CSHP Summer Educational Sessions (SES) 2013: Poster Abstracts / Séances éducatives d'été (SÉÉ) 2012 de la SCPH : Résumés des affiches

CSHP 2015

CSHP 2015 is a quality program that sets out a vision of pharmacy practice excellence in the year 2015. Through this project, CSHP challenges hospital pharmacists to reach measurable targets for 36 objectives grouped under 6 goals, all aimed toward the effective, scientific, and safe use of medications and meaningful contributions to public health. CSHP 2015 applies to inpatients and outpatients, community and hospital pharmacists, and all practice settings. Poster abstracts identified with a "CSHP 2015" logo are those judged by the CSHP 2015 Steering Committee to be particularly relevant to one or more of the 36 objectives.

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Le projet SCPH 2015 est un programme axé sur la qualité qui propose une vision de l'excellence en pratique pharmaceutique en l'an 2015. Au moyen de ce projet, la SCPH met les pharmaciens d'établissements au défi d'atteindre les cibles mesurables de 36 objectifs répartis entre 6 buts, visant tous l'utilisation efficace, scientifique et sûre des médicaments ainsi que des contributions significatives à la santé publique. Le projet SCPH 2015 s'applique aux patients hospitalisés et externes, aux pharmaciens d'hôpitaux et communautaires, et à tous les milieux de pratique. Les résumés des affiches marqués du logo « SCPH 2015 » sont ceux que le comité directeur du projet SCPH 2015 a jugé particulièrement appropriés à l'un ou l'autre des 36 objectifs.

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The texts of poster abstracts are published exactly as submitted by the authors and have not undergone any copyediting by the Canadian Journal of Hospital Pharmacy.

Le Journal canadien de la pharmacie hospitalière *n'a pas soumis le texte des résumés des affiches à une révision linguistique et les publie ici tels que remis par les auteurs.*

Case Report of Clenbuterol Cardiac Toxicity and Type II Myocardial Infarction after Ingestion for Weight Loss

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Background: Clenbuterol is an oral ß2-agonist utilized as an illicit substance for performance-enhancement or weight loss. We report a case of clenbuterol toxicity and type II myocardial infarction after deliberate ingestion.

Case Description: A 23-year-old male presented to the Emergency Department with palpitations, anxiety, chest tightness and shortness of breath after intentional ingestion of 5000 mcg of clenbuterol (125 times the recommended adult dose) to lose weight. He denied intentional self-harm or ingestion of other illicit substances. His past medical history was non-contributory. He was not taking any regular medications. On examination, he was diaphoretic and tachycardic (heart rate 160 bpm). His electrocardiogram showed sinus tachycardia with diffuse nonspecific repolarization abnormalities. Bloodwork revealed potassium of 2.0 mmol/L, lactate of 9.4 mmol/L and peak troponin of 5.39 mcg/L. He was transferred to the Coronary Care Unit for observation. Transthoracic echocardiogram was normal except for hyperdynamic left ventricular function. He was treated with intravenous fluids and oral metoprolol. His tachycardia and electrocardiogram abnormalities resolved after 48 hours. He was discharged on oral metoprolol for 1 week.

Assessment of Causality: Probable based on the Naranjo Algorithm.

Literature Review: There are sporadic case reports of clenbuterol toxicity in the published literature. Clenbuterol is a long-acting, ß2-agonist indicated for the treatment of reactive airway diseases in veterinary medicine (not available in Canada for human consumption). It is more ß2-selective and 100 times more potent that salbutamol, and has purported anabolic properties. Patients often present with agitation, palpitations, tachycardia, hypokalemia and hyperglycemia. Treatment is supportive with intravenous fluids, ß-blockers and potassium supplementation.

Importance to Practitioners: Clenbuterol has gained notoriety in recent years as a drug of abuse. Escalating societal demand for image-enhancing substances will likely lead to an increase in clenbuterol toxicity cases due to its relative attainability and readily accessible dosing information via the internet.

Medication Use after Laparoscopic Sleeve Gastrectomy: One Year Results from the Newfoundland and Labrador Bariatric Surgery Cohort Study

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Background: Patients undergoing bariatric surgery for treatment of obesity may experience improvement or resolution of type 2 diabetes (T2DM), hypertension, and dyslipidemia. However, there is limited medication use data for the laparoscopic sleeve gastrectomy (LSG) patient population.

Objectives: This study aims to determine whether LSG patients require fewer medications for the management of diabetes, hypertension and dyslipidemia post-surgery.

Methods: Inception cohort (n = 111) of patients ≥ 19 years of age living in NL with a BMI ≥ 35 kg/m^2 ± two comorbid conditions or a BMI ≥ 40 kg/m^2, undergoing LSG for treatment of obesity at Eastern Health, the largest regional health authority. A nurse practitioner collects data on medication use using standard medication reconciliation and study protocol data extraction forms. Number of antidiabetic, hypotensive, and antilipemic medications at baseline, 1, 3, 6, 12, 18, and 24 months after surgery will be compared.

Results: The sample is female (85%), mean age 44 (SD 9.5). Pertinent comorbid conditions include T2DM (40.4%), hypertension (52.6%), and dyslipidemia (51.8%). A statistically significant reduction in medication use is observed 12 months after LSG. More specifically, patients are less likely to be taking antidiabetic [OR = 0.237 (95% CI 0.128-0.439)], hypotensive [OR = 0.190 (95% CI 0.077-0.466)], and antilipemic agents [OR = 0.685 (95% CI 0.489-0.959)].

Conclusion: Study findings suggest that patients with a history of diabetes, hypertension, and/or dyslipidemia who undergo LSG are less likely to require disease specific medications post-surgery.

A Basal-Prandial Insulin Protocol for Improving Inpatient Glycemic Control (A BIG Study)

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Background: Hyperglycemia occurs frequently in hospitalized patients and is associated with poor outcomes. Guidelines recommend a proactive approach to insulin dosing and encourage institutions to implement protocols for inpatient glucose management; however, most institutions continue to utilize reactive sliding scale regimens.

Objectives: To determine whether the use of a pre-printed care order (PPCO) for basal-prandial subcutaneous insulin improves glycemic control, as compared to usual insulin dosing in hospitalized patients.

Methods: This was a retrospective, observational, cross-sectional study following the implementation of a new basal-prandial insulin PPCO. We reviewed a random sample of patients receiving subcutaneous insulin who were admitted to family medicine, nephrology and orthopaedic surgery units during two study periods: 2009 (pre-PPCO) and 2010 (post-PPCO). The co-primary outcomes were the difference between the mean capillary blood glucose (CBG) readings and the incidence of hyperglycemia (CBG>15 mmol/L) and hypoglycemia (CBG<4 mmol/L) as analyzed by ANOVA and chi-squared tests, respectively.

Results: One-hundred thirty-four patients were included with 8745 CBG readings recorded. Demographics and length of stay were similar between the groups and did not significantly affect glycemic control. The mean CBG following PPCO implementation was clinically, though not statistically, lower (10.97 mmol/L vs. 9.92 mmol/L, p=0.10). The overall incidence of hyperglycemia decreased by 4.73% (p=0.05), with a non-statistically significant decrease in mean percentage of days with hyperglycemia (38.9 vs. 29.4, p=0.08). Importantly,

the overall incidence of hypoglycemia did not significantly change (3.29% vs. 3.77%, p=0.65). Secondary outcomes demonstrated a significant increase in the mean dose of basal insulin used in the post-PPCO group and a high rate of user satisfaction with the PPCO.

Conclusion: A standardized PPCO that encourages the use of basal-prandial subcutaneous insulin can improve glycemic control in hospitalized patients without increasing the risk of hypoglycemia.

A Point Prevalence Survey of Antimicrobial Use: Benchmarking and Patterns of Use to Support Antimicrobial Stewardship Efforts

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Background: Antimicrobial stewardship interventions are required to minimize the unintended consequences of antimicrobial therapy and should be tailored to the local environment and patient population.

Objectives: To assess current patterns of antimicrobial utilisation and identify targets for antimicrobial stewardship interventions.

Methods: A point prevalence survey was completed in 21 hospitals with inpatient acute, general medical, surgical and paediatric services. All patients admitted to a participating hospital administrative unit at the time of the survey and receiving at least one systemic antimicrobial were included. Main outcome measures included patterns of utilisation based on indication and antimicrobial prescribed, appropriateness of utilisation, and duration of surgical prophylaxis. Descriptive statistics were used to analyse data.

Results: The survey was completed between June and August 2012. A total of 2244 patients were admitted at the time of the survey; 529 (23.6%) were on antimicrobials. A total of 691 antimicrobials were prescribed, 587 (85%) were for treatment, 82 (12%) for surgical prophylaxis and 22 (3%) for medical prophylaxis. The most frequently prescribed classes of antimicrobials for treatment were quinolones (25.6%), extended-spectrum penicillins (10.2%), metronidazole (8.5%) and third-generation cephalosporins (8.3%). The most common indications for treatment were pneumonia (36%), gastrointestinal infections (19%), skin and soft tissue infections (17%), and cystitis (14%). Based on predefined criteria 43% (n=297) of orders were incomplete or inappropriate. Twenty percent (n=138) of orders had no documented indication. Areas of inappropriateness included not switched from intravenous to oral (n=41, 6%), inappropriate dose (n=35, 5%), treatment of asymptomatic bacteriuria (n=28, 4%) and inappropriate duplication (n=28, 4%). Thirty-three percent of surgical prophylaxis orders exceeded 24 hours.

Conclusions: The findings support that antimicrobial stewardship efforts should focus on improving documentation, optimising the use of quinolones and minimizing the length of surgical prophylaxis. Further research is required to better define the antimicrobial drug use issues identified.

Treatment of Cerebellar and Brainstem Stroke Symptoms with Amitriptyline: A 4 Patient Case Report

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Background: Cerebellar and brainstem strokes represent 15% of strokes and do not often result in severe disability. However, 4 patients on the stroke rehabilitation unit experienced debilitating symptoms and amitriptyline improved the symptoms, thereby facilitating participation in rehabilitation.

Case Description: Patients included: 1. A 63 year old male with acute left medullary infarct experiencing dizziness, nausea, vomiting, poor appetite with a 13 kilogram weight loss and decreased balance. 2. A 49 year old female with multiple bilateral cerebellar infarcts admitted with nausea, vomiting and dizziness. 3. A 52 year old male with right sided Wallenberg's syndrome, experiencing nausea, vomiting, headaches and dizziness. 4. A 69 year old male with hemorrhage in the left cerebellar hemisphere experiencing nausea, vomiting and dizziness. Several medications were trialed to manage symptoms without success. Amitriptyline, trialed based on anecdote, provided immediate relief of symptoms for all 4 patients. Amitriptyline was eventually discontinued in 2 patients while the third and fourth patients tolerated a dose reduction.

Assessment of Causality: Based on the World Health Organization – Uppsala Monitoring Centre (WHO-UMC) system for causality assessment, it is probable/likely that amitriptyline resulted in relief of symptoms. The anti-cholinergic properties of amitriptyline, the time association between drug administration and effect and the exclusion of other contributing factors support this assessment.

Literature Review: A literature search did not reveal any published evidence demonstrating the use of amitriptyline to treat symptoms associated with cerebellar or brainstem strokes.

Importance to Practitioners: For patients experiencing symptoms from a cerebellar or brainstem stroke, which are refractory to conventional therapy, a trial with amitriptyline can be considered. The successful responses in these 4 patients highlight the value of this therapy for other similar patients. The clinical decision of when to use amitriptyline should be on a case by case basis.

Round 1 Delphi Results of the National Hospital Clinical Pharmacy Key Performance Indicators Consensus Process

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Background: A clinical pharmacy key performance indicator (cpKPI) is defined by 5 characteristics: it reflects a desired quality practice; it is a metric with a link to direct patient care; it is associated with evidence of impact on meaningful patient outcomes; it is pharmacy/pharmacist sensitive; and it is feasible to measure. Currently, there is no established national or international consensus on ideal cpKPIs for hospital pharmacists.

Description/Action: Objective- to report Round 1 Delphi quantitative cpKPI rankings and qualitative themes in a systematic, evidence-informed, national consensus building process to establish a core set of hospital cpKPI. We used a modified Delphi technique with 26 expert panelists representing all 10 Canadian provinces. Panelists ranked each of the 26 candidate cpKPI against 11 consensus criteria/ ideal attributes ('Slavik-11') and used these rankings to assign an overall rating (usefulness in advancing clinical pharmacy practice to improve the quality of patient care) for each candidate cpKPI. The pre-specified consensus threshold was reached when ≥75% of panelists assigned the candidate cpKPI an overall rating of ≥7 on a 9-point Likert Scale.

Evaluation: After Round 1 of 3, 7/26 candidate cpKPI met the criteria for consensus. These were: 1) admission medication reconciliation; 2) interprofessional rounds; 3) drug therapy problems (DTPs) resolved; 4) "high alert" DTPs resolved; 5) discharge counselling; 6) discharge medication reconciliation; and 7) venous thromboembolism prophylaxis. Three new cpKPI were submitted by panelists for Round 2 consideration. Qualitative discussion themes which arose from panelist comments included: variance in degree of sensitivity to pharmacists' contribution, feasibility, generalizability and inter-relationships between cpKPI.

Implications: After Round 1, 7/26 cpKPI met consensus criteria in a national modified Delphi process with panelist results to be used to inform subsequent rounds. National consensus cpKPI may serve to standardize and advance hospital pharmacy practice towards evidence-informed care to improve patient outcomes.

Round 2 Delphi Results of the National Hospital Clinical Pharmacy Key Performance Indicators Consensus Process

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Background: Key performance indicators (KPI) are quantifiable measures of healthcare quality. A working group of Canadian hospital pharmacists developed national consensus selection criteria and candidate clinical pharmacy key performance indicators (cpKPIs) that may be suitable for advancing clinical pharmacy practice.

Description/Action: Objective- to report Round 2 Delphi quantitative cpKPI rankings from a systematic, evidence-informed, national consensus building process. A modified Delphi approach was utilized and a Delphi panel comprising of 26 hospital pharmacists from ten provinces was convened. Two of 3 rounds of an electronic Delphi survey instrument and a live Delphi meeting were conducted. Panelists ranked twenty-nine candidate cpKPIs on 11 predetermined critical KPI attributes using a 9-point Likert scale. Additionally, an overall score was assigned to determine whether the cpKPI would be useful for advancing clinical pharmacy practice to improve the quality of patient care. The a-priori consensus criterion was attained if 75% of the panelists assigned an overall rating ≥7 on the Likert scale.

Evaluation: Eight candidate cpKPIs met the consensus definition after round two of the Delphi process: 1) pharmacist admission medication reconciliation; 2) pharmacist participation in interprofessional patient care rounds; 3) the number of drug therapy problems (DTPs) resolved; 4) patients who received in- person pharmacist education about their diseases and medications; 5) pharmacist discharge medication counseling; 6) pharmacist discharge medication reconciliation; 7) combined BPMH admission medication reconciliation; and 8) "bundled" proactive direct patient care provided by a pharmacist. Notably, an additional cpKPI evaluating the number (or proportion) of patients for whom pharmacists have completed a pharmaceutical care plan was developed after round two.

Implications: Eight candidate cpKPI met the consensus criteria after round 2 of 3 in a modified Delphi process. The measurement of performance indicators at a national level may serve to advance clinical pharmacy practice and improve patient outcomes.

Analysis of Dose and Concurrent Medication Administration of "As Needed" Chemical Restraint to Inpatients with Behavioural and Psychological Symptoms of Dementia

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Background: The use of chemical restraint on a "pro re nata" (PRN) basis is utilized in patients suffering from behavioural and psychological symptoms of dementia (BPSD), but may lead to double dosing and be contrary to the principle of least restraint.

Objectives: To evaluate administration of PRN chemical restraint by nursing staff to in-patients with BPSD with regards to dosage and concurrent medications.

Methods: Chart reviews were completed on in-patients who had a diagnosis of dementia from May 1, 2009 until April 30, 2011. Medication administration records were reviewed for PRN use of antipsychotics, benzodiazepines, antidepressants, mood stabilizers, and zopiclone prescribed for aggression, agitation, or insomnia. Data collected and evaluated included age, gender, time of day, day of week, frequency of high and low doses if range dose was provided, and proximity to regular scheduled medication. Previous analysis showed significant differences in PRN use by age, time of day & day of week. We further evaluated dose ranges and whether proximity to regularly scheduled medication affected administration of PRN's.

Results: A total of 170 individuals with dementia were included; 49% were males and 42% of patients were 65-79 years. Over a total of 50346 bed days 4000 PRNs were administered. Ranged doses were administered as the high dose 77% of the time. There was a strong association between time to next dose and receiving a PRN from the

same class of medication with 7% being administered within +/- 30minutes of the next scheduled dose, 40% administered within +/- 2 hours and 67% within +/- 4hours.

Conclusions: It is uncertain if the principle of least restraint is being applied to PRN chemical restraint. It appears that concurrent medication administration is not being considered in the administration of PRNs and that PRN chemical restraint is a significant source of double dosing.

The Development and Implementation of a Provincial Clinical Training Program for Pharmacists

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Background: The creation of a provincial pharmacy program in 2008 enabled the standardization of clinical expectations for pharmacists. A need for provincial structured clinical training was identified to manage the gaps between education and practice, taking into account diversity in practice experience and training resources.

Description: A three-day structured program that focused on fundamental Clinical Skills, Clinical Knowledge, and Therapeutic Drug Monitoring was developed. Each day contained several modules that integrated didactic delivery and case based learning. Participants were provided with pre-workshop readings and assignments. They participated in the sessions either in person or via videoconference.

Action: Surveys of leadership and staff across the province were used to determine learning preferences, educational needs and current training practices. A provincial working group formed to develop the Clinical Orientation Program. Representatives included managers, Clinical Practice Leaders, educators, and staff pharmacists from urban and rural practices. Subgroups developed modules that were presented to a pilot group. Clinical Practice Leaders also audited the program. Participant and auditor evaluations were reviewed and collated, and the recommendations were incorporated prior to full implementation of the program.

Evaluation: The program was evaluated in two ways post implementation. Immediately following the program, participants were asked to complete an evaluation of each session soliciting feedback on delivery methods, content and session interactivity. Participants received a second evaluation survey several months after the session to assess the applicability of the concepts, skills and tools that were introduced. Responses from participants indicated a higher level of application of the presented information and an increased level of confidence in their clinical abilities.

Implications: A structured training program was developed and implemented to support provincial clinical expectations. It was accessible and relevant to a diverse group over a large geographical area. This program enhanced participants' knowledge, skills and confidence.

Strategies for Optimizing Non-Antimicrobial Medication Prescribing in Hospital: A Systematic Review of the Literature

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Background: Effective, safe, and sustainable drug use is vital for ensuring ideal outcomes for patients admitted to hospital. Appropriate use of medication is driven by informed prescribing.

Objective: To systematically review and report the literature identifying strategies to optimize prescribing of non-antimicrobial drugs in the hospital setting.

Methods: We used Cochrane Collaboration guidelines to conduct this systematic review. A health sciences librarian searched Embase, International Pharmaceutical Abstracts, Ovid Medline(R), Pubmed Clinical Queries, and Cochrane Database of Systematic Reviews, and Google and Google Scholar for grey literature, published from January 2000 to November 2012. Two reviewers assessed abstracts for relevancy and full text manuscripts for inclusion. Studies were included if they evaluated an intervention intended to improve prescribing within the hospital setting and reported change in prescribing, or were systematic reviews, and were English language. Studies were excluded if they evaluated antimicrobial therapy or were not available in full text form (i.e. abstracts or study protocols).

Results: A total of 872 records were screened for relevancy, 51 records were assessed for inclusion, and 28 studies were included in the systematic review. Among these studies, 6 were randomized controlled trials, 4 were systematic reviews, and 18 were before-after studies. Interventions included computerized alerts/prompts, printed educational tools, academic detailing, local opinion leaders, audit and feedback, pharmaceutical care, and multifaceted approaches. Most used usual care as a comparison. Multifaceted approaches had a greater impact on prescribing, whereas those that used only one intervention had little impact. Studies were limited by a short duration of follow-up and lack of head-to-head comparisons.

Conclusions: The greatest impact on in-patient prescribing occurred by using multifaceted approaches. More research is needed to identify duration of effect, as well as the most effective combination of i nterventions to maintain impact on prescribing.

Beliefs and Current Practices of Pharmacists with Osteoporosis Treatment in Patients with Renal Failure

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Background: The dilemma of how to treat osteoporosis in patients with renal failure is an issue often faced by clinicians due to limited evidence. To provide guidance to health care providers it is important to understand their beliefs.

Objectives: To describe the current practices and beliefs of pharmacists for the treatment of osteoporosis in patients with renal failure.

Methods: This was a cross-sectional survey of pharmacists working in hospitals and related healthcare settings. A 34-item online questionnaire was developed consisting of 4 sections: demographics, practice, beliefs, and comfort level. An email invitation was sent to members of CSHP (n=2499) in November 2012. Summary statistics was used for analyses.

Results: Overall, 367 pharmacists completed the survey. Respondents were mostly female (70%), > 10 years in practice (58%), and providing care to ≥ 1 – 2 osteoporosis patients per week (58%). Forty-eight percent agreed that oral bisphosphonates can be used in patients with renal failure as long as dosage adjustments are made. Few agreed that bisphosphonates were not as effective in preventing fractures in patients

with renal failure (14%), while 57% believed that adverse effects of oral bisphosphonates increased in patients with renal failure. However, there was a high "do not know" response (30%). Nearly 41% would use a bisphosphonate for creatinine clearance (CrCl) 15 – 30 mL/min, but 56% would avoid a bisphosphonate and recommend another medication for CrCl < 15 mL/min. Pharmacists expressed low level of comfort in assessing (51%) and initiating (55%) osteoporosis treatment in patients with renal failure. Most common resources identified to support practice included summary of guidelines/research (71%), tools (66%) and print continuing education material (54%).

Conclusion: Pharmacists had varying beliefs about approaches to managing osteoporosis in patients with renal failure. High level of interest for further learning was expressed, especially through the use of practice tools, guidelines and research summaries.

Serotonin Syndrome Precipitated by Fentanyl Administration in the Emergency Department

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Background: Fentanyl is widely used for both pain and procedural sedation in the emergency department (ED) due to its rapid onset, short duration of action and lack of propensity to cause histamine-mediated reactions. Recently, fentanyl has been identified as a precipitant of serotonin syndrome in patients chronically taking serotonergic medications.

Case Description: A patient stabilized on citalopram and bupriopion, presented to the ED with 8/10 right upper quadrant pain and received fentanyl. Within 2 hours of fentanyl administration, the patient reported strange thoughts and within 7 hours experienced agitation, confusion, myoclonus and hyperreflexia. Resolution of symptoms occurred within 48 hours of ED presentation and fentanyl administration.

Assessment of Causality: The presence of spontaneous clonus on it's own or the combination of tremor and hyperreflexia are the characteristic symptoms meeting Hunter Serotonin Toxicity Criteria in this patient. Using the Naranjo nomogram, a calculated score of 6 fits the classification of a probable adverse drug effect.

Literature Review: Seven out of 10 articles from the literature search described similar cases of serotonin syndrome secondary to fentanyl administration in those chronically taking serotonergic medications. To this effect, there has also been a recent focus on fentanyl and serotonin syndrome in Health Canada's Adverse Reaction Newsletter in response to 5 adverse reaction reports over the past decade, including 1 fatality.

Importance to Practitioners: As the clinical diagnosis of serotonin syndrome is notoriously missed, the mainstays of management are prevention and recognition. Fentanyl will continue to be a commonly used drug in the ED, however knowledge of patients' medications prior to administration should increase identification of those at high risk of serotonin syndrome. Awareness of this adverse reaction should also lead to improved recognition.

Common Diagnoses of Patients Admitted to General Internal Medicine: A Review to Assist New Pharmacy Clinicians

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Background: Multidisciplinary health care teams practicing in general internal medicine (GIM) provide care to patients with a variety of medical conditions. An effective pharmacy clinician practicing within the team requires diverse pharmacotherapy knowledge. When educating, training, and integrating a new pharmacy clinician, it can be challenging to prioritize the core therapeutic topics that should be emphasized for initial learning.

Objectives: To describe the most frequent admitting diagnoses of patients admitted to GIM in order to prioritize therapeutic topics for orientation and education of new internal medicine pharmacy clinicians.

Methods: A review of the admitting diagnoses for patients admitted to a GIM service between May and December 2012 was performed using data from a survey study. In addition to tracking the frequency of each diagnosis, ten internal medicine specialties were defined, and each diagnosis was assigned to the appropriate specialty group.

Results: Data was collected for 233 patients with a median age of 62 (range 19-97) and 55% were male. Fifty two different admitting diagnoses were recorded. The most frequent diagnoses were pneumonia (8.6%), sepsis (7.7%), congestive heart failure (7.3%), and gastrointestinal bleed (5.6%). The specialty groups encompassing the most patients were infectious disease (30%), gastroenterology (15%), cardiology (12.9%), hematology/oncology (8.6%), and neurology (7.7%).

Conclusion: This study suggests that admitting diagnoses within the specialties of infectious disease, gastroenterology, cardiology, hematology/oncology, and neurology are most common in a GIM service. A new pharmacist, resident, or student may benefit from directing their initial learning on the pharmacotherapy associated with these specialties. Furthermore, our results advise that specific emphasis should be placed on knowledge of pneumonia, sepsis, congestive heart failure and gastrointestinal bleed. Developing structured training materials and facilitating patient care experiences within the specialties identified, may help trainers and preceptors successfully integrate a new pharmacist into a collaborative GIM practice.

Pharmacist Management and Monitoring of Therapeutic Anticoagulation

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Targeting Excellence in Pharmacy Practice

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Background: Therapeutic doses of anticoagulation carry an increased risk of adverse effects when compared to prophylactic doses. Pharmacist management of inpatient anticoagulation is associated with improved clinical outcomes and safety. The current pharmacist management

practices at a suburban acute care centre are unknown.

Objectives: To determine the number of patients on therapeutic doses of anticoagulation who are managed or monitored by a clinical pharmacist while on a patient care unit with dedicated pharmacist services.

Methods: Retrospective review of 150 electronic pharmacy profiles of patients on therapeutic doses of anticoagulants while on a patient care unit with pharmacist services. Profiles were reviewed for electronic pharmacist documentation of management or monitoring. Results were analyzed using descriptive statistics.

Results: A total of 1473 patients were identified and 366 were screened to enroll a consecutive convenience sample of 150 patients. Pharmacists managed a total of 13 (9%) patients and monitored 9 (6%) patients who received therapeutic anticoagulation. When developing a management plan, pharmacists were most likely to order a lab test. There was a median of 2 instances of documentation per patient stay.

Conclusion: Despite dedicated pharmacist services, only a minority of inpatients who received therapeutic doses of anticoagulation while on a patient care unit were managed or monitored by a pharmacist. Further research is required to identify barriers to pharmacist management and monitoring of patients on therapeutic anticoagulation.

Prevalence of Alternative Medicine Use on a General Medical Unit and a Hematology Unit

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Background: The prevalence of alternative medicine (AM) use among hospitalized patients ranges from 7 – 69%. Usage rates of greater than 70% has been reported in several studies for patients with malignancies. AM usually refers to medical interventions that have not met the standards of clinical effectiveness, either through randomized controlled clinical trials or the consensus of the medical community. AM may have potential side effects or adverse interactions with prescribed medication. Hospitalized patients may be more vulnerable to adverse effects due to their medical conditions. However, little is known about the prevalence of alternative medicine use in hospitalized patients in Canada.

Objective: To determine the prevalence of alternative medicine use in hospitalized patients on a General Medical Unit and a Hematology Unit.

Methods: A pilot study was conducted on patients who were admitted to a General Medical Unit and a Hematology Unit at two different acute care hospitals. Age, sex, admitting diagnosis, comorbidities, vitamin/mineral use, and alternative medicine use were collected by interviewing these patients.

Results: A total of 87 patients were included in this pilot study. There were 54 from the General Medical Unit and 33 from the Hematology Unit. The patients' characteristics are shown in the following table.

	General Medical Unit		Hematology	
	No AM	AM	No AM	AM
Number	49 (91%)	5 (9%)	26 (79%)	7 (21%)
Age: median (range)	65 (19-96)	50 (32-79)	63 (18-82)	47 (32-66)
Male:female	25:24	3:2	15:11	2:5
Cancer pre-admission	6 (12%)	0 (0%)	14 (54%)	5 (71%)
Multivitamin	22 (45%)	3 (60%)	5 (20%)	2 (29%)

Conclusion: The prevalence of alternative medicine use in this pilot study is low. A larger study is needed to further characterize the features of alternative medicine users and to determine the predictors of alternative medicine use in this population.

Inhaler Device Technique in Community-Dwelling Older Adults

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Background: Older adults have been found to have difficulty using inhalers.

Objective: The primary objective of this study was to evaluate how well patients diagnosed with COPD and/or asthma used their inhaler device(s).

Methods: We conducted an observational study on patients with asthma and/or COPD who were using an inhaler. Participants were recruited across Alberta from respiratory clinics, family medicine clinics, or community pharmacies. Participants filled out a questionnaire (demographics, medical history, questions about perception of devices used). They demonstrated inhaler technique while trained research assistants objectively scored the technique using a common 5-point scale (0 - not at all effective, 4 - completely effective). Multiple regression techniques with backward removal were used to investigate the relationship between independent variables and technique.

Results: A total of n = 161 older adults (67% female) enrolled. The mean technique score and the number of patients using each device were M_{MD}=3.22 (n=82), $M_{MDIwSpcr}$=2.45 (n=42), $M_{handihaler}$=3.09 (n=45), $M_{turbuhaler}$=2.48 (n=40), and M_{diskus}=3.04 (n=51). Unstandardized regression coefficients indicate females and patients with longer duration of COPD used turbuhaler less effectively than males (B_{fem} = -.69, p<.05) or patients with shorter duration of COPD ($B_{yrsCOPD}$= .10, p<.05), respectively. Similarly, older patients and patients with cognitive impairment used the metered-dose inhaler (MDI) less effectively, (B_{Age}=-.02, p<.05; B_{cogimp}=-1.31, p<.05). Neuropathy was also associated with less effective MDI with spacer technique (B_{neurop}=-1.81, p<.01). Arthritis was not associated with poorer inhaler technique for any device.

Conclusions: The older adults in our study had a number of medical conditions that were associated with poorer inhaler technique. While the results do not support a causal link between the predictor variables and effective device technique, evidence of the existence of relationships suggests clinicians should carefully consider how patient characteristics interact with the inhaler device when advising patients as there are numerous challenges to effective use.

Assessing Calcium and Vitamin D Intake, Knowledge, Attitudes and Beliefs in Middle-Aged Men

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Background: Maintaining adequate calcium and vitamin D intake is important for preventing osteoporosis and for maintaining good general health. To promote calcium and vitamin D intake, it is first

important to understand the knowledge, attitudes and beliefs of calcium and vitamin D. Men have historically been overlooked in osteoporosis research and bone health.

Objectives: The purpose of this study was to describe the intake, knowledge, attitudes and beliefs of calcium and vitamin D in middle-aged men, ages 35-64 years.

Methods: A 97-item written, self-administered questionnaire was designed by the study team The questionnaire had 6 sections including: basic demographics and questions regarding intake, knowledge, attitudes and beliefs of calcium and vitamin D, and a section for debriefing. Study participants were ambulatory, community-dwelling men between the ages of 35 and 64. Participants were recruited at a local sporting goods store, financial institution, fitness centre, and community-pharmacies. Surveys were distributed and collected from fall 2011 – spring 2012. The study was approved by the University of Alberta Health Research Ethics Board.

Results: A total of 93men consented to participate in the study. The mean age of participants was 47 (36 to 61), and the majority were Caucasian (89%). Most men were unsure of the recommended daily intakes for both calcium and vitamin D (55%, 54% respectively). A minority of men were supplementing with vitamin D (35%) or calcium (18%). Most men (80%) believed that calcium would help their bones, while a lower proportion associated bones with vitamin D (53%). The most frequently identified sources of calcium were milk (97%), yogurt (86%), and fortified soy beverages (52%). The most commonly cited sources of vitamin D were sunlight (78%) and milk (55%).

Conclusions: Knowledge of these nutrients, particularly vitamin D, was unacceptably low and more research needs to examine effective methods for educating this population.

The Effect of Prescriber Order Entry on Antibiotic Turn-around Time: A Meta-Analysis

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Background: Early administration of antibiotics is associated with decreased mortality. Computerized Prescriber Order Entry (CPOE) has the potential to decrease antibiotic turn-around time (TAT). However, the effect is uncertain as CPOE may also have unintended consequences such as unfavourable workflow and new kinds of errors which may lengthen antibiotic TAT.

Objective: To evaluate the potential impact of pre- and post-CPOE on antibiotic TAT from when it is ordered to the time it is administered.

Methods: We searched PubMed, EMBASE, International Pharmaceutical Abstracts, and the CINALH database. We included all pre- and post-intervention study designs examining antibiotic TAT. Two reviewers independently searched and screened for relevant studies between 1947–2012. The quality of the studies was assessed using a modified Newcastle-Ottawa Scale. The primary outcome was time from antibiotic order to administration of the first dose. The secondary outcome was the time from medication order to pharmacy verification.

Results: We included 5 studies out of 87 unique citations. All were pre-post intervention observational studies conducted in critical care or non-critical care wards in hospital. The combined number of orders (N) in the pre-CPOE was 756 and post-CPOE was 1204. The mean antibiotic TAT was 49.86 minutes faster in favour of CPOE (95% confidence interval = 88.14 to 11.57; p-value = 0.01). Analysis of the secondary outcome demonstrated that of these 49.86 minutes 40.11 minutes (95% confidence interval = 63.88 to 16.34; p-value = 0.0009) were attributed to the time from the order entry to pharmacist verification.

Conclusion: The implementation of CPOE was associated earlier administration of antibiotics in hospitalized patients. The majority of the reduction in antibiotic TAT was at the medication order to the pharmacy verification step.