis should be based on the severity of the drug-drug interactions, the patient's modifiable risk factors and the mechanism in which the drug interaction results. In cases where the necessary doses may exceed the maximum dosing recommendations, community pharmacists should ensure that baseline and steady-state 12-lead electrocardiograms are performed. Patients should be made aware of the signs and symptoms of abnormal arrhythmias and precipitating factors that may result in TdP. We developed a clinical algorithm to guide community pharmacists in assessing and managing drug-drug interactions that involve potential QTc prolongation risks associated with these 3 medications.

CONCLUSIONS: Until further large-scale risk assessment tests and scoring can be performed, our clinical algorithm derived from a comprehensive environmental scan and literature review suggests that community pharmacists should utilize their medication therapy expertise and effectively communicate potential risks of QTc prolongation to patients.

Patients are at risk of information overload when starting an oral anticancer medication

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- OBJECTIVES:** This study was conducted in patients who were starting a new oral anticancer medication (OACM). OACMs are high risk medications due to complex administration instructions and potentially severe side effects that require patient self-monitoring. The goal was to understand if the drug information discussed in the initial drug counselling sessions conducted by the oncologist, clinic nurse and staff pharmacist in a busy cancer centre was retained by the patient 3 to 7 days after the counselling sessions.
- METHODS:** Patients starting an OACM were presented information about the medication in clinic by their oncologist with the clinic nurse. The patient was then counselled extensively by the pharmacist at the cancer centre and provided with the OACM. All counselling sessions were part of standard care and details were documented in the patient chart. Patients were then proactively called by the oral chemotherapy pharmacist within 7 days in order to complete a standardized questionnaire that elucidated what they remembered from the counselling sessions. Questions included how to take the OACM, how to manage missed doses, storage considerations, side effects to expect and side effect management. The answers to these questions were documented and then retrospectively collected and analyzed.
- RESULTS:** Despite extensive multi-disciplinary education, patients struggled to recall basic information about their OACMs. Pharmacists spent the majority of their counselling sessions focusing on side effects and management due to the toxic nature of these medications. However, patients were usually unable to identify common side effects and the majority could not recall toxicity management recommendations.
- CONCLUSIONS:** Taking into account the principles of health literacy, this study shows that patients starting a new OACM are often not able to retain medication-specific information. This reinforces the need to simplify initial education sessions and identify new ways to review toxicity self-management principles with patients throughout treatment.

The co-located pharmacist model: Opinions and barriers from the community pharmacist, physician and patient perspective

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OBJECTIVES: Our study aims to understand the opinions and perceived barriers of patients, community pharmacists and family physicians on a new, co-located pharmacist model in primary care. While various team-based primary care models have been explored across Canada, there is a need to better understand the role of the community pharmacist and the perspectives of the patient and physicians.

METHODS: Three paper-based surveys were developed based on prior research for patients, physicians and community pharmacists. Questions were on a 5 point-Likert scale or short answer style. Patient and physician surveys were collected from one clinic where co-located pharmacist services had been ongoing. Community pharmacists were surveyed from 10 pharmacies within closest proximity to the clinic.

RESULTS: Twenty-two pharmacists were surveyed with the majority indicating confidence in their ability to innovate and expand their scope of practice (Mean=4.18, SD=0.73), that physicians who work closely with community pharmacists significantly improve the quality of patient care (Mean=4.50, SD=0.51) and that co-located pharmacists can help improve communication and collaboration between physicians and community pharmacists (Mean=4.32, SD=0.65). Hesitancy towards major change was frequently mentioned as a barrier, including a lack of support from corporations or other health care providers. Other barriers included a lack of funding/time, inadequate staffing and training. Patients and physicians agreed that the co-located pharmacist is a valuable addition to the health care team (Mean=4.16, Mean=5.00) and wanted increased frequency of pharmacist visits. Foreign language needs and the availability of the pharmacist schedule were identified barriers.

CONCLUSIONS: The results support the co-located pharmacist model as a way to improve care and collaboration between physicians, patients and pharmacies. The role of the community pharmacist and the collaborative model with the co-located pharmacist needs to be further explored. A larger pilot of this model in more clinics is needed and has the potential to impact care and interprofessional teams.

Ready or not? Pharmacist perceptions of a changing scope of practice before it happens

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OBJECTIVES: Since 2012, Ontario pharmacists have been authorized to administer the influenza vaccine. In April 2016, the Ontario College of Pharmacists (OCP) proposed to expand the Pharmacy Act to allow pharmacists to vaccinate against 13 additional conditions. The OCP held an online public consultation and invited pharmacists, members of the public and organizations to weigh in on the proposed changes. Our objective was to explore the factors influencing how Ontario pharmacists may adopt or reject an expanding scope of practice using data from the public consultation.

METHODS: We coded the responses to the public consultation in 2 ways: 1) sentiment analysis and 2) an integrative approach to coding using Roger's Diffusion of Innovations theory across 5 domains: relative advantage, compatibility, complexity, trialability and observability.

RESULTS: On average, responses were moderately positive. Pharmacists most commonly mentioned relative advantages, including benefits for patients, pharmacists, physicians and the health system. Positive responses focused on accessibility for patients, improved vaccine coverage, lower health care spending and freed physician time, but cited lack of prescribing rights as a barrier to the proposed changes. Negative responses focused on increased workload, patient safety concerns and the complexity of travel medicine.

CONCLUSIONS: The expanded immunization services are likely to be well received by most pharmacists. Convenience and accessibility for patients were commonly cited benefits, but the changes will be only a slight improvement over the current system unless pharmacists can prescribe these vaccines. Although employers responded positively, the question remains if they will support pharmacists in a way that aligns with pharmacists' values and expectations. Decision makers must pay close attention to the pharmacy infrastructure and how this will impact uptake of these services. Recognition of this, combined with pharmacists' positive perceptions of the expanded scope, will facilitate smooth integration of this legislation into Ontario pharmacy practice.

Community pharmacists' views and practices regarding natural health products sold in community pharmacies

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OBJECTIVES: The objectives of this study are: 1) to assess the attitudes and practices of Alberta pharmacists regarding NHPs offered for sale in community pharmacies and 2) explore Alberta pharmacists' views of the evidentiary basis for clinical and related uses of NHPs, the indications for which NHPs are used and the regulatory process for approval and licensing of NHPs.

METHODS: Using Qualtrics, a web-based data collection and analysis software and a study instrument made up of 15 open-ended, closed and rating scale questions, we surveyed the attitudes and practices of 403 community pharmacists in Alberta regarding NHPs offered for sale in community pharmacies.

RESULTS: Majority of pharmacists surveyed (86%) recommend NHPs to clients sometimes to very often. Vitamin D, calcium, multivitamins, prenatal vitamins, probiotics and fish oil and omega-3 fatty acids were the most frequently recommended NHPs. Most common indications for which NHPs are recommended include bone and musculoskeletal disorders, maintenance of general health, gastrointestinal disorders and pregnancy. Review articles published in the Pharmacist's Letter and Canadian Pharmacists Journal were the primary basis for recommending NHPs. The majority of pharmacists surveyed recommend the use of NHPs concurrently with conventional drugs while a significant proportion recommend alternative use. Pharmacists in the study overwhelmingly provide counselling on NHPs to clients based on information obtained mainly from the Natural Medicines Comprehensive Database.

CONCLUSIONS: The study findings indicate a high prevalence of pharmacy care relating to NHPs among study participants. Although pharmacists' practices around NHPs are consistent with the existing licensing framework, we found some involvement in problematic practices that necessitate further research and potential policy scrutiny. The study also uncovered patterns of recommendations, including sources relied on in recommending NHPs and in providing counselling to patients, that raise concerns about the quality and credibility of NHP-related care provided to pharmacy patrons.

Applying STOPP/START criteria to elderly patients in the primary care home

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OBJECTIVES: Potentially inappropriate prescribing in older adults is a problem that is well documented in the literature and has been associated with serious adverse drug reactions, hospitalization and significant morbidity and mortality. Clinical support for the identification of potentially inappropriate medications and potential prescribing omissions is a priority for many clinicians in the primary care setting. The purpose of this research was to characterize the extent of potentially inappropriate prescribing, as defined by the STOPP/START criteria (Screening Tool for Older Persons potentially inappropriate Prescriptions, Screening Tool to Alert doctors to the Right Treatment), in the primary care setting.

METHODS: A retrospective, observational chart review of older patients (>65 years) was conducted in a single primary care practice in Prince George, British Columbia, Canada. STOPP/START criteria were applied to patient charts and the number of Potentially Inappropriate Medications (PIMs) and Potential Prescribing Omissions (PPOs) were recorded for each category.

RESULTS: A randomized convenience sample of 100 patient charts was reviewed. 38% of patient charts had at least 1 PIM, with an average of 0.5 PIMs per chart. 76% of patient charts had at least one PPO. When excluding START criteria relating to vaccinations, 35% of patients had at least one PPO with an average of 0.6 PPOs per chart.

CONCLUSIONS: Elderly patients are at risk of adverse events secondary to sub-optimal prescribing. The STOPP/START criteria may be a useful tool to flag medications that require clinician follow-up and assessment. Problem medications/classes identified in this study (e.g., benzodiazepines and other medications predisposing persons to falls) may be good targets for future quality improvement strategies.

Community pharmacists' experiences with the Saskatchewan Medication Assessment Program

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- OBJECTIVES:** Most provinces fund community pharmacy-based medication assessment programs, but data on program outcomes are limited. The Saskatchewan Medication Assessment Program (SMAP) launched in 2013. The objectives of this study were to: 1) determine the extent to which pharmacists perceive the SMAP is fulfilling its intended purposes and, 2) identify barriers and facilitators to fulfilling the SMAP purposes.
- METHODS:** A web-based questionnaire comprised of 53 Likert-scale items was utilized. Pharmacists practicing in Saskatchewan community pharmacies were eligible to participate. An email invitation was sent to these pharmacists in January 2016, with one reminder sent two weeks later.
- RESULTS:** A total of 228 responses were received (response rate 20.3%, n=228/1124). Most were staff pharmacists (64.3%, n=128/199), who worked 31-40 hours per week (57.5%, n=115/200) and who had completed at least one SMAP medication assessment (91.2%, n=207/227). The majority of respondents believed the SMAP was fulfilling its intended purposes. For example, 75.2% (n=161/214) strongly agreed or agreed that the SMAP improved health outcomes of seniors. The majority of respondents reported that they enjoyed performing medication assessments (84.6%, n=159/188), were confident in their ability to identify drug therapy problems (88.2%, n=172/195) and were comfortable making recommendations to physicians (81.7%, n=156/191). Many reported having trouble completing assessments and identifying drug therapy problems due to lack of patient history (67.2%, n=131/195), but few regularly contacted physicians to request missing patient information (10.3%, n=20/195). Common barriers reported to fulfilling the purposes of the SMAP were lack of time, patient difficulty coming to the pharmacy for the assessment and patients who did not meet eligibility criteria. Common facilitators were good pharmacy teamwork, employer support and personal passion for the service.
- CONCLUSIONS:** Most Saskatchewan community pharmacists perceive that the SMAP is meeting its intended purposes. However, several challenges were identified that may limit the potential impact of the program.

Impact of pharmacist-led workplace health events on participant health awareness and behaviour

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OBJECTIVES: To measure the impact of pharmacist-led workplace health events on participant health awareness and behaviour.

METHODS: Three health fairs were conducted for University of British Columbia (UBC) employees between 2013-2015 on heart, bone and lung health. Participants received health education, screening and consultation from pharmacy students and pharmacists. Participant opinion data was gathered via surveys developed and administered by UBC Human Resources. Clinical data was extracted from pharmacist notes. Analysis was by descriptive statistics.

RESULTS: UBC employees received a total of 691 services. Clinical and opinion data were collected for 100% and 91% of service episodes respectively. The average age of participants was 45.4 years and 76% were female. Of 228 heart health participants, 12.5% were at moderate to high cardiovascular risk. Of 264 bone health participants, none met target physical activity levels, with 31% and 41% meeting targets for vitamin D and calcium intake, respectively. Of 199 lung health participants, 6% were smokers, 12% reported asthma, 27% reported allergies with respiratory symptoms and 6% reported sleep apnea. The most commonly noted barriers to optimal lung health were sedentary lifestyle and obesity. More than a third (38%) of participants indicated their results were poorer than expected. Two thirds (62%) would not have talked to a health care professional before participating in a health fair and 37% reported motivation to continue engaging with a health care professional. One third of participants identified a specific health behavior change they planned on implementing, while an additional third were considering a new behavior change they had not considered previously.

CONCLUSIONS: Participants in pharmacist-led workplace health events gained awareness of undetected health issues and motivation to implement change after pharmacist consultation. Health promotion and disease prevention are important roles within the pharmacist's scope of practice.

Canadian study of adherence outcomes in adalimumab patients: Three-year results from the COMPANION study

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- OBJECTIVES:** Adalimumab (ADL) is a TNF-alpha inhibitor indicated for various inflammatory autoimmune diseases. Patients receiving ADL in Canada can enroll in the AbbVie Care patient support program (PSP). This retrospective study assessed the impact of PSP services and patient characteristics on persistence and adherence to ADL over a 3-year period.
- METHODS:** Upon probabilistic linkage to the IMS longitudinal pharmacy transaction database (LRx), PSP patients starting ADL between July 2010 and August 2012 were tracked for 36 months to calculate persistence (end if >90 days without therapy). Cox and multivariable logistic regression models provided hazard ratios (HR) and adjusted odds ratios (OR) to measure the association between patient characteristics/PSP services and persistence and adherence, respectively. Adherence was measured using the medication possession ratio (MPR) ($\geq 80\%$ MPR). Persistence analyses over 36 months were done in patients who were persistent up to when specific PSP services were introduced.
- RESULTS:** In the overall cohort (N=4,772), older age groups had significantly greater odds of adherence (40-49, 50-59, 60-69, 70+; OR=1.3, 1.4, 1.4, 2.1; $p < 0.05$ for all comparisons) relative to the 30-39 years age group. In patients (n=2,866) who were persistent when ongoing care coach calls became available, those receiving this service were 65% less likely to stop therapy (HR=0.35, $p < 0.01$) and 38% more likely to be adherent (OR = 1.38, $p < 0.01$) compared to those without it.
- CONCLUSIONS:** Ongoing care coach calls provided by the AbbVie Care PSP significantly correlate with greater patient persistence and adherence over 36 months. Patients aged between 30 and 39 years appear to have lower adherence compared to older age groups. These results may help refine services that improve treatment adherence.

Electronic medication adherence technologies' classification to guide use in older adults

Tejal Patel, PharmD; Maheen Farooqi, BSc candidate; Caitlin Carter, HBA, MLIS

OBJECTIVES: Medication non-adherence in the older adult population can be attributed to several factors (e.g., physical and cognitive functioning). Technologies available to address medication adherence range from alarms integrated into pill boxes to cloud-based pill dispensers that remotely connect the patient to caregivers and care providers. This project aimed to systematically find and classify available electronic medication adherence technologies (EMATs) and to determine how these EMATs would impact adherence based on specific factors.

METHODS: A Google search was conducted to identify EMATs available to Canadians. Additionally, websites of common suppliers were searched (e.g., Amazon, eBay, ePill). A supplementary search of PubMed, Embase, IPA and Scopus was also conducted. Each EMAT was classified by reviewing the description, obtaining the device and/or in discussion with the manufacturer. A preliminary scale was developed to assess the impact of EMAT on adherence, based on patient specific factors (e.g., physical and cognitive limitation, complexity of medications), impact on caregiver stress, availability of remote monitoring and safety.

RESULTS: The Google search revealed 344 results, of which 40 were relevant to the present project. A total of 80 EMATs were identified and classified as Automatic Pill Dispensers (APDs; n=28), Pill Boxes with Alarms (PBA; n=31), Vibrating Pill Box (VPB; n=3), Electronic Blister Pack (EBP; n=5), Reminder Alarms (RA; n=6), Clock Caps (CC; n=4), or Smart Caps (SC; n=3). APDs, PBAs, VPBs, EPBs and CCs were thought to improve adherence in older adults with cognitive limitations, improve caregiver stress and worsen adherence in persons with physical limitations. SCs would likely make no difference on adherence impacted by physical limitations, but may improve caregiver stress.

CONCLUSIONS: A significant number of EMATs are available to assist the older adult population with medication adherence. Our comprehensive EMATs list and scale will enable clinicians to recommend an EMAT based on patient specific limitations and needs.

Development and evaluation of a protocol for the periprocedural management of direct oral anticoagulants for percutaneous coronary procedures

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- OBJECTIVES:** Direct oral anticoagulants (DOACs) have emerged as recommended treatment for stroke prophylaxis in patients with non-valvular atrial fibrillation. Limited guidance exists regarding their peri-procedural management. At our institution, a pharmacy-developed guideline is available, but its use in practice is unknown. This study was conducted to evaluate its usability and identify the gap between the guideline and practice. Plasma DOAC concentrations were obtained to identify whether current recommendations resulted in DOAC levels that correlated with expected plasma concentrations reported in the literature
- METHODS:** This prospective observational study describes the current management of patients on DOACs undergoing elective coronary procedures. Information that was collected included: the date and time of the last DOAC dose, patients' past medical history, medications; physicians' instructions for peri-procedural management, patient adherence and periprocedural complications. Descriptive statistics were used. Pre-procedural blood samples were collected to measure plasma DOAC concentrations using anti-factor Xa levels (rivaroxaban and apixaban) and the Hemoclot® Assay (dabigatran).
- RESULTS:** Twenty-four patients were recruited between February and May 2016. Physicians' recommendations were consistent with our guideline in 12.5% patients suggesting that uptake on its use is low and/or inconsistently followed. Variability in physician practice was noted in the recommendations. Patient adherence to the recommendations was 70.8%. DOAC plasma concentrations of the study patients were consistently below reported "on-therapy" trough ranges—an expected outcome for patients who were off therapy for at least 24 hours. There were no significant peri-procedural complications.
- CONCLUSIONS:** The results of this study suggest that a revision to the institutional guideline is needed to improve its usability. Furthermore, patient education needs to be improved to increase adherence.

Pharmacists' perceptions and attitudes towards disease screening and prevention roles including HIV point of care testing

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- OBJECTIVES:** The purpose of this study is to determine pharmacists' current and ideal involvement in public health activities and explore pharmacists' perceptions and attitudes towards providing rapid HIV point of care (POC) testing.
- METHODS:** A cross-sectional web-based survey was distributed via email to pharmacists on the Alberta College of Pharmacist's clinical register. Survey questions were developed based on the literature; face and content validity were performed. The survey remained open for 3 weeks with 2 reminder emails. Descriptive statistics were used to summarize data.
- RESULTS:** A total of 141 pharmacists completed all sections of the survey (3.1% response rate). The majority of respondents were female (71%), working in community practice (79%) and licensed ≤ 10 years (54%). Pharmacists reported frequent involvement in public health activities including smoking cessation (45%), healthy eating (50%), screening for hypertension (65%) or diabetes (60%), and providing vaccinations (60%). In their ideal practice, most pharmacists reported support for increased involvement in public health activities. Approximately one-quarter of pharmacists offered POC testing in their practice; group A strep was most commonly reported. Most (72%) agreed that HIV POC testing would be a reasonable addition to the evolving role of community pharmacists and an important public health service. Nearly 50% of respondents indicated interest in providing HIV POC testing; barriers identified included lack of expertise/knowledge (89%) and lack of procedures for follow-up, confirmatory testing and access to care (73%).
- CONCLUSIONS:** Pharmacists reported frequent involvement in public health activities and a desire to increase involvement in their ideal practice. The majority of pharmacists agreed pharmacy based HIV POC testing would be an important public health service. Development and evaluation of a model for HIV POC testing in community pharmacies as well as education and training programs will help address challenges with expanding HIV testing in pharmacy settings.

Blood pressure reduction by prescribing pharmacists—Insights from the Multicentre Randomized RxEACH study

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OBJECTIVES: RxEACH was a 723 patient randomized trial of pharmacist care (including prescribing and laboratory monitoring) vs. usual care in patients at high risk for cardiovascular events (those with diabetes, chronic kidney disease (CKD), atherosclerotic vascular disease, or primary prevention with Framingham Risk > 20%). In this trial, estimated risk for major cardiovascular events was reduced by 21% over 3 months in the pharmacist care group when compared to usual care group. Blood pressure (BP) reduction had a major impact on this reduction in risk. Our objective was to evaluate the effects of pharmacist care on blood pressure reduction within the RxEACH study.

METHODS: This was a prespecified subgroup analysis. We used ANCOVA to evaluate differences in change in BP from baseline to 3 months between pharmacist care and usual care groups.

RESULTS: Overall, the contribution of BP to cardiovascular risk at baseline was 30% (SD 30) and BP reduction (difference in change in BP between pharmacist care and usual care groups at 3 months) was 9.4 (95% CI 7.7, 11.1) / 2.9 (95% CI 1.6, 4.2) mmHg ($p < 0.001$) in the full cohort of 723 patients. BP reduction in selected subgroups were as follows (subgroups not mutually exclusive): 1) 8.6/2.7 mmHg ($p = 0.002$) in 573 patients with diabetes, 2) 10.5/2.7 mmHg ($p = 0.013$) in 290 patients with CKD, 3) 11.4/4.7 mmHg ($p < 0.001$) in 220 patients with atherosclerotic disease, 4) 11.8/1.1 mmHg ($p = 0.655$) in 53 high Framingham risk primary prevention patients, 5) 12.2/5.2 mmHg ($p < 0.001$) in 440 (systolic) and 361 (diastolic) patients with uncontrolled BP at baseline and 6) 18.7 mmHg ($p < 0.001$) in 229 patients in the highest tertile of baseline BP.

CONCLUSIONS: In a randomized trial, application of pharmacists' advanced scope of practice resulted in clinically important BP reductions across all subgroups. These effects were greatest in those with the highest baseline BPs. Widespread application of these interventions could have important public health implications.

Sex-related clinical outcomes following generic clopidogrel commercialization: A population-based comparative safety study

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- OBJECTIVES:** Clopidogrel is widely used to prevent atherothrombotic events in secondary prevention. Generic drugs are licensed through comparative bioavailability studies and mostly conducted in men. No systematic post-marketing surveillance studies are conducted once generic drugs are commercialized. We evaluated the sex-related impact of generic clopidogrel commercialization on adverse events: emergency room consultations (ER) or hospitalizations.
- METHODS:** This interrupted time series analysis was conducted using data from the Quebec Integrated Chronic Disease Surveillance System. Rates of adverse events for clopidogrel users at risk ($n=74,925$; 45% women and 55% men) aged ≥ 66 years were calculated monthly, 12 months before and 12 months after generics commercialization. Monthly periods before and after generics commercialization were compared by segmented regression models with a specific variable for generic and brand-name users, stratified by sex and including a sex-related interaction term.
- RESULTS:** During the 2-year period, there was a monthly mean rate for 1000 users-month of 157 adverse events for all users (range: 147-177): 167 for women (151-183) vs. 149 for men (136-173). In sex-stratified models, there was an increase in adverse events rates of 24.9% and 19.3% for generic women and men users respectively the month of generics commercialization, both higher vs. brand-name users ($p<0.0006$). In models including sex and its interaction term, women had 14.5% more adverse events vs. men over the observed period ($p<0.0001$), independently of generic or brand-name usage at the moment of generics commercialization ($p=0.7625$).
- CONCLUSIONS:** Among generic clopidogrel users, similar patterns of increased rates of adverse events were observed soon after generics commercialization for women and men. Women had consistently higher adverse events rates compared to men either on brand-name or generic clopidogrel. Further population-based post-marketing surveillance studies, such as cohort studies controlling for potential confounders, would be required to test potential causality.

Economic analysis of community pharmacists providing influenza vaccination in Ontario

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- OBJECTIVES:** In 2012, Ontario pharmacists were authorized to administer influenza vaccines to individuals 5 years of age and older. Little is known on the economic impact of allowing pharmacists to vaccinate against influenza. The aim of this study was to conduct a pre-post comparison of the health care resource use and indirect costs associated with this legislative change, from 2011/12 to 2013/14. The Ministry of Health perspective was applied to estimates of direct health care costs and the societal perspective was applied to indirect health care cost estimates.
- METHODS:** Changes in vaccination rates were determined from administrative data. Efficacy of the vaccine, rates of physician and emergency department visits, hospitalizations and lost productivity due to illness from influenza or obtaining the vaccine in different settings were obtained from the literature. Program costs considered both vaccine costs and professional fees.
- RESULTS:** A net increase of 448,000 vaccinations was realized after pharmacies participated in influenza immunization. A cost to the health system of approximately \$6.3 million was incurred from these additional vaccinations and a savings of \$763,000 in direct health care costs was estimated, as the population vaccinated in pharmacies tended to be younger and healthier individuals. From a societal perspective, up to \$4.5 million in lost productivity was saved as a result of workers not having to take time off to obtain the vaccine at community pharmacies (highlighting their greater accessibility and longer operating hours) compared to other settings and an additional \$3.4 million was saved from reduced absenteeism due to influenza illness.
- CONCLUSIONS:** The convenience of pharmacy-based vaccination rates among younger and healthier patients is estimated to result in savings from both direct and indirect/productivity costs. As this population of working adults are frequently caregivers for children or aging parents, vaccination of this hard-to-reach demographic is also expected to further reduce flu transmission to these more vulnerable populations.

Sex and gender-based analysis in pharmacy practice research

Lisa McCarthy, PharmD, MSc; Nancy Waite, PharmD, FCCP; Emily Milne, PhD; Martin Cooke, PhD; Katie Cook, MA; Feng Chang, PharmD; Beth Sproule, PharmD

OBJECTIVES: Many health outcomes are potentially affected by both biological differences associated with sex and by socio-cultural processes connected to gender. We sought to understand the extent to which sex-gender based analysis (SGBA) is included in pharmacy practice research.

METHODS: Scoping review of English-language studies identified through search of MEDLINE, Embase, International Pharmacy Abstracts (IPA) and CINAHL (inception to Jan 2014). Two raters independently screened citations to identify titles and abstracts that included key words related to sex or gender and studies that could be categorized as pharmacy practice research. One author extracted data from included studies related to study design, population, intervention/exposure and outcomes, with results reviewed by a second author. All authors reviewed eligible articles to categorize them according a previously-developed typology and to assess 4 criteria: 1) the inclusion of sex or gender in research objectives, 2) the depth of sex/gender analysis incorporated into study designs and reporting, 3) the inclusion of sex or gender considerations in interpretation of study results, 4) the intentional and accurate use of sex/gender language.

RESULTS: Of 458 unique search results, 6 articles met the inclusion eligibility criteria. Two of these 4 publications were considered to have included sex/gender considerations in a model consistent with SGBA as described by Hammarström. Three of the 6 studies inaccurately applied sex and gender terminology, whereas the 2 studies that featured sex or gender in their primary research question did use these terms appropriately.

CONCLUSIONS: Despite increasing attention on sex-gender based considerations by policy makers and research funding agencies, there was a paucity of pharmacy practice research publications that conducted SGBA. This presents the pharmacy practice research community with an opportunity to explore questions related to SGBA and intersectionality and to support international efforts to increase inclusion of sex/gender considerations in health research.

Reducing occupational exposure: An evaluation of cleaning methods to decontaminate work surfaces exposed to antineoplastic drugs

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OBJECTIVES: Pharmacists, technicians and nurses have the highest potential exposure risk to antineoplastic drugs in health care facilities. Occupational exposure to these drugs can be reduced by an appropriate cleaning of work surfaces and floors. NIOSH and oncology societies have not determined the optimal combination of cleaning products and devices to be used for cleaning of pharmacy and patient care areas potentially contaminated with hazardous drugs. The objective was to compare the efficacy of cleaning products and devices usually employed in health care facilities to eliminate environmental contamination to antineoplastic drugs.

METHODS: This is an evaluative and comparative study of 8 cleaning scenarios involving 4 cleaning products (sodium hypochlorite, quaternary ammonium, hydrogen peroxide, detergent) and 2 cleaning devices (disposable and reusable microfiber mops). The study was conducted in 3 phases: the voluntary contamination of the floor of a non-clinical room with a pre-established quantity of cyclophosphamide (20 000 000 ng), the cleaning of the floor according each scenario, the quantification of cyclophosphamide detected on the floor using wipe samples.

RESULTS: A total of 36 wipe samples were performed. Of the 4 cleaning products tested in triplicate with 2 different cleaning devices (n=24 samples), the average rate of efficacy of cleaning strategies was 99,72% \pm 0,25%. Average rate of efficacy was not statistically different between both disposable and reusable devices (99,58% \pm 0,28% vs. 99,86 \pm 0,28) and between the 4 cleaning products (e.g., detergent 99,53% \pm 0,41, quaternary ammonium 99,74% \pm 0,15, sodium hypochlorite 99,86% \pm 0,11, hydrogen peroxide 99,75% \pm 0,15). Despite numerous cleanings of the floor, a residual concentration of cyclophosphamide was still detectable. Further studies are required to confirm the residual traces or analytical cross contamination

CONCLUSIONS: The study showed that the efficacy of cleaning products and devices usually employed in health care facilities was comparable.

The out-of-pocket cost burden of prescription drugs: A pan-Canadian comparison

I fan Kuo, MSc, PharmD; Katlyn Taylor, BScPharm; Shawn Bugden, MSc, PharmD; Silvia Alessi-Severini, PhD

OBJECTIVES: In Canada, prescription drug reimbursement policies by public payers vary across each provincial jurisdiction. This study aimed to 1) characterize the current provincial public drug insurance programs and 2) compare Canadians out-of-pocket (OOP) drug costs across provincial jurisdictions.

METHODS: Information concerning each provincial drug plan was collected as of August 2016, including eligibility, cost-sharing strategies, maximum payable, dispensing fee, drug cost, drug markup and maximum days supply. Multiple clinical scenarios highlighting common chronic conditions were developed for analysis from the senior and non-senior perspectives, applying five different income thresholds.

RESULTS: Public prescription drug plans varied across jurisdictions in terms of eligibility and cost-sharing strategies. Consequently, OOP costs differed for Canadian residents depending on their income, age and province of residence. Income was found to have a greater role in determining OOP costs for non-seniors relative to seniors. In one case, annual OOP cost for a non-senior earning the national average income ranged from \$461 in Saskatchewan to \$2526 in Quebec. Differences in OOP costs were largely attributed to cost-sharing strategies under each provincial drug programs, while drug costs remained fairly consistent across provinces.

CONCLUSIONS: Prescription drug coverage varied across Canada and resulted in disparate OOP cost for Canadians across all income levels and age groups. While recent strategies (i.e., pan Canadian Pharmaceutical Alliance) have reduced and standardized drug pricing across the country for several therapeutic agents, future policy should focus on minimizing the disparity in cost-sharing schemes between provinces to improve equitable prescription drug access for Canadians.

Point prevalence survey of antimicrobial use in small acute care hospitals in Nova Scotia

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OBJECTIVES: Point prevalence surveys (PPS) are used to monitor antimicrobial use and identify targets for improvement through antimicrobial stewardship (AMS) activities. The objective of this study was to determine prevalence and characterize antimicrobial use at acute care hospitals in small communities across Nova Scotia (NS).

METHODS: Hospitals in rural or small to medium population centers (population < 100 000) with at least 30 acute care beds were invited to participate in a PPS of antimicrobial use in 2015. Paper-based inpatient charts were reviewed to identify adult and pediatric patients receiving a systemic antimicrobial agent by 0800 on the day of the survey. Data was gathered on type of antimicrobial agent prescribed, dose, administration route, intended duration of use and indication. Adherence to regional guidelines for 4 indications was also assessed in adult patients. Results were summarized descriptively.

RESULTS: Ten of the 11 hospitals in small communities meeting inclusion criteria participated. Most hospitals had clinical pharmacists however, only 1 hospital had an on-site AMS pharmacist and few hospitals had an infectious disease specialist. The overall prevalence of antimicrobial use among the 10 hospitals was 27.6% (233/845) and ranged from 20.3% (13/64) to 43.5% (30/69). The most common indications for antimicrobial use were respiratory tract infections (19.8%), urinary tract infections (16.5%) and prophylaxis (16.5%). The most frequently prescribed class of antimicrobial agents were cephalosporin antibiotics (28.0%) and quinolones (20.0%). The majority of patients (61.1%) received parenteral antimicrobial agents. Low uptake of regional guidelines was identified.

CONCLUSIONS: Antimicrobial agents were frequently prescribed to acute care patients in small community hospitals. A number of AMS targets were identified. Clinical pharmacists working in communities without comprehensive AMS programs or resources can play an important role in improving antimicrobial use through initiatives such as promotion of intravenous to oral de-escalation and encouraging adherence to regional guidelines.

Home care pharmacy practice in Canada: A cross-sectional survey of services provided, remuneration, barriers and facilitators

Sherilyn Houle, BSP, PhD; Linda MacKeigan, BScPharm, PhD

- OBJECTIVES:** Despite the medical complexity of patients receiving home care, pharmacists appear to be rarely formally acknowledged as members of home care teams. The aim of this study was to determine the number of Canadian pharmacy practices providing services to patients in their homes.
- METHODS:** A web survey was designed and disseminated to Canadian pharmacists via pharmacy association newsletters and through targeted emails to those known to practice in the area. Respondents who are currently practicing, conduct at least one home visit per week for clinical purposes and who document these visits were eligible. The survey examined the frequency of visits, medication management needs of patients, care provided, documentation practices and perceived barriers and facilitators. One survey was to be completed per work site to capture the number of unique practices in Canada.
- RESULTS:** 17 practices were identified from October-December 2015, comprising 7 community pharmacies, 3 consultant practices, 3 home care agencies or government-administered programs, 2 outpatient clinics and 2 hospitals. Three practices charged a home care agency and 5 received remuneration from provincial pharmacy services billing programs, while 3 received no remuneration. The remainder consisted of funded staff positions within a home care program. A median of 9 visits were performed per practice per month, with the highest number observed among pharmacists employed by independent community pharmacies and home care agencies. Medication reviews and adherence assessments were the most common reason for referrals. 12 of 17 respondents collected some form of outcome data. Referrals from other health professionals and supportive management were the key facilitators of the service, while insufficient reimbursement and resistance from other health professionals were key barriers.
- CONCLUSIONS:** Pharmacist home services appear to be an infrequent area of practice nationally. Future work will examine the impact of pharmacist practice in home care on patient and health system outcomes.

Community pharmacy practice and integrated e technology: Feasibility and lessons learned for seniors' care for the 21st century

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OBJECTIVES: Remote monitoring of health for seniors is readily available. However, feasibility, patient and staff acceptance are not well studied. The objective of this study was to pilot the feasibility of integrating a pharmacy medication record (oneMAR) in an assisted living facility with data from wireless monitoring devices for vital signs and body functions.

METHODS: This pilot study involved 4 phases: Phase 1: identifying the vital signs and features to be monitored and selecting devices, phase 2: site readiness assessment, subject recruitment and baseline interviews, phase 3: staff training at the facility, phase 4: data collection and integration. The technology included 3 devices to measure weight, blood pressure, hydration and oxygen saturation. An alert system was built to send a message immediately to a staff member at the facility if data fell outside of a desirable range. The data was analyzed descriptively.

RESULTS: A total of 53 seniors (23 control, 30 intervention) were recruited from one assisted living facility in Calgary, Alberta. The readiness assessment highlighted that for residents, comfort of devices was an important aspect. For staff, time to use technology and interpret the data and confidence in using the technology were important. These aspects were considered when choosing the devices. Measurement of patient data was partially successful with the selected devices. Challenges included staff and resident turnover and drop-out. The linking of medication records were delayed, which required a change in process to create alerts.

CONCLUSIONS: Technology to monitor seniors health may not easily integrate with existing pharmacy and medication records used in assisted living facilities due to technological challenges. Concerns regarding staff preparation and patient comfort must also be considered in implementing technology for seniors.

A review of geriatric assessment tools for medication management and medication administration in older adults

Cheryl Sadowski, BScPharm, PharmD; Phoebe Hsu, BScPharm candidate; Mai Lang, BScPharm; Travis Featherstone, BScPharm

OBJECTIVES: Older adults may have difficulty managing their medication regimens, which requires assessment to address any potential problems. The purpose of our study was to identify and evaluate the content and applicability of geriatric medication assessment tools (GMATs) relating to medication management that could be used by pharmacists in any practice setting.

METHODS: We searched MEDLINE, EMBASE and PubMed for articles published on GMATs. The databases were searched from inception through September 2016 and restricted to the English language. Exclusion criteria included study samples that did not include older adults, tools related to specific disease states and tools not related to medication management. A title/abstract screening was done, followed by full article review. We also conducted a reference search of key white papers/position papers (including the American Geriatrics Society Multimorbidity Guidelines). Articles selected were further reviewed manually for their reference lists. Data was abstracted by 2 reviewers for specific features of the tools.

RESULTS: The search produced 62 articles, in which 4 unique assessment tools were found, with an additional 4 assessment tools identified through the AGS, for a total of 8 medication management tools. The tools were designed to take between 5-30 minutes to administer and each tool generated a numeric score. Only 5 of the tools used the patient's own regimen and 3 used a standardized regimen. Five of the tools identified if patients required additional supports for medication management. Most tools were correlated with a functional or cognitive measure.

CONCLUSIONS: A number of validated tools are available to determine medication management ability in older adults. Because there is no evidence of superiority of any single tool, the decision of using one tool over another is dependent on setting, outcomes being measured, the limitations with regards to time and materials needed to administer the tool.

Case finding for geriatric syndromes in community pharmacies

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OBJECTIVES: Geriatric syndromes (falls and lower urinary tract symptoms [LUTS]) are highly prevalent in older adults and cause a burden to the patient and health care system, yet remain poorly assessed and undertreated. Objective: To identify the prevalence of falls and LUTS in community dwelling seniors accessing pharmacy services.

METHODS: This case finding study involved pharmacy and medical students on their community clerkship rotation surveying consecutive older adults (age 65 year and older) in pharmacies regarding geriatric syndromes. The questionnaire included basic demographics, self-report of falls over the past year, self-report of LUTS (incontinence in the past 4 weeks) and if the individual had sought health care assistance for these conditions. After completing the questionnaire, the students provided the subjects with brochures on these syndromes. The data was analyzed descriptively using SAS 9.4.

RESULTS: A total of 152 subjects were surveyed, 62% were female and mean age 75.9 (SD 8.3). More than one third of the participants (38%) reported falling. Of those 35% were injured, yet the majority of them did not discuss it with a health care professional. More than half of the participants (58%) reported LUTS symptoms, but only 25% of them discussed them with a health care professional. When discussing geriatric syndromes, the vast majority of the participants discussed them with a physician (97%).

CONCLUSIONS: Falls and LUTS are common geriatric syndromes that older adults do not commonly address with health professionals. There are opportunities for pharmacists in the community, using simple tools, to start the conversation with patients about these syndromes.

Evaluating readability and legibility of patient health information: A review of available tools

Cheryl Sadowski, BScPharm, PharmD; Ghasak Hussain, BSc

- OBJECTIVES:** There are multiple instruments that have been developed to direct the formatting and design of patient education materials to enhance readability. The aim of this study was to compare and contrast validated tools available to guide the formatting and readability of patient information materials.
- METHODS:** The primary objective of this narrative review was to identify tools to assess readability and legibility of health information. Online databases, including MEDLINE, Pubmed, ERIC, HAPI, EMBASE and Web of Science, were searched for relevant publications. These sources were searched for papers containing the terms readability, legibility, font, typography, health education, patient education, health material, consumer health information, tool, instrument, test, scale, assess, measure and valid. The publications relating to these tools were reviewed and data abstracted about the tool characteristics (including content and format of assessment, administration time, advantages, disadvantages).
- RESULTS:** Twenty readability formulas and seven legibility tools met the inclusion criteria. These instruments differ slightly in the variables assessed and formulas utilized. Most tools use a calculation of sentence length or syllables per word. All tools provide some sort of scoring or classification system for level of reading, often relating the level to a grade-school level based on North American education. Only 3 tools were validated for health information. A common disadvantage is the requirement to buy particular software and the time-consuming nature of reviewing a particular passage or document and the focus on English language materials.
- CONCLUSIONS:** There is a diversity of tools available that can assist health professionals in designing readable health information for patients. There is not one tool that fully addresses legibility and readability, although the Simple Measure of Gobbledygook Grading (SMOG) may be most useful for patient brochures or leaflets, due to scoring, ease of administration and high correlation with other readability tools.

Physical function and drugs in the elderly: A scoping review

Cheryl Sadowski, BScPharm, PharmD; Jonathon Thomson, BSc; Allyson Jones, PhD; Christina Shaw, BScPharm candidate; Adrian Wagg, MB, BS, FRCP, FRCP(E), FHEA (MD)

OBJECTIVES: Over half of older adults use medications long-term to treat a chronic condition. Although side effect profiles are well known, evidence has not been synthesized regarding medications impacting physical function. This evidence gap poses a challenge for clinicians making decisions about medication use in older adults at risk of functional impairment. The purpose of this scoping review was to evaluate the literature regarding medication and function in older adults.

METHODS: Databases searched were MEDLINE, EMBASE and CINAHL. Study restrictions included English language, subjects mean age >64 years, medications from top 10 drug classes used by older adults and having a validated physical function test. The titles/abstracts were screened by 2 individuals and the full text articles were abstracted by 2 individuals, with consensus used for discrepancies.

RESULTS: We screened 11,375 titles/abstracts, with 41 articles meeting our inclusion criteria. The studies were divided into two categories, with 21 focusing on physical function and 20 focusing on falls. For physical function, antihypertensive medications lead to motor decline. Most cardiovascular medications (statins, ACE inhibitors [ACE-I], thiazides) showed no impairment with grip strength or overall muscle strength. Findings of functional status with statins and ACE-I were mixed. Although risk of falling was increased within the first 3 weeks of initiating most cardiovascular medications (ACE-I, beta-blockers, nifedipine, candesartan and thiazides), no risk was seen with chronic users (> 12-month use).

CONCLUSIONS: There is limited literature available regarding how medications impact physical function in seniors. Most studies did not include functional measures as primary outcomes.

PharmaZzz: Feasibility and impact of pharmacist-delivered cognitive behavioural therapy for chronic insomnia

Fred Remillard, BScPharm, PharmD, BCPP; Karen Jensen, BSP, MSc; Loren Regier, BSP; Janelle Trifa, BSP; Lindsay Edgington, BSP candidate

- 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. 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 training manual for pharmacists and accompanying patient workbook were developed by our student researcher. These were reviewed and revised by a focus group of selected community pharmacists. In Phase 2, interested community and primary health care pharmacists were recruited to attend a one day workshop to train for CBTi, then asked to recruit and provide CBTi to 5 patients with chronic insomnia during the next year (August 1st, 2015 to July 31, 2016). Pharmacists recorded de-identified patient participant data on the PharmaZzz webpage.
- RESULTS:** The workshop was attended by 13 community and 3 primary health care 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 number expected) 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, 3 (43%) were able to decrease hypnotic use and 2 (29%) were able to stop hypnotic use completely.
- CONCLUSIONS:** Pharmacists are able to effectively deliver CBTi in both community and primary health care settings but time constraints, lack of reimbursement and difficulty recruiting and retaining patients are barriers to providing the service.

Medication information services: Still relevant in the Internet age?

Karen Jensen, BSP, MSc; Yvonne Shevchuk, BSP, PharmD; Martin Rachel, BSP

- OBJECTIVES:** The value of medication information services for community pharmacist practice has been questioned due to increased access to online drug information resources. The objectives of this study were to assess the usefulness of medication information provided to community pharmacists by a medication information service in Saskatchewan and to determine to what extent this service improved patient care and promoted positive patient outcomes.
- METHODS:** After a comprehensive literature review, a fourth-year pharmacy research student designed a survey to evaluate the research objectives. The link to the online questionnaire was sent to 79 pharmacists who submitted a query to the medication information service and consented to participate during the month of July, 2015.
- RESULTS:** Use of information provided to pharmacists: inform or reassure patients (75%); reassure pharmacists about existing therapy (51%); modify existing therapy (35%); learn about alternative / new therapy (27%); initiate new therapy (27%); identify potential drug interactions (15%); identify adverse events (15%); stop therapy (4%); and others (7%). Patient outcomes reported: prevention of disease / symptom (19%); optimized medication administration (65%); reduction / elimination of symptoms (19%); resolution of therapeutic problem (30%); arresting / slowing disease process (5%); and others (3%). The majority of pharmacists (93%) felt the information provided by the medication information service enhanced their ability to service their customers; almost 50% of pharmacists felt the information enhanced their reputation with their interprofessional colleagues.
- CONCLUSIONS:** Information provided to pharmacists by medication information consultants is used for direct patient care (education, treatment decisions) and results in positive outcomes for patients. In addition, pharmacists feel access to this information enhances their image with patients and other health care professionals. Medication information services continue to provide services which are of value to community pharmacists.

Use of aggregate medication incident information by community pharmacies

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OBJECTIVES: To explore the uptake and use of aggregate medication incident (MI) information (i.e., summaries of MIs occurring elsewhere) in community pharmacies.

METHODS: Semi-structured interviews were conducted using a convenience sample of 15 community pharmacy managers in Halifax, Nova Scotia. The study focused on community pharmacy use of aggregate MI information provided by the Institute for Safe Medication Practices Canada (ISMP Canada), including information available through the online Community Pharmacist Incident Reporting (CPhIR) system. Interview questions elicited participant feedback on: (1) how the pharmacy accesses aggregate MI information (i.e., specific sources accessed); (2) how the pharmacy uses the aggregate MI information available to them; and (3) what barriers inhibit the use of aggregate information to enhance patient safety. Interviews were audio recorded, transcribed and analyzed using thematic analysis.

RESULTS: No common source for accessing aggregate MI information was identified. Pharmacies more commonly used CPhIR to explore their own data rather than the different aggregate level reports available. When accessed, variable approaches were used to disseminate aggregate MI information, ranging from acting on an MI right away to discussing them at quarterly meetings. Four overarching themes emerged regarding barriers to the uptake of aggregate MI information: 1) competing sources of information; 2) inability to identify relevant information quickly; 3) difficulty matching the information to the specific need; and 4) general time constraints

CONCLUSIONS: While pharmacies use aggregate MI information to enhance patient safety, lack of time, lack of knowledge about where to get information and lack of tailored information for the community pharmacy context limit its potential benefits. Results indicate a need for increased awareness (e.g., what sources will benefit the pharmacy), reduced information overload (e.g., simplifying and streamlining access) and enhanced information customization (e.g., increased focus on community pharmacies).

Quality of online information regarding oral combined hormonal contraceptives: A content analysis

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- OBJECTIVES:** Combined oral contraceptives (COC) remain a popular choice among women. The Internet is an easily accessible source of information on contraception options. The objective of this study was to evaluate the quality of information provided on COCs on the Internet.
- METHODS:** A quantitative content analysis was completed on websites containing patient health information on COC. The search was completed in October 2016 using Google. Search terms included birth control pill, oral contraception, oral birth control, birth control and pregnancy prevention. The first 3 pages of search results were screened according to inclusion and exclusion criteria. The DISCERN instrument was used to determine the content quality. Websites were analyzed separately by two coders; discrepancies were resolved by a third coder.
- RESULTS:** Of the 155 websites identified, 32 were eligible for review. Only 25% of sites mentioned that COCs were safe. Majority provided at least one mechanism of action (94%). Most sites mentioned contraceptive benefit (84%), however non-contraceptive benefits were variable with dysmenorrhea (84%) and menstrual blood loss (84%) most commonly mentioned. Increased risk of VTE was listed in 78% sites, alongside stroke (53%) and myocardial infarction (44%). The most common side effect listed was breakthrough bleeding (97%) with mood changes in 50% of sites. Contraindications were listed in just over half of the sites. Only 34% of sites provided correct information on starting COC, while just 16% sites included information that was accurate on what to do with missed pills. Few sites addressed myths of COC. The DISCERN score for overall quality was 2.84 (SD±0.72) indicating low to moderate quality. The mean Flesch-Kincaid Grade Level was 9 (SD±2.0).
- CONCLUSIONS:** Online information on COCs was variable in quality, often missing key information to make informed decisions. Pharmacists should be cautious when advising women to retrieve health information regarding COCs online.

Impact of pharmacist activities on medication regimen complexity of patients monitored by pharmacists in family medicine groups

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Line Gunette, BPharm, MSc, PhD*

- OBJECTIVES:** Context: Medication regimen complexity can have a negative impact on medication taking and several health outcomes. Pharmacists working in family medicine groups (GMF or UMF), through their interventions in patients with complex needs could reduce medication regimen complexity. Objective: To compare medication regimen complexity in patients referred to GMF-UMF pharmacists by their physician, before and after pharmacists interventions.
- METHODS:** A pre-post intervention study was conducted from August 2015 to April 2016, in patients with complex needs monitored by pharmacists in 4 Quebec City GMF-UMF. Complexity of therapeutic regimens was calculated with the Medication Regimen Complexity Index (MRCI), using medication reconciliation, performed at the start of follow-up (MRCI-1) and 4 to 6 months later (MRCI-2). A two-tailed Student t-test on a paired sample was performed to compare the 2 MRCIs.
- RESULTS:** Thirty-seven patients with 2 MRCIs were selected for this analysis: 26 women (70.27%) and 11 (29.73%) men. Median age was 74 years (interquartile: 64-82) and the mean Charlson Comorbidity Index (CCI) was 6.95 (\pm 3.21). The mean number of prescribed drugs at study start was 13.51 (\pm 5.54) while it was 12.19 (\pm 5.26) after pharmacists interventions. The mean MRCI-1 was 36.47 (95% confidence interval [CI]: 31.00 to 41.95) and the mean MRCI-2 was 32.41 (95% CI: 27.63 to 37.18). The difference in MRCI means was 4.07 (95% CI: -3.07 to 11.21) with a P-value > 0.05.
- CONCLUSIONS:** Patients with complex needs monitored by pharmacists in GMF-UMF have complex medication regimens. Our results suggest that this medication regimen complexity decreases after GMF-UMF pharmacist interventions. Nevertheless, the difference was not statically significant, probably because of the low statistical power achieved. A study with a larger number of patients, a longer follow-up and a control group would be required.

A retrospective audit of medication prescribing practices: A quality improvement initiative

Taban Saifi, PharmD; Erin Cicinelli, HBSc; Rachel Liu, PharmD candidate; Doret Cheng, BPhm, RPh, PharmD; Jacinta Apio, BPhm; Jacob Lachere, BPhm

OBJECTIVES: Adverse drug events due to medication errors can occur at the prescribing, dispensing and administration levels of drug use and are considered preventable. Patient and medication safety initiatives in low-resource settings may face more barriers than in high-income countries. We aim to describe the prescribing practices (adherence to institutional and national practice guidelines and missing components of orders) in a large acute care institution in Uganda.

METHODS: A data collection tool was created to retrospectively audit the presence of all required components of a medication order and adherence to institutional and national clinical guidelines. An order was confirmed to have followed guidelines if it was legible, written using full generic names and included all components of an order (i.e., drug, strength, dose, frequency and duration of therapy). Data collection took place over 1 week and was completed by 3 pharmacy team members

RESULTS: Overall, 282 orders were assessed. Of these, 108 (38%) and 114 (41%) orders were adherent to institutional and national practice guidelines, respectively. The most common missing components of an order were duration of therapy (81%), followed by indication (34%) and frequency (7%).

CONCLUSIONS: This preliminary audit is part of a larger, interdisciplinary initiative led by the hospital's pharmacy department to improve pharmaceutical care and patient outcomes at a large acute care hospital in Uganda. The data collected from this study will inform the development of systems and interventions (e.g., implementation of antimicrobial stewardship principles, pre-printed order sets, etc.) to improve prescribing practices.

Enhancing appropriate prescribing by promoting the tenets of a long-term care formulary: Interim analysis of a formal quality improvement initiative

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- OBJECTIVES:** In September 2016, the Ontario Long-Term-Care (LTC) Medication Management Demonstration Project was launched, a voluntary initiative developed by the MOHLTC Working Group to proactively address burgeoning provincial drug costs. The project consisted of a LTC formulary promoting fiscally responsible and therapeutically equivalent choices among 7 drug categories. The following 4-month interim analysis of a structured quality improvement initiative supporting the Demonstration Project involved 3 LTC facilities, totalling 995 beds. The objectives were to reduce drug costs by 20% at 6 months and measure the feasibility of a LTC formulary in clinical practice by evaluating clinical outcomes and the rationale of rejected recommendations.
- METHODS:** Two approaches were observed; a traditional approach where a pharmacist provided written recommendations to physicians regarding potential substitutions and a focused review where the physician and pharmacist met to discuss the pharmacist's recommendations. Follow up costs and clinical outcomes were monitored on a weekly basis and compared to the baseline evaluation.
- RESULTS:** There were 408 out of 995 residents at baseline with 1 active prescription for one of the targeted molecules identified in the LTC formulary with 502 recommendations generated. At 4 months, drug costs for the medications within the top 5 targeted drug categories were reduced by 25.7% with the focused review and 7.2% using the traditional approach. Overall recommendation acceptance rate in two LTC homes was 60% using the focused review and 20% at a comparator LTC home using the traditional approach. Of the accepted recommendations, 95.3% of residents remained clinically stable.
- CONCLUSIONS:** The introduction of a LTC formulary is a feasible strategy to optimize cost effectiveness and maintain therapeutic equivalence. A dedicated focused review appears to be the most effective approach. The projected annual cost savings is \$8.95M if used across all LTC homes in Ontario and possible greater savings if this process was legislated.

Distribution of influenza vaccine to community pharmacies in Ontario: The 2015-16 flu season experience

Richard Violette, MA; Nancy Waite, PharmD, FCCP; John Papastergiou, BScHons, BScPharm; Sherilyn Houle, BSP, PhD; Jane Pearson-Sharpe, BSc; Emily Milne, PhD

OBJECTIVES: Prior to the 2016-17 flu season, Ontario distributed influenza vaccine to community pharmacies via two mechanisms: one inside the Greater Toronto Area (GTA) and the other outside. Issues related to the acquisition of influenza vaccine have been cited by pharmacists as a barrier to providing immunization to patients. A survey was conducted during the 2015-16 influenza season to understand the experience of community pharmacies in acquiring the vaccine and to assess the impact of distribution practices on patients, pharmacists and pharmacies.

METHODS: A random and proportionally representative sample of 400 community pharmacies participating in Ontario's Universal Influenza Immunization Program (UIIP) across the 36 Public Health Units was identified. Screening and recruitment of respondents was done by phone prior to survey launch. Descriptive analyses were conducted.

RESULTS: The survey was completed by 172 respondents. Results suggest that under this distribution system, many community pharmacies experienced issues acquiring influenza vaccine, especially early in the season. One third of pharmacies (32.7%) reported that the first order of influenza vaccine did not arrive in time for the start of their immunization initiative. Most pharmacies (97.3%) reported patients asking for the vaccine prior to first order fulfillment, almost half of pharmacies (40.6%) reported instances where they could not provide vaccine and 39.2% reported being out of vaccine more than 5 days during flu season. Pharmacies estimated losing between 10-50 opportunities to vaccinate due to fulfillment issues.

CONCLUSIONS: With the recently implemented wholesaler distribution system for pharmacies outside the GTA in the 2016-17 flu season, our data provides a necessary snapshot of past practices through which the new distribution system can be more readily assessed to ensure that previous inefficiencies are not repeated; and that the influenza immunization needs of Ontarians are being met with improved, timely and consistent access to the vaccine for community pharmacists.

The fragility of bisphosphonate formulary policy

Cole Lane, BScPharm candidate; Shawn Bugden, BScPharm, MSc, PharmD; Kevin J Friesen, MSc; Jamie Falk, BScPharm; Olasumbo Ojo, BSc (Pharm), MSc candidate

OBJECTIVES: To evaluate the impact of the change from pharmacist managed (Part 2 Exception Drug Status EDS) to physician controlled (Part 3 EDS) restricted access to bisphosphonates.

METHODS: Utilization of oral bisphosphonates was assessed using data from the Manitoba Drug Program Information Network (DPIN) from 1998-2014. Incident use, overall utilization and medication costs were assessed before and after EDS coverage policy changes. Administrative data was used to assess the proportion of new users meeting 1 of 3 criteria (osteoporotic fractures, bone mineral density t-scores 2.5, or x-ray diagnosis of osteoporosis) using linked data from the Manitoba Population Research Data Repository.

RESULTS: Alendronate and risedronate were the most common oral bisphosphonates used, comprising 68% and 20% of the new users (n = 61,260), respectively. Since restricting bisphosphonate coverage, the proportion of users meeting coverage criteria increased modestly from 29.5% [95% CI: 27.0%-32.0%] to 34.3% [95% CI: 31.6%-37.0%] (ANOVA F2, 12; P = 0.034). During the pharmacist-managed coverage period (1998 to 2004), the use increased with a mean number of incident users of 3,829/year [95% CI: 3,311-4,347] over that period. Since the implementation of a physician controlled system the number of incident users has fallen dramatically by 43% to 2,199/year [95% CI: 1,780-2,618] (P < 0.0001). This decline in use occurred despite generic price reduction of more than 70% over the study period due to the release of generic equivalents.

CONCLUSIONS: Physician-managed formulary restriction to oral bisphosphonates appears to have been a substantial regressive barrier and has dramatically reduced bisphosphonate utilization. In light of lower generic cost and the modest difference in the proportion of users meeting EDS criteria, consideration should be given to returning to a pharmacy-managed approach that eliminates barriers but encourages appropriate utilization.

Medication history review and the availability of breakthrough medication in cancer patients using fentanyl patches

Mohamad Al-Biaty, BScPharm candidate; Shawn Bugden, BScPharm, MSc, PharmD; Kevin Friesen, MSc

OBJECTIVES: To assess the availability and appropriateness of breakthrough pain medication in cancer patients using fentanyl patches for pain.

METHODS: An observational, cohort-based study was conducted using administrative health care data (2001-2014) to assess pain management in a cohort of fentanyl treated cancer patients. Fentanyl doses were calculated per patient-month and used to determine an appropriate dose of immediate release (IR) opioid for breakthrough pain. Medication history for the month of the fentanyl use and the preceding 2 months was reviewed to determine if such an appropriate IR opioid had been dispensed to the patient. Each patient-month of fentanyl use was then classified according to whether an appropriate dose of IR opioid was available for treating breakthrough pain.

RESULTS: A total of 7,910 cancer patients using transdermal fentanyl patches were identified, for a total of 47,371 patient-months of observation time. Of this, 21,138 (44.6%) patient-months were associated with no concurrent IR opioid prescriptions. A further 8,694 (18.4%) patient-months were associated with inadequate levels of concurrent IR opioids. Only 17,539 (37.0%) patient-months were found where patients had filled prescriptions that could provide adequate breakthrough pain relief if required.

CONCLUSIONS: The availability of a breakthrough IR opioid medication for cancer patients using long action opioids is considered to be a standard of care. The recent Centers for Disease Control (CDC) opioid guideline suggests that transdermal fentanyl is often misunderstood by both clinician and patients. More than half of cancer patients treated with fentanyl patches did not receive appropriate breakthrough medications. Pharmacists, as the keepers of patients' medication histories, should be playing a key role in management by making recommendations to improve the quality of care provided to patients with cancer.

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

Jillian Reardon, BScPharm, PharmD, ACPR; Barbara Gobis, BScPharm, MScPhm, ACPR

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

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

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

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

A prospective audit of medication preparation and administration practices: A quality improvement initiative

Rachel Liu, PharmD candidate; Erin Cicinelli, HBSc, PharmD candidate; Taban Saifi, PharmD; Doret Cheng, BPhm, RPh, PharmD; Jacinta Apio, BPhm; Jacob Lachere, BPhm

OBJECTIVES: Medication administration errors (MAEs) have important implications for patient safety including increased cost and length of hospitalization, undue discomfort, disability and death. Patient and medication safety initiatives in low-resource settings may face more barriers than in high-income countries. We aim to describe the baseline frequency and type of errors occurring in a large acute care institution in Uganda.

METHODS: Prospective observation was used to determine the baseline frequency, types and severity of MAEs. A data collection tool was created to prospectively audit reconstitution methods, drug, dose, frequency, route and missing doses in the last 24 hours. Data collection was conducted over 2 weeks by 3 pharmacy team members. Any deviation in administration from the order written on the patients treatment chart was considered to be a MAE. Each drug administration could be associated with none or multiple procedural failures and/or clinical errors. Error rates were calculated using the total number of doses administered as the denominator.

RESULTS: Overall, 530 drug administration events were observed and 101 (19%) had MAEs. The most common type of error was wrong dose (39%) followed by wrong route (36%), wrong drug (24%) and wrong frequency (1%). Inappropriate technique was observed for 26% of reconstitutions and 89 drugs had missed doses within the previous 24 hours.

CONCLUSIONS: This audit is part of an interdisciplinary initiative led by the hospital's pharmacy department to improve pharmaceutical care and patient outcomes in a low-resource setting. The results will inform the development of systems and interventions (e.g., educational seminars, annual competency checks and revised medication administration record) to reduce the occurrence of MAEs. It may also encourage other institutions to incorporate similar processes into their practice to help diminish MAEs.

Characterizing pharmacist prescribers in Alberta using cluster analysis

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OBJECTIVES: Canadian pharmacists have been using different types of prescribing in their practice since 2007, which may increase the efficiency of the health care system. Characterizing the pharmacists based on their types of prescribing adoption may help policy makers and researchers to understand the adoption. The study objective was to describe the relationship between pharmacists, their prescribing practices and support from the practice environment.

METHODS: A cross sectional survey was tested for validity and reliability in 3 stages and administered from April to June in 2013 to a random sample of 700 practicing registered pharmacists in Alberta to explore adoption of pharmacist prescribing. We used descriptive analysis to measure the participants demographic information and cluster analysis to characterize and group the participants based on their prescribing behavior. Chi-square and ANOVA were used to compare the groups of pharmacists according to their practice setting and level of support from practice environment.

RESULTS: Total response was 378 (54%) with majority of pharmacist involved in prescribing activities. We identified 3 types of pharmacist prescribers—renewal focused prescriber (74%), comprehensive adopter (9%) and disease focused prescriber (17%), who prescribed by employment of focused/higher level of clinical knowledge. Most of the renewal focused prescribers were from community pharmacy practice (84%), whereas 68% disease focused prescribers were from hospital/consultancy settings. Pharmacists experiences of support, for example, pharmacy staffing, access to patient information, patients and employers expectations from the practice environment were significantly different among 3 clusters [$F(2,300)=4.071$, $p=0.018$]. Increased level of support from practice environment facilitated comprehensive adoption of prescribing.

CONCLUSIONS: Pharmacist prescribing was adopted in 3 distinct ways: renewal focused, comprehensive and disease focused prescribing. Future research on adoption of pharmacist prescribing should account for practice environment and related support.

Assessment of practising community pharmacists' knowledge, attitudes and behaviour towards influenza vaccine hesitancy in Ontario: An exploratory study

Gokul Raj Pullagura, PharmD, DCM; Nancy Waite, PharmD, FCCP; Richard Violette, MA; Sherilyn Houle, BSP, PhD

- OBJECTIVES:** The emergence of vaccine hesitancy (VH) as a barrier to vaccine uptake calls for research to better understand this challenge. The purpose of this study was to assess the Ontario community pharmacists knowledge, attitudes and behaviour towards influenza VH.
- METHODS:** A cross-sectional survey was developed and refined in consultation with members of the Canadian Immunization Research Network (CIRN). The survey was distributed electronically to 5,610 community pharmacists practicing in Ontario.
- RESULTS:** The survey was completed by 885 community pharmacists, yielding a response rate of 16%. Pharmacists reported encountering an average of 16 vaccine-hesitants per week during the 2015-16 influenza season. Pharmacists self-rated knowledge on influenza: disease, vaccine and related issues across a 15-component question was consistently high. Four-out-of-five pharmacists [78.3% (n=634)] recognize their role in engaging with influenza vaccine-hesitants as that of very high importance. They also consistently rated high confidence in addressing common vaccine concerns. However, close to two-thirds [61.6% (507)] of the pharmacists believed that 70% of all individuals getting the influenza vaccine have already made their decision, prior to meeting their health care provider. The pharmacists rated workflow, time and staffing as the most important barriers to effective immunization service delivery, while the quality of current immunization training and the confidence in their ability to immunize were the least limiting.
- CONCLUSIONS:** Results suggest that community pharmacists do encounter VH in their practice. Although they recognize the importance of and possess the knowledge and ability to address influenza VH, pharmacy specific operational barriers prevent them from optimally engaging with patients in this space. Solutions to overcome the challenge of VH in the community pharmacy must be explored to improve pharmacist-patient engagement and positive vaccine outcomes amongst those hesitant.

Impact of pharmacist-developed educational influenza vaccination video on influenza knowledge, attitudes and behaviours in young adults

Daniel Leung, BScPharm candidate; Sharon Mitchell, BScPharm, PharmD, PhD; Kenneth Cor, PhD

- OBJECTIVES:** Young adults are consistently within the demographic with the lowest influenza vaccination rate. We evaluated the effectiveness of a brief, educational video about influenza vaccination on their behaviours towards the seasonal influenza vaccine. Secondary objectives included the evaluation of the video's impact on influenza vaccine knowledge as well as attitudes towards the seasonal influenza vaccine.
- METHODS:** A repeated measures questionnaire was administered to young adults aged 18-25 before and after viewing a brief, educational video on influenza vaccination. The questionnaire consisted of 2 questions about behaviours (likelihood of receiving the yearly flu vaccine and likelihood of promoting it to others), 7 true-false flu vaccine knowledge questions (common vaccine risks/myths, flu prevention & treatment) and 7 questions on attitudes (personal/societal benefits, flu shot recipients). The behaviour and attitude questions were assessed with a 6-point Likert scale (1=strongly disagree, 6=strongly agree). The primary outcome was the mean difference between pre-test and post-test scores in the behaviour questions.
- RESULTS:** A total of 27 respondents were included for analysis. For behaviour, a significant increase from the pre-test mean Likert score (4.87) to the post-test mean Likert score (5.22) was observed (mean difference: 0.35, $P < 0.05$). For attitudes about flu shot recipients, a significant increase from 5.07 (pre-test) to 5.34 (post-test) was demonstrated (mean difference: 0.27, $P < 0.01$). For knowledge, the pre-test score (95%) had a non-significant increase to 96% post-test (mean difference: 1%, $P = 0.42$). For attitudes about personal/societal benefits, a non-significant increase from 5.36 (pre-test) to 5.48 (post-test) was seen (mean difference: 0.12, $P = 0.12$).
- CONCLUSIONS:** In young adults, a brief, educational video on influenza vaccination showed a positive impact on their seasonal influenza vaccine behaviours (increased likelihood of receiving the flu vaccine and promoting it to others). Attitudes about flu shot recipients were also improved.

Feasibility of a community pharmacist intervention for lower urinary tract symptoms

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OBJECTIVES: Lower urinary tract symptoms (LUTS) are common in older adults, but it has not been studied if pharmacists can assess and provide care for this syndrome. Our objective was to assess the feasibility of a community pharmacist assessment and intervention in patients with LUTS.

METHODS: This prospective pilot study involved one community pharmacy site where older adults (minimum age 60 years) were recruited. These subjects were screened for presence of LUTS, then underwent an interview (that recorded demographics, lifestyle and behavioural issues affecting bladder function, LUTS symptoms and bother, attempted interventions). All subjects completed 3 bladder validated bladder questionnaires, with the primary measure being the Patient Perception of Bladder Condition (PPBC). Subjects were randomized to intervention or control (usual care). The intervention included tailored recommendations to address the LUTS (based on a previously published guideline), a 3-week follow-up phone call and repeated 6-week visit and repeat of the questionnaires. The control group received no recommendations for LUTS, but did receive a healthy aging brochure. The control had a 6-week follow-up visit repeating the questionnaires. Feasibility included documentation, time, billing and pharmacist and patient acceptance.

RESULTS: A total of 16 subjects were enrolled (8 control, 8 intervention). Eight controls and 6 intervention subjects had complete follow-up at 6 weeks. The study was not powered to show a difference in questionnaire scores, but there was a trend to improvement in the intervention group in the PPBC. Most interventions focused on lifestyle (e.g., fluid consumption) and behavioural changes (e.g., scheduled toileting). The mean time spent with each subject was 23.8 minutes (SD 12.1). Eight subjects had interactions that could be billed. The biggest barrier in the process was patient embarrassment discussing LUTS.

CONCLUSIONS: A community-based pharmacist intervention to address LUTS was feasible and could potentially lead to improvements in patient outcomes.

Mapping functional medication management

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OBJECTIVES: Functional medication management describes the process of how patients obtain and use their medications. This concept has been proposed but not fully mapped. The purpose of this project was to map the steps involved in medication use, identifying points where the pharmacist or patient may intervene to address potential management problems.

METHODS: This project involved students enrolled in the PHARM 452 Pharmacy Practice Design and Function, specialization elective course at the University of Alberta. The 8 students in the fall 2016 semester collaborated with industrial design students to map the process for functional medication management. Processes included mind mapping and use of personas to identify steps.

RESULTS: The students developed 3 unique maps for functional medication management. The primary phases were prior to community pharmacy interaction, at the pharmacy, then use of medication when the patient left the pharmacy. The key participants were the patient (and/or caregiver) and the community pharmacist. There were over 200 points or steps from obtaining the medication, interacting at the community pharmacy, then handling the medication independently at home. The groups identified numerous touch points, where there would be challenges for the patient to manage the medications. The first step related to patient trust and safety in interacting with the community pharmacist. Vulnerable groups identified were youth, older adults and those with disabilities, as these groups would have challenges in the community and at home in managing their medications.

CONCLUSIONS: The mapping of functional medication management showed the complexity of managing medications and the points where an individual could be at risk of not properly using medications. There are numerous intersecting points where a pharmacist could intervene to ensure vulnerable patients have their medication needs addressed.

Is there a difference in pharmacist confidence levels with DOACs versus traditional anticoagulation therapy? Preliminary results from a multinational pharmacist needs assessment survey

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- OBJECTIVES:** The International Pharmacists for Anticoagulation Care Taskforce (iPACT), an expert group committed to enhancing the key role that pharmacists play in anticoagulation management, conducted a needs assessment survey to identify self-reported gaps in confidence among practicing pharmacists and to identify variances in confidence levels between traditional and novel therapies.
- METHODS:** An electronic link to the needs assessment survey was distributed to pharmacists in the participating countries via their respective professional organizations or colleges.
- RESULTS:** 680 pharmacists from fourteen countries completed the survey. Pharmacists were significantly less confident providing necessary information on DOACs versus VKAs (48.6% versus 75.8%; $p < 0.0001$). In terms of DOACs, pharmacists from the Netherlands, Canada, UK and New Zealand were the most confident (range 71.6-78.8%). All remaining countries had a confidence of <70% (range 21.6-63.0%). Notably, 51.4% of pharmacists reported not being confident in providing necessary information on DOACs. Pharmacists cited the most confidence discussing benefits of anticoagulation (84.8%), indications (79.1%) and adverse effects (75.7%). They were least confident with anticoagulant bridging/switching (28.2%), monitoring INR (37.3%), managing bleeds (44.7%), missed doses (49.1%) and interactions (60.8%). The majority of pharmacists (91.6%) reported they would like additional education, with a preference for e-learning (65.0%).
- CONCLUSIONS:** These results suggest a lack of pharmacist confidence in providing information on anticoagulation therapy, particularly DOACs. Future e-learning programs should focus on practical clinical themes including management of bleeding, adverse events and bridging between agents.

Community pharmacist cholesterol point-of-care screening with Framingham risk score

Laura Bron, BSCPharm

- OBJECTIVES:** Point-of-care cholesterol screening is a valuable tool that community pharmacists can use to identify and educate patients at risk for hypercholesterolemia, cardiovascular disease and related events. Here, we report data from screening 112 patients at structured cholesterol-screening clinics held in the community of Thunder Bay, ON.
- METHODS:** The CardioCheck Cholesterol Monitor was used to do a point-of-care calculation of a patient's HDL and total cholesterol. A minute amount of blood from the finger was needed to run the test. Patients were screened for conditions that place them at higher risk of a cardiovascular event (hypertension, past myocardial infarction or transient ischemic attack, diabetes, smoking). Patients' 10-year risk assessment of a cardiovascular event was calculated using the Framingham Risk Score. Data collection took place over a year.
- RESULTS:** Testing successfully identified patients potentially at risk for experiencing a cardiovascular event in the next 10 years. The average total cholesterol was 4.88 mmol/L and HDL was 1.04 mmol/L. The average Framingham Risk Score was 18.6%. The majority of patients were not maintaining the requirements of having 150 minutes of moderate exercise per week. Smoking cessation and decreasing alcohol and caffeine intake were also discussed.
- CONCLUSIONS:** These results illustrate the prevalence of potentially undiagnosed hypercholesterolemia for patients in the community. Our intervention data suggests that a structured cholesterol and cardiovascular consultation by a community pharmacist can identify patients at risk for experiencing an event. Patients at low risk were given evidence based and practical recommendations to maintain their cardiovascular health and reduce the risk of developing any related diseases. Patients with moderate and high risk were given instruction to visit their primary care practitioner (physician, nurse practitioner) to discuss the results and inquire about possible prescription medication. Continued expansion in scope of pharmacy practice may contribute to increased hypercholesterolemia detection and reduced cardiovascular events.

Use of electronic medication administration records (eMAR) to support medication administration practices in long-term care: A scoping review of the quantitative and qualitative evidence

Andrew Fuller, BScPharm, MScPharm candidate; Mark Makowsky, BSP, PharmD

OBJECTIVES: Patients who reside in long-term care can have extensive medication regimens. Electronic medication administration records may increase the safety of medication administration in this setting. Our objective was to map the extent, range and nature of research on the effectiveness, level of use and perceptions about eMAR in long-term care (LTC), identify gaps in current knowledge and priority areas for future research.

METHODS: A search of MEDLINE, CINAHL, Cochrane Library, SCOPUS, Theses Global and ProQuest Dissertations databases from 2000 to 2016 was completed with the assistance of a medical librarian. Original research relating to eMAR in LTC, nursing homes, residential aged care facilities, assisted living facilities and care homes were eligible for inclusion. Both authors completed two rounds of screening for eligibility of papers. Data regarding country of origin, major themes, design, study methods, outcomes studied and main results were extracted.

RESULTS: Of the 440 citations identified, 11 met inclusion criteria. An additional 5 were obtained from reference lists. Studies were published between 2007 and 2016 and were from the United States (n=11), Australia (n=3), Sweden (n=1) and the UK (n=1). Research themes explored eMAR prevalence in LTC (n=7), evaluated process outcomes (n=6) and the perceptions of the benefits and limitations of eMAR (n=3). Research designs consist of quantitative (n=10), qualitative (n=2) and mixed (n=4) methodologies which included surveys (n=10), interviews (n=6), direct observation (n=4), chart reviews (n=3) and focus groups (n=2). Main process outcomes consisted of nursing time on medication pass (n=1), design challenges (n=1), internal process barriers (n=1), medication administration error (MAE) prevention (n=1), medication order discrepancies (n=1) and eMAR workarounds (n=1).

CONCLUSIONS: There is a lack of high quality studies evaluating eMAR in LTC. Further investigations are required to evaluate the impact eMAR has on MAEs and patient safety, factors influencing uptake and pharmacists perceptions of eMAR.

Learning from our mistakes: A pilot study to explore the perceptions and implementation of continuous quality improvement in Ontario community pharmacies

Certina Ho, RPh, BScPharm, MSt, MEd, PhD; Mi Qi Liu, PharmD candidate; Janice Law, BSc, PharmD candidate

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: A 28-item online questionnaire was administered 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 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.

Efficacy of pharmacist intervention in patient non-adherence

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OBJECTIVES: Medication non-adherence poses a significant barrier to the effective treatment of diabetes. The objective of this study was to determine how effectively pharmacists could identify and resolve non-adherence issues in a clinical setting.

METHODS: The study was conducted at several pharmacies co-located within endocrinology clinics. In this setting, pharmacists work closely with the multidisciplinary team and have access to patients' electronic medical records and lab values. Patients were seen by a pharmacist for a comprehensive medication review prior to their endocrinologist appointments. Patients who missed a medication dose once weekly or more were flagged as non-adherent. Causes of non-adherence and the pharmacists recommendations were documented.

RESULTS: Between January and April 2016, 2604 patients were seen and 303 were identified as non-adherent. In 95.4% of cases (n=289), the pharmacist was able to provide counselling or propose a solution, leading to a resolution in 82% (n=248). The most common cause of non-adherence was due to a patient misunderstanding the benefits or proper use of their medications. Pharmacist counselling was often able to overcome this barrier. Common counselling topics included the benefits of statin and RAAS therapy; and areas of skill training included injection technique and insulin kinetics.

CONCLUSIONS: Pharmacists employed in a clinical setting can accurately identify non-adherence and its related issues. Pharmacist counselling was an effective intervention in overcoming non-adherence. As Canadian pharmacists assume a growing responsibility in the care of diabetes patients, understanding their optimal area of effectiveness will allow better application of their time.

Preventable medication errors: Solid oral dosage forms of diltiazem

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OBJECTIVES: Hypertension is a significant risk factor for cardiovascular diseases such as stroke and heart attack, making blood pressure control an important priority in preventing these events. Available in a wide range of formulations, generics and doses, diltiazem is used to control blood pressure as a first or second line agent, with other Health Canada approved indications including stable angina and coronary spasms. If used incorrectly, diltiazem may lead to negative consequences including heart block and heart failure and compromised patient safety. The objective of this multi-incident analysis was to examine potential contributing factors of medication incidents involving solid oral dosage forms of diltiazem and provide recommendations with the aim to enhance medication safety.

METHODS: Medication incidents involving solid oral dosage forms of diltiazem from January 2010 to April 2016 were extracted from a national incident reporting database. A total of 184 incidents were subjected to a qualitative, multi-incident analysis.

RESULTS: The incidents were analyzed and categorized into 3 main themes: diltiazem-specific and medication-use process. Associated subthemes were identified for each main theme, with 1) different formulations and generics, 2) wide dosing ranges, 3) oral dosage forms, 4) drug interactions and 5) non-dihydropyridine calcium channel blocker role in drug therapy, under the main theme of diltiazem-specific; and 1) prescribing, 2) prescription order entry and 3) prescription preparation/dispensing under the main theme of medication-use process. Recommendations included physical separation or storage of look-alike bottles to minimize confusion with similar names and multiple strengths and the performance of comprehensive medication review to assess the appropriateness of medication therapy for patients.

CONCLUSIONS: By sharing incident analysis findings and the lessons learned, we expect an increase in the understanding of medication errors involving diltiazem by pharmacy practitioners, followed by an active discussion and adoption of quality improvement measures that can advance safe medication use.

Ontario Pharmacy Smoking Cessation Program: More pharmacies need to participate

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- OBJECTIVES:** The Ontario Pharmacy Smoking Cessation Program was introduced in September 2011 to reimburse pharmacies for smoking cessation counselling services for Ontario Drug Benefit (ODB) eligible individuals. Prescription smoking cessation medications were also added to the ODB formulary in August 2011. We aimed to describe the use of pharmacy smoking cessation services over time and measure compliance with prescription smoking cessation medication.
- METHODS:** We analyzed medical and pharmacy claims data to identify the number of patients and pharmacies participating; compare patient characteristics over time (2011/09-2013/08 vs. 2013/09-2015/03); and estimate prescription smoking cessation medication compliance (proportion of days covered over 90 days $\geq 80\%$). Analyses were stratified by drug plan group (seniors ≥ 65 years; or social assistance < 65 years), sex and region.
- RESULTS:** Forty percent ($n=1,710$) of Ontario pharmacies participated, with 26% being new providers from 2013/09-2015/12. We identified 12,819 patients; patient characteristics remained similar over the 2 time periods, with 29% seniors (mean age=70, SD=4.7; 53% male) and 71% social assistance (mean age=46, SD=11.7; 49% male). In the year prior to smoking cessation service, almost half received another professional pharmacy service such as MedsCheck (18% at enrolment) and 89% had a physician smoking cessation service. Regional differences in use were identified. North East region had among the lowest prior use of physician smoking cessation services (80%), yet among the highest prior use of professional pharmacy services (55%). Among patients with one-year follow-up data, 58% received follow-up smoking cessation services and 74% received prescription smoking cessation medication. More patients starting prescription smoking cessation medication at enrolment were compliant (37%), compared to patients starting before (25%), or after (12%) enrolment.
- CONCLUSIONS:** More pharmacies offering smoking cessation services may improve patient access to smoking cessation services, particularly in areas with limited access to physicians.

Pediatric acute otitis media: A comparison of current management in a primary care clinic with national clinical practice guidelines

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OBJECTIVES: It is not known if the primary care management of acute otitis media (AOM) in Canada is congruent with published guidelines. We compared the current treatment practices for paediatric AOM at a Toronto primary care clinic with 2009 Canadian Paediatric Society (CPS) AOM guidelines.

METHODS: This retrospective chart review of electronic medical records (EMR) was conducted at an academic family health team in Toronto. Data were collected from patients identified using billing code reports and an EMR keyword search. Patients aged 6 months to 12 years and diagnosed with AOM between January 1, 2013, and December 31, 2015, were eligible for inclusion. Severe and/or complex AOM cases were excluded. The primary and secondary outcomes were the respective congruence of the treatment approach and the prescribed antibiotic regimen with 2009 CPS AOM guidelines. For the primary outcome, the choice to treat with watchful waiting or immediate antibiotic therapy was reviewed and compared to guideline recommendations. For the secondary outcome, we compared all prescribed antibiotic regimens to guidelines according to choice of drug, dose and duration of therapy.

RESULTS: A total of 138 cases met our inclusion criteria. The decision of whether or not to prescribe antibiotics was congruent with guidelines in 81% of cases ($n = 112/138$). However, watchful waiting was warranted in 40% of the cases prescribed immediate antibiotic therapy ($n = 17/43$). When antibiotics were prescribed ($n = 91$), the choice of drug, weight-based dose and duration of therapy were all guideline-congruent in 38% of cases. The remaining prescriptions deviated from Canadian guideline recommendations in one or more domains, most frequently for dose and duration of therapy.

CONCLUSIONS: Current treatment practices for paediatric AOM in our clinic were largely congruent with 2009 Canadian Paediatric Society treatment guidelines, with opportunities to maximize watchful waiting and optimize dosing and duration of antibiotic therapy.

Pharmacist experiences with providing care for patients with chronic pain in the community setting: A qualitative study

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OBJECTIVES: Chronic pain is a condition pharmacists frequently encounter in practice; however, the pharmacist role is under-investigated. This study examined pharmacist perceptions and experience in providing care to patients with chronic pain.

METHODS: Primary care practicing pharmacists in Ontario were recruited and interviewed using a semi-structured guide. Interviews were analyzed using grounded theory. Sample recruitment continued until saturation was achieved.

RESULTS: Of the 12 pharmacists who responded to the email invitation, two did not meet eligibility criteria and one withdrew. The sample consisted of 6 female and 3 male pharmacists with a mean age of 47 years (range: 27 - 63) and mean of 20 years (range: 2 - 40) of practice. Five themes emerged from the content analysis: (1) perception of chronic pain (2) concern about opioid use (3) lack of support for patients, (4) communication with prescribers and (5) knowledge gaps. Participants were comfortable with their knowledge of chronic pain and were empathetic of their patients' suffering. They also felt their role is limited within the current health care system. Participants reported that misuse of opioids is the most challenging; issues included high potential for misuse, inadequate monitoring and under-use of other medications and resources for the treatment of chronic pain. Additionally, participants believed that patients suffer from lack of support by their family, employers and the health care system. Furthermore, trust was identified as the most important parameter in building a collaborative relationship with physicians. Finally, participants felt more training on legal issues related to opioids is required.

CONCLUSIONS: Pharmacists were empathetic towards patients with chronic pain; however, they felt their role is limited in current climate. Deficiencies in the current system of managing chronic pain were identified including opioid use as the most challenging. Future research should investigate expansion of pharmacist roles to optimize chronic pain management.

Perceived barriers and facilitators to providing methadone maintenance treatment among rural community pharmacists in southwestern Ontario

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- OBJECTIVES:** Pervasive misuse of prescription opioids in Ontario has contributed to increased demand for community-based management programs. Rural patients have limited access to methadone maintenance treatment (MMT), an opioid addiction-treatment service that could be offered by community pharmacists. The aim of this study was to identify rural community pharmacists perceived barriers, motivations and solutions to offering MMT in their communities.
- METHODS:** Potential participants were identified using the Ontario College of Pharmacists online pharmacy and member search tool and stratified by criteria such as geographical location and type of pharmacy. One-on-one, semi-structured interviews were conducted with community pharmacists who practiced in two Counties in rural Southwestern Ontario. Interview transcripts were analyzed using inductive content analysis.
- RESULTS:** 11 pharmacists participated in the study. Participants included owners (n=4), managers (n=3) and staff pharmacists (n=4) in independent/banner pharmacies (n=4) or chain pharmacies (n=7). Increased workload, extended operating hours and concerns about safety, theft, community resistance and the availability of methadone training courses were identified as pharmacist-related barriers to providing MMT services. Professional satisfaction was the strongest motivation. Limited pharmacy staff availability exacerbated concerns about increased workload and security. Rural emergency-response times were cited among safety concerns. Participating pharmacists felt that rural regions had fewer MMT prescribers and that community members in rural regions had greater apprehension about addiction-treatment services than those in urban regions. Pharmacists proposed that a coordinated, multi-center approach to providing MMT could improve access to treatment for rural patients.
- CONCLUSIONS:** Rural community pharmacy practice has unique barriers to implementing and providing MMT services. A coordinated, multi-pharmacy approach may be an option to provide and expand MMT services in rural regions.

L'implantation du Réseau STAT : Soutien technologique pour l'application et le transfert des pratiques novatrices en pharmacie

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OBJECTIFS: Les réseaux de recherche axée sur la pratique de première ligne permettent de mettre en contact chercheurs, cliniciens et décideurs pour répondre à des questions pertinentes pour eux. Le réseau STAT, accessible via le web depuis juin 2014, est axé sur la pratique en pharmacie et permet aux membres de partager des outils cliniques, d'apprendre sur les pratiques novatrices en pharmacie et d'évaluer les pratiques par le biais de programmes structurés. L'objectif était d'évaluer l'implantation du Réseau STAT, la faisabilité d'y réaliser des activités de transfert et d'application des connaissances et la satisfaction des membres.

METHODOLOGIE: Étude descriptive des membres et de l'utilisation de quatre grandes composantes du Réseau STAT: 1) programme de formation à la recherche sur les pratiques pharmaceutiques; 2) forum de discussion; 3) babillard électronique et liste d'envoi pour la diffusion de communications; et, 4) bibliothèque d'outils cliniques. Un questionnaire en ligne sur la satisfaction des membres et une analyse descriptive ont aussi été effectués.

RESULTANTS: En décembre 2016, le réseau comptait 922 membres de 130 villes différentes: 69% de femmes et 60% de pharmaciens salariés. Les autres membres étaient des pharmaciens propriétaires (n=181), étudiants en pharmacie (108), chercheurs (17) et gestionnaires (11). Le réseau a permis la formation de 188 membres à la recherche sur les pratiques pharmaceutiques et de réaliser 2 projets de recherche. Le forum de discussion a été consulté 3182 fois, la bibliothèque contenait 179 documents et le babillard 75 annonces. Soixante-six membres (12%) ont répondu au questionnaire de satisfaction. Les éléments les plus appréciés sont la bibliothèque et le babillard. La consultation régulière et l'engagement des membres sont à améliorer.

CONCLUSION: Ce réseau est le tout premier du genre au Canada et offre un grand potentiel pour la recherche et le transfert des connaissances sur les pratiques novatrices en pharmacie.

Saskatchewan pharmacists' opinions on prescribing hormonal contraception

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OBJECTIVES: To determine Saskatchewan pharmacists' opinions and beliefs towards pharmacist prescribing of hormonal contraceptives.

METHODS: We conducted an online survey of practicing pharmacists in Saskatchewan. The survey contained 22 questions which explored beliefs and opinions in four content areas related to prescribing hormonal contraception: acceptability and/or appropriateness; personal confidence and comfort level; prescribing caveats; and, perceived benefits and barriers. A descriptive analysis of the responses was conducted and response frequency distributions compiled.

RESULTS: The survey was distributed to 1579 pharmacists; 270 (17.1%) completed some or all survey questions. Of the respondents, 68.6% were female and 31.4% male. Approximately 75% of respondents indicated hormonal contraception should be available as a Schedule II or III product. Over 75% of respondents agreed patient demand for pharmacist prescribing of hormonal contraception would be high. Approximately 70% agreed additional training would be required in order to prescribe hormonal contraception, with more than 50% strongly agreeing that additional training should be mandatory. Over 60% believed age restrictions would be important for prescribing hormonal contraception, with the majority suggesting patients should be at least 16 years old. More than 80% of respondents indicated both benefits and barriers to pharmacist prescribing of hormonal contraception. The greatest benefits identified were fewer unintended pregnancies and reduced costs to the health care system, while the greatest barriers were resistance from other health care professionals and lack of time.

CONCLUSIONS: The majority of respondents believe that, with additional training, pharmacist prescribing of hormonal contraception is appropriate. An estimated 40% of pregnancies in Canada are unintended, resulting in significant burden to the woman, the health care system and society. Pharmacist prescribing of hormonal contraception would increase access to contraception, potentially reducing some of these burdens.

Use of Hypertension Canada/Canadian Hypertension Education Program (CHEP) guidelines in teaching in Canadian pharmacy schools

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- OBJECTIVES:** The Hypertension Canada (HC)/CHEP guidelines are considered the authoritative source for the management of hypertension in Canada. Pharmacists are playing an increasingly important role in hypertension management as accessible primary health care practitioners. We wanted to determine if the HC/CHEP guidelines were being used in the teaching of undergraduate pharmacy students in Canada.
- METHODS:** We surveyed the individuals teaching hypertension therapeutics in all pharmacy schools in Canada. We asked questions on the use of the HC/CHEP guidelines, the HC website, slides and tools. We also requested a copy of their handout/slide materials used for validation.
- RESULTS:** All 10 schools responded. Overall, 9/10 schools reported teaching and referring to the HC/CHEP Guidelines. Similarly, 8/10 instructors reported using at least some of the official HC slide sets and tools (including the pocket guidebook, blood pressure measurement and salt restriction resources). All instructors reported having skills labs which taught blood pressure measurement, with 6/10 discussing the validation of automated blood pressure devices. Finally, 8/10 instructors agreed they would value additional teaching materials produced by HC if offered.
- CONCLUSIONS:** Most Canadian pharmacy schools are using the HC/CHEP guidelines in the teaching of hypertension, however, increased integration of evidence-based HC materials into curricula would be welcomed. Pharmacists are a key resource and support for persons with or at risk for hypertension and thus, improving access to HC materials in pharmacy training represents a strategy to improve the management of hypertension in primary care.

Cost-effectiveness of pharmacist intervention for managing hypertension in Canada

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OBJECTIVES: Hypertension is the single most important cause of premature morbidity and mortality in the world. Indeed, over half of all heart disease and stroke are attributable to hypertension, which is associated with approximately 10% of direct medical costs globally. Clinical trial evidence has conclusively demonstrated the benefits of pharmacist intervention – including patient education, consultation and/or prescription – significantly reduces blood pressure, including a recent Canadian trial which found an 18.3 mmHg reduction in systolic blood pressure with pharmacist prescribing and care. Objective: To evaluate the economic impact of pharmacist management of hypertension in a Canadian setting.

METHODS: A Markov cost-effectiveness model was developed to extrapolate potential differences in long-term cardiovascular and renal disease outcomes, using Framingham risk equations and other published risk equations. A range of values for systolic blood pressure reduction by pharmacists were considered (7.6-18.3 mmHg), to reflect the range of potential interventions and available evidence. The model incorporated health outcomes, costs and quality of life to estimate an overall incremental cost-effectiveness ratio. Costs considered included direct medical costs as well as the costs associated with implementing the pharmacist intervention strategy.

RESULTS: For a systolic blood pressure reduction of 18.3 mmHg, the estimated impact is 0.21 fewer cardiovascular events per person and, discounted at 5% per year: 0.3 additional life years, 0.4 additional quality-adjusted life years and \$6364 cost savings over a lifetime. As such, pharmacist care in hypertension is economically dominant, i.e., both more effective and cost-saving compared to usual care. Across a range of one-way and probabilistic sensitivity analyses of key parameters and assumptions, pharmacist intervention remained both effective and cost-saving, indicating a robustness of the analyses.

CONCLUSIONS: Comprehensive pharmacist care of hypertension, including patient education and prescribing, has the potential to offer both health benefits and cost savings to Canadians and as such, has important public health implications.

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