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ABSTRACTS / RÉSUMÉS

"FACTS, FIGURES, AND THE ART OF HEALTH CARE DECISION-MAKING: LINKING KNOWLEDGE GENERATION TO HEALTH OUTCOMES"

MARCH 28TH – 30TH, 2010
TORONTO, ONTARIO
THE FOUR SEASONS HOTEL

CAPT ACTP

THE CANADIAN ASSOCIATION FOR POPULATION THERAPEUTICS /
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CAPT ABSTRACTS

ORAL PRESENTATIONS

1

Adherence to osteoporosis drugs and fracture prevention: no evidence of healthy adherer bias in a frail cohort of seniors

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Background: Adherence to preventive pharmacotherapy has been linked to health behaviours that may reduce the risk for clinical outcomes unrelated to drug effects. We examined the potential for healthy adherer bias when studying the effects of adherence to osteoporosis pharmacotherapy on fracture risk.
Methods: Cohort study of older adults in Pennsylvania ho initiated osteoporosis drugs between 1995 and 2005. We included new users of bisphosphonates, calcitonin and raloxifene. Adherence was categorized as high (proportion of days covered [PDC]>=80%), intermediate (50%<PDC<80%) or low (PDC<=50%) according to a 180 day ascertainment period. Nonvertebral fracture rates within 365 days after the ascertainment period were compared between adherence categories (reference=low) using Cox proportional hazard models, and adjusting for fracture risk factors. Primary and secondary prevention cohorts were examined separately. Adherence to calcitonin and raloxifene were considered control analyses given no clinical trial evidence of nonvertebral fracture prevention.
Results: We found little difference in fracture rates between levels of adherence to: calcitonin, bisphosphonates for primary prevention, or raloxifene for secondary prevention. We document lower fracture rates among high versus low adherent bisphosphonate users for secondary prevention (HR=0.53,95%CI=0.38-0.74), and higher fracture rates among high versus low adherent raloxifene users for primary prevention (HR=2.01, 95%CI=1.04-3.87).
Conclusion: We document little evidence of healthy adherer bias when studying the association between better adherence to osteoporosis drugs and fracture risk reduction, with only better adherence to bisphosphonates reducing fracture risk. The higher fracture risk among highly adherent raloxifene users for primary prevention is likely due to residual confounding.
Keywords: *Adherence, bias, cohort study, fracture*

2

An open-source, interactive model to assess the outcomes and economics of diabetes interventions

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Background: Several decision-theoretic models exist to assess the long-term outcomes and economics of diabetic interventions. Since the models are proprietary, users are limited in their ability to critically review program code and modify inputs for their specific setting. We developed a diabetes model with open-source code that is unlocked, transparent, and modifiable by users.
Methods: The analytical framework is similar to the United Kingdom Prospective Diabetes Study (UKPDS)-based model (Clarke et al., Diabetologia

2004), and is created in Microsoft Excel, using visual basic. It is adaptable to both individual- and cohort-level data. Relationships between outcomes (e.g., myocardial infarction) and exogenous variables (e.g., HbA1c) were based on the equations as reported by Clark et al. The model was further modified to include (1) costs and disutilities associated with hypoglycemia and (2) options for emerging treatment intensification regimens as the patient's diabetes progresses. The model uses Canadian resource use data as defaults. The model was validated against the findings of the Ontario Diabetes Economic Model (ODEM, 2006).

Results: The results were concordant with the published ODEM results. The model conforms to the guidelines of the Common Drug Review (CDR) and fulfills Canadian drug submission requirements.

Conclusion: An open-source, interactive diabetes model will greatly facilitate users'–specifically clinicians and other decision makers–ability to modify inputs specific to their setting and rigorously assess the validity of findings.

Keywords: *Cost-effectiveness, diabetes, Canada*

3

Antipsychotic-induced cerebrovascular events in the elderly residents of Manitoba: a population-based cohort study

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Funding Source: Manitoba Medical Service Foundation, Manitoba Health Research Council

Background: Health Canada has issued warnings regarding the risks of severe adverse events associated with the use of second generation antipsychotic agents (SGAs) in elderly persons affected by dementia; however, the prescribing of these agents has not decreased and conflicting results have been recently published on the relative safety of SGAs and conventional first generation agents (FGAs). In this study, we compared the risk of cerebrovascular events (CVEs) in elderly persons treated with SGAs or FGAs.

Methods: A retrospective cohort study was carried out on all elderly residents of Manitoba (65 years and older) who were dispensed their first antipsychotic medication between April 1, 2000 and March 31, 2007 (total of 14,635 incident users). Administrative health care databases of the Manitoba Population Health Research Data Repository (housed at the Manitoba Centre for Health Policy) were accessed for the analyses. Cox proportional hazards models were used to compare risks of developing CVEs in FGA- and SGA-users.

Results: After controlling for potential confounders (e.g., demographics, comorbidity and medication use), the SGA-users did not exhibit significantly greater risk of CVEs compared to the FGA-users (adjusted hazard ratio 1.077, 95% CI: 0.953 to 1.217). No significant differences in risk were found between persons treated with specific SGAs compared to those treated with FGAs.

Conclusions: Elderly persons taking SGAs demonstrated a risk of CVEs similar to that of those treated with FGAs. Further analyses will contrast adverse events in elderly individuals treated with antipsychotic agents, compared to matched individuals who had not received antipsychotic medications.

Keywords: *Antipsychotics, elderly, retrospective cohort study*

4 – ENCORE PRESENTATION

Are we treating wheeze with bug killer?

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5

Confounding and participation effect in a primary care cluster randomised controlled trial on dyslipidemia prescribing practices of physicians

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Funding Source: TEAM study is funded by the Canadian Institutes of Health Research, AstraZeneca

Background: In a cluster randomized trial (CRT), prescribing practices may vary across groups due to confounding or participation effects. To estimate their magnitude, trial and non-trial physicians were compared.

Methods: TEAM study evaluated the efficacy of a physician-pharmacist collaborative care for dyslipidemia. Fifteen clusters including 77 physicians and 108 pharmacists were assigned to intervention or control group. Using the IMS database, participating trial physicians (n=53) were matched to non-trial physicians (n=1552). To assess confounding, the

percentage of statin prescriptions (statin prescriptions/total prescriptions) one year prior to randomisation was compared between the intervention-trial and control-trial physicians. To estimate the participation effect, the change in the percentage of statin prescriptions during the study was compared between control-trial and their matched non-trial physicians.

Results: Prior to the study, the mean percentage of statin prescriptions among trial physicians was lower in the intervention group compared to the control group (6.17% versus 7.48%; between-group difference:-1.31% (95%CI:-2.49% to -0.13%); translating in a mean cost difference of $43,469 (95%CI:-$73,912 to -$13,027). During the study, in the control groups, trial physicians increased their proportion of statin prescriptions by 0.89% compared to 0.38% in non-trial physicians (between-group difference: 0.51% (95%CI:0.15% to 0.88%); translating in a non significant mean cost difference of $1,121 (95%CI:-$4,609 to $6,852).

Conclusions: In a CRT involving a small number of clusters, confounding at the level of the clinicians represents a more severe threat to the internal validity than the participation effect. In these circumstances, randomisation at the level of the patients seems justified.

Keywords: *Cluster randomised trial, confounding, participation effect*

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Cost-effectiveness analysis of thiopurine methyltransferase testing to guide mercaptopurine starting doses in pediatric patients with acute lymphoblastic leukemia

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Funding Source: ACOA, the provincial government of Newfoundland and Labrador, Memorial University of Newfoundland

Background: With a trend towards personalized medicine and understanding the genetic basis of disease and treatment, it is essential to evaluate the economic impact of genotyping technology used to guide therapy. The objective of this study was to assess the incremental cost-effectiveness per life-month gained of thiopurine methyltransferase (TPMT) genotyping to guide doses of 6-mercaptopurine in children with acute lymphoblastic leukemia (ALL) compared to phenotype testing and empirical weight-based dosing. The intended audience is provincial and institutional health policy makers, pediatric hematologists and pharmacogeneticists.

Methods: A cost-effectiveness analysis (CEA) was conducted from health care system perspective comparing costs and consequences over three months. A decision model was constructed to evaluate the impact of TPMT tests on preventing myelosuppression and improving survival in ALL patients receiving 6-mercaptopurine. Direct medical costs included laboratory tests, medications, pharmacy and physician services and inpatient care. Probabilities were extracted from clinical guidelines and published evidence. The outcome was survival measured in life-months. One-way sensitivity analyses were performed for TPMT test and hospitalization costs, incidence of myelosuppression, and sensitivity and specificity of genotype and phenotype tests.

Results: Neither of the testing interventions showed a benefit in survival compared to weight-based dosing. Both test strategies were more costly compared to weight-based dosing with incremental costs of CDN$438 and CDN$358 per patient for genotype and phenotype tests, respectively.

Conclusion: At this time, there is insufficient evidence to recommend the use of phenotype or genotype testing prior to mercaptopurine therapy to guide initial doses of 6-mercaptopurine in pediatric ALL patients.

Keywords: *Cost-effectiveness analysis, thiopurine methyletransferase, pharmacogenetics*

7

Differences in EuroQol Five Dimension (EQ-5D) and Health Utilities Index 3 (HUI3) derived utility scores in an HIV population

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Background/objective: Reimbursement decisions are based on factors including cost-utility of an intervention. Anchored between 0 (worst) and 1 (perfect health), utility scores are a measure of morbidity and are commonly collected using instruments such as the HUI3 and EQ-5D. However, these instruments and as such may yield diverging outcomes despite attempting to measure the same construct. The purpose of the analysis was to investigate utility scores elicited from different instruments in a cohort of individuals with HIV.

Methods: The Ontario HIV Treatment Network (OHTN) Cohort Study collected utility scores through the EQ-5D and HUI3, as well as demographic and clinical variables. An exploratory analysis was conducted to investigate the differences between the EQ-5D and HUI3 based utility scores.
Results: A total of 1,051 follow-up visits were available. HUI3 utility scores were lower and more variable (mean±SD = 0.71±0.28) compared to the EQ-5D utility scores (0.83±0.16). Disutility was observed in 17 cases with the HUI3 compared to none with the EQ-5D. Change in utility score for lowCD4 (< 350 cells/mm^3) subgroup versus medium (350 to 500 cells/mm^3) was similar for both instruments. A larger difference was observed with the HUI3 between medium and high CD4 (?500 cells/mm^3) 0.015 versus 0.007, respectively.
Conclusions: Elicitation of utility scores relies on the sensitivity and validity of the instrument to capture the construct. The choice of instrument used may bias or limit results of a cost-utility analysis.
Keywords: *HIV, health preference*

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Effectiveness of antihypertensive agents in the secondary prevention of vascular events among patients with ischemic stroke - a nested case-control study

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Background/Aims: Antihypertensive agents (AH) have been shown to reduce the risk of major cardiovascular (CVD) events. However, there is no large scale effectiveness studies which have assessed the relationship between adherence to AH medications and major CVD outcomes in high risk individuals that have suffered an ischemic stroke. Our aim is to evaluate the relationship between AH drug adherence and vascular outcomes in a cohort of older patients hospitalized for an ischemic stroke and discharged in the community.
Methods: A cohort of 8,179 patients with ischemic stroke was reconstructed from RAMQ and Med-Echo databases. Eligible subjects were 65 years and older and treated with AH agents between 1999 and 2007. A nested case-control design was used to study major CVD outcomes. Every case was matched for age and duration of follow-up. The adherence to AH drugs was measured as the proportion of days supply of medication dispensed over a defined period. Conditional logistic regression models were used to estimate the rate ratio of vascular events adjusting for covariables.
Results: Mean patient age was 75 years, 54% were male, 23% had diabetes, and 47% had dyslipidemia, 38% had CAD, 6% MI and 14% had atrial fibrillation. Adherence to AH agents equal to or more than 80% reduced the risk of vascular events (RR: 0.69; 0.63-0.76) compared to the one of <80%. Male gender, prior CVD, and non adherence to therapies for diabetes and dyslipidemia were risk factors.
Conclusion: Higher adherence to AH therapy is linked with a risk reduction of vascular events among patients with ischemic stroke.
Keywords: *Antihypertensive agents, secondary prevention, stroke*

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Electronic vascular risk decision support: COMPETE III randomized trial

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Background: Computerized decision support linked with electronic medical records is promoted as an effective means of improving quality of prescribing and patient care. However, there are very few high quality studies in routine clinical care and no consistent evidence of an effect on important patient outcomes.
Methods: A randomized controlled trial in EMR primary care practices in Ontario. Patients > 55 years with prior vascular events, diabetes, hypertension or hypercholesterolemia, were randomized to the COMPETE III intervention package or usual care. The intervention included personally tailored electronic vascular risk monitoring and treatment advice shared between physician and patient, risk calculation and a clinical care coordinator. Primary outcome was a composite of 8 recommended process outcomes at 1 year.
Results: 1102 patients in 49 physician practices were randomized and included in the analysis (53.3% female, mean age 69.1 yr, 32.8% with previous vascular event). The intervention had a significantly greater improvement

in mean process composite, with a difference of 4.7 ($p< 0.0001$) (maximum possible score 27). Significantly more patients improved by at least 3 points (67.7% vs. 25.5%, $p<0.0001$). Despite this, the clinical outcomes of blood pressure, cholesterol, BMI, exercise, diet or psychosocial scores showed no significant difference, only prescribing of ASA improved (OR 1.44, p=0.015). Physicians noted regular technical difficulties with their systems.
Conclusions: Despite important improvements in the complex processes required to reduce vascular risk, clinical variables including prescribing were not consistently improved. Large investments in electronic decision support may not be warranted until electronic medical records are of higher quality.
Keywords: *Electronic decision support, randomized controlled trial, vascular risk*

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Ethnic disparities in prescription drug use: evidence from British Columbia

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Background: Although ethnic disparities in health services utilization have been widely documented, ethnic disparities in prescription drug use have been less thoroughly studied. To address this gap, we studied rates of prescription drug purchases by persons of differing self-identified ethnicity.
Methods: For a sample of 28,197 people in British Columbia (BC), we linked Canadian Community Health Survey data on self-identified ethnicity with administrative data describing all prescriptions purchased during 2005. We used logistical regressions to measure differences in purchases of antihypertensives, statins, antibiotics, NSAIDs, and antidepressants across BC's largest ethnic groups: whites, Chinese, other Asians, other non-whites, and mixed ethnicities. Models were sex-stratified and adjusted for age, recent immigration, language, income, and health status.
Results: We found significant ethnic disparities that varied by therapeutic category and sex. After other factors were accounted for, there were no significant ethnic differences in men's use of antihypertensives while women who identified as being Chinese were approximately 50% less likely use antihypertensives than women who identified as white. In contrast, there were no significant ethnic differences in women's use of statins while men who identified as being Chinese were approximately 30% less likely to use statins than men who identified as white. The largest difference we found was that men identifying as Chinese were just 16% as likely to purchase antidepressants as men identifying as white.
Conclusions: There appear to be important differences in prescription drug used by Canadians of different ethnic identity. Some of these disparities may reflect inequities in health care delivery.
Keywords: *Access, ethnicity, disparities*

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Rheumatoid arthritis and serious infections: a nested case-control study from the Ontario Biologics Research Initiative (OBRI)

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Background: The OBRI represents a novel approach to real-world rheumatology surveillance. We evaluated serious infections in seniors (aged >65) with RA.
Methods: We studied a population-based RA cohort (N=81497) using physician billing and hospitalization data (1992-2008). The RA definition was based on >2 billing codes (>2 months apart but within 5 years) and >1 anti-rheumatic drug prescription. Co-morbidity and markers of RA severity were determined using hospitalization, billing and procedure code data. Our primary outcome, assessed over 1998-2008, was an infection requiring hospitalization or emergency room visit. We matched the cases (by age, sex, and time) to up to 5 controls, and used multivariate logistic regression to assess independent exposure effects, adjusting for demographics, co-morbidity, markers of RA severity, and concomitant/past medications.
Results: Within the RA cohort (N=81497), 14214 cases of serious infection occurred; these were matched to 71058 controls. The most common event was pneumonia (N=7026). Multivariate models demonstrated that infection was independently associated with low income status, high co-morbidity, and greater RA severity. Steroids were an important risk factor, even at prednisone doses <5mg/d(compared to none, adjusted odds ratio, OR 4.0, 95% CI 3.7, 4.3). Higher prednisone doses (>10mg/d) increased risk even more (compared to none, adjusted OR 6.1, 5.5, 6.7). For current drug exposures, the adjusted OR was 2.3(1.8, 3.0) for azathioprine; 2.2(1.5,3.2) for anti-TNF drugs; 1.9(1.8,2.1) for methotrexate; and 1.5(1.2, 1.9) for leflunomide.
Conclusions: Low income status, high co-morbidity and disease severity are associated with infection risk

in seniors with RA. Corticosteroids dramatically increase risk, and other agents appear to confer risk as well.
Keywords: *Rheumatoid arthritis, infection, pharmacoepidemiology*

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Seniors presenting to the Emergency Department after a fall: costs and consequences

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Objectives: Falls among seniors are the primary cause of injury related hospitalizations. Previous Canadian estimates of the costs of seniors' falls were based upon administrative data which has been shown to underestimate the incidence of falls. Using prospectively collected data our study objective was to estimate the costs of falls by seniors which resulted in an Emergency Department (ED) visit from the health provider perspective.
Methods: We prospectively collected data from seniors (>70 years) presenting to the Vancouver General Hospital ED after a fall. We excluded individuals who where cognitively impaired or unable to read/write English. Data were collected on the care provided including physician assessments/consultations, radiology and laboratory tests, ED/hospital time, rehabilitation facility time, and in-hospital procedures. Unit costs of health resources were taken from a fully allocated hospital cost model.
Results: Data were collected on 100 fall related ED presentations. The most common diagnosis was hip/pelvic fracture (N=18), followed by upper body fracture (n=12), and laceration (n=11). 38 fallers had injuries requiring hospital admission, with an average length of stay of 40 days (Median:29 days Range:2-143 days). The mean cost of a fall causing ED presentation was $11,408 (Median: $1,023, Range: $55-$96,045). Among the 62 individuals not admitted to hospital, the average cost of their ED visit was $673 (Median: $794 Range: $56-$1,719). Individuals requiring hospital admission had an average cost of $29,977 (Median: $27,183, Range: $2,203-$96,045).
Conclusion: Among the growing population of Canadian seniors, falls have substantial costs. With the cost of a fall related hospitalization approaching $30,000, there is an increased need for fall prevention programmes.
Keywords: *Senior fallers, health economics, cost*

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Surrogate outcomes in HTA decision making

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Background: Efficacy data from surrogate outcomes (SOs) can demonstrate treatment effects before evidence from true clinical endpoints becomes available. Here, we present key findings from a study exploring the use and impact of SOs in decision making by Health Technology Assessment (HTA) organisations, including CADTH.
Methods: A review of appraisal reports produced by AHRQ, CADTH, HAS, IQWiG, NICE, SMC and PBAC between 2004-2009 was conducted. To manage scope, treatments of diseases with a combined high global burden of illness (cardiovascular disease (CVD), diabetes mellitus, HIV, oncology and osteoporosis), were included in the review. To ensure data of sufficient depth were available for comparison, treatments appraised by multiple HTA organisations were extracted in detail.
Results: Approximately 10% of appraisals retrieved were extracted. Overall, across HTAs, consideration of SO data was stated in the recommendation section of appraisals in 52% (CVD), 70% (diabetes), 81% (HIV), 40% (oncology) and 67% (osteoporosis) of cases, respectively. Typically, cost-effectiveness analyses based on SO efficacy data were accepted in HIV and diabetes, and accepted with reservations in CVD and oncology. The level of detail rationalising recommendations varied between HTA organisations, NICE provided the most detail; SMC the least. CADTH also provided limited detail. The degree of acceptance of SO as evidence of efficacy also differed.
Conclusion: Across HTA organisations, HAS generally accepted SO data. CADTH, PBAC and the SMC appeared more cautious in some disease areas, however the consideration process was not always transparent.
Keywords: *Systematic review, surrogate outcomes, heath technology assessment*

14
The importance of adjusting for potential confounders when combining evidence from randomised and non-randomised studies: a Bayesian hierarchical model

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Background: Informing health care decisions may necessitate the synthesis of evidence from different study designs. The objective of this study was to extend a published Bayesian hierarchical model to combine evidence from randomised and non-randomised studies and adjust for bias due to confounding.
Methods: In this new methodology study estimates were adjusted for potential confounders using differences between study arms. The model was applied to a synthesis of randomised and non-randomised evidence from a published review comparing treatments for abdominal aortic aneurysms. We compared the results of the Bayesian hierarchical model adjusted for differences in study arms with: 1) unadjusted results, 2) results adjusted using aggregate study values, and 3) two methods for downweighting the potentially biased non-randomised evidence.
Results: When analysed separately, the estimated odds ratio (95% Bayesian credible interval) was 0.32 (0.13,0.76) for the randomised studies and 0.57 (0.41,0.82) for the non-randomised studies. When the randomised and non-randomised evidence was combined, the unadjusted odds ratio was 0.49 (0.21,0.98). Adjusted for differences between study arms, the estimated odds ratio was 0.37 (0.17,0.77), representing a shift towards the estimate for the randomised studies alone. Adjustment for aggregate values resulted in an estimate of 0.60 (0.28,1.20). The two methods used for downweighting gave odd ratios of 0.43 (0.18,0.89) and 0.35 (0.16,0.76), respectively.
Conclusions: The approach presented in this paper could help facilitate the use of all available evidence to inform health policy decisions by providing a systematic way of incorporating potentially biased evidence, relying on bias adjustment.
Keywords: *Bayesian, evidence synthesis, bias*

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Under-use of disease-modifying anti-rheumatic drugs for seniors with early rheumatoid arthritis: a population based study from the Ontario Biologics Research Initiative (OBRI)

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Background: Rheumatoid arthritis (RA) is a potentially catastrophic inflammatory disease. Current literature emphasizes early rheumatology consultation, for prompt diagnosis and treatment. Primary care physicians are gatekeepers for access to specialists and play an integral role in optimal care. The OBRI, a collaboration of rheumatologists, patients and researchers, aims to delineate provincial practice patterns, evaluate real-world therapeutics, and ultimately improve clinical outcomes. Our objective was to estimate use of disease-modifying anti-rheumatic drugs (DMARDs) in the first year of RA diagnosis.
Methods: We assembled an incident cohort of seniors (>65years) with RA, using physician billing data for 1997-2006. Drug exposures were obtained from pharmacy claims. We assessed if patients had been exposed to at least one DMARD prescription within the first year after RA diagnosis. We assessed secular trends and potential differences for patients receiving rheumatology care versus those who did not.
Results: Overall, only 40% of the 24326 seniors with new-onset RA were exposed to DMARD therapy within 1 year of diagnosis. This increased from 30% in 1997 to 55% in 2006. Only 55% of patients saw a rheumatologist. In 2006, the percentage of early RA patients on DMARDs for those who saw a rheumatologist was 70% compared to 20% for those that did not.
Conclusion: Improvements in RA care have occurred but more efforts are needed. Patients not under rheumatology care rarely receive appropriate therapy in the 1st year of diagnosis. This emphasizes the need for increased awareness among primary care physicians, regarding the importance of RA referral.
Keywords: *Rheumatoid arthritis, quality care, pharmacoepidemiology*

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Use and misuse of IV pantoprazole in paediatric inpatients

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Funding Source: None

Background: IV proton pump inhibitors (PPI) are effective at acid blockade, but are expensive alternatives to other acid suppressing agents. Pantoprazole, the only IV PPI in Canada, costs approximately $15.07 to treat a 20kg child per day whereas oral PPIs cost between $1-2 per day. The Council of Academic Hospitals of Ontario (CAHO) developed guidelines in 2007 to encourage the rational use of IV pantoprazole. Appropriate indications were defined as: severe upper GI (UGI) bleed or acid

suppression where oral therapies are not feasible. The use and misuse of IV PPIs has been studied in adult patients with up to 65% of treatments deemed inappropriate. This is the first study, to our knowledge, to assess the appropriate use of IV PPI in paediatric inpatients.
Methods: A retrospective chart review was conducted over a 4-month period in 288 patients admitted to the Hospital for Sick Children in 2008 who received IV pantoprazole. Data was abstracted on prescribing service, indication, dose, length of therapy, and concurrent oral medications or nutrition. Indications and dosing were evaluated against CAHO guidelines.
Results: Over four months, 212 out of 257 patients (82.5%) prescribed IV pantoprazole did not meet prescribing guidelines. Of these, 204 (96.2%) had an inappropriate indication and 40 patients (18.9%) had dosing errors, including 13 (32.5%) with high dose, 15 (37.5%) with low dose, 6 (15.0%) with no bolus, and 9 (22.5%) with infusions longer than 72 hours. The cost of inappropriate use was estimated at $22,081 ($5,520/month).
Conclusions: A significant number of IV pantoprazole doses were administered where equally effective, cheaper alternatives could be used instead. These findings provide an excellent opportunity for the GI service to conduct an educational intervention around the appropriate use of IV PPI, and perform a follow-up quality improvement audit.
Keywords: *Proton pump inhibitor, drug utilization evaluation, quality assurance*

17
Using GIS maps to interpret patterns of contraceptive use among youth across British Columbia

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Background: Hormonal contraceptive use is an important determinant of youth sexual health as it impacts teen pregnancy rates. The main objective of this paper is to examine, through the lens of gender and place, how socio-economic variables influence the choice and use of contraceptives among youth across British Columbia (BC).
Methods: Using Geographic Information System (GIS) technologies, maps were prepared to examine the choice and patterns of contraceptive use from 1996 to 2003 among youth aged 10-24 years across BC. The maps graphically display the relation between contraceptive patterns and socio-economic status (SES) variables, such as lone parent family, income inequality, proportion of 18 year olds who did not graduate across geographic regions. Pharmanet data was used to generate contraception usage by age categories while BC Vital Statistics data was used for generating SES variables.
Results: This is a part of the BC Youth Sexual Health Atlas project. From these maps, SES variables appear related to the rate of contraceptive use among youth. Areas with high teen pregnancy rates that rank low on SES variables, such as regions in rural and northern BC, have almost 40 per cent less contraceptive use compared with regions near Vancouver, which rank higher on SES variables.
Conclusions: These maps provide a means by which researchers, policy makers, and service providers can conduct relative comparisons between the different regions of BC and promote discussion about how social and structural inequalities among youth sexual health outcomes can be reduced.
Keywords: *Sexual health, contraceptive use, gender and place-based analysis*

POSTER PRESENTATIONS

18
A survey of Canadian stakeholders about OctreoScan utilization

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Funding Source: Covidien Canada

Background: The incidence and prevalence of gastrointestinal neuroendocrine tumours (GI NETs) have increased. GI NETs contain somatostatin receptor subtypes 2 and 5. Somatostatin analogues such as octreotide have been synthesized and radiolabelled to become a radionuclide (111In-pentetreotide or OctreoScan) and used to visualize the tumour and metastases. There is no specific reimbursement code for the professional services associated with OctreoScan and the test itself.
Methods: A telephone survey of utilization and costs of OctreoScan across Canada was conducted between August and November 2009.
Results: There were 17 clinicians (endocrinologist N=2, oncologist N=2, nuclear medicine physician N=9 and surgeon N=4) who completed the survey. Mean number of years in practice was 11 years. An average of 99 GI NETs patients had been seen in the last year,

with 37% and 63% being new and follow-up patients, respectively. The majority ordered or used OctreoScan on a weekly basis and an average of 4.6 scans per centre was conducted monthly. A number of medical specialties were involved with ordering and administering OctreoScan including nuclear medicine physicians (100%), medical oncologists (80%), endocrinologists (60%) and surgical oncologists (60%). OctreoScan was selected as a "first-line evaluation tool" (40%), followed by "secondary evaluation tool after surgery and other tests" (33%) by the clinicians. Funding for OctreoScan was variable across the country with the institution, clinics and departmental budgets paying for the test.
Conclusions: OctreoScan is used by clinicians to diagnose and monitor GI NETs patients. Some provinces reimburse OctreoScan. However, in Ontario, there is currently no reimbursement.
Keywords: *OctreoScan, reimbursement*

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Resource use after an ischemic stroke: results from The BURST Study

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Background: This study determined resource use, 1-month and 6-month post ischemic stroke, of participants enrolled in The BURden of Ischemic STroke (BURST) Study.
Methods: The BURST Study was a prospective, observational study with 232 ischemic stroke patients recruited in a consecutive manner at 12 stroke sites across Canada. Participants were asked to complete 1- and 6-month diaries after their index stroke to evaluate health professional visits and out of pocket costs (e.g., paid services, devices).
Results: 103 diaries were completed at 1-month; 58 diaries at 6-months. The mean age of participants was 69.4 +/- 15.4 (27 – 97) years, 51.3% male. After 1-month, there was a total of 530 physician visits (average of 5.1 visits) by all participants. Nurses were the most visited allied health professional, contributing 30.1% of the total 2,051 visits. And 31.1% of participants reported using at least one paid service visit while 32.0% purchased at least one stroke-related item under $499. After 6-months, there was a total of 52 physician visits (average of 0.9 visits) by all participants. Occupational therapists were the most visited allied health professionals, contributing 25.2% of the total 103 visits. And 17.2% reported using at least one paid service while 22.4% purchased at least one stroke-related item under $499.
Conclusions: Participants at 1-month reported an average of 5 physician and 20 allied health professional visits, decreasing to 1 physician and 2 allied health professional visits at 6-months. There was also a decrease in out of pocket cost between 1- and 6-months.
Keywords: *Resources, stroke, diary*

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A systematic review of interventions that optimize medication prescribing and use in Canada

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Background: Information about sustainability of effective interventions to optimize medications has been largely lacking. This study examined the effectiveness, perceived usefulness, and sustainability of Canadian interventions to optimize medication prescribing and use in primary care.
Methods: This systematic overview was supplemented with email surveys and key informant interviews. Five bibliographic databases (Medline, EMBASE, CINAHL, IPA, HEED) were searched from 1998-2008. An exhaustive search of grey literature sources and other systematic reviews was completed. A standardized data abstraction form based on the Cochrane EPOC form was used. All steps were done in duplicate. Kappa scores were calculated. Data were analyzed qualitatively. Key stakeholders completed email or phone surveys regarding the benefits, practicality and sustainability of interventions identified from the overview.
Results: Of 7906 citations reviewed, 31 interventions were included in the overview. An additional 23 interventions were included based on grey literature, systematic reviews, and reference lists of included articles (n=54 total). Most (89%) of studies were randomized controlled trials (RCTs) or cluster RCTs. Interventions typically related to cardiovascular disease, diabetes, or musculoskeletal conditions. Fifty-four percent of interventions were multi-component interventions. Almost half of the interventions were delivered by pharmacists. Nine outcome categories measuring effectiveness were identified with prescribing and drug utilization and clinical outcomes measured for most interventions. Effectiveness varied

across interventions. Results on practicality and sustainability are pending.
Conclusions: Few Canadian-based medication focused interventions have been tested in randomized controlled trials in the past ten years. Those that were tested varied in intervention type and effect on processes and outcomes of care.
Keywords: *Systematic review, medication prescribing and use, Canada*

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CIHR Training Program in Bridging Scientific Domains in Medication Safety and Effectiveness: program concepts and development

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Background / Objectives: Drug therapy problems are an ever increasing burden on our healthcare system. The CIHR Training Program in Bridging Scientific Domains in Medication Safety and Effectiveness seeks to address this challenge by providing a training environment for graduate and post-doctoral students to integrate concepts and findings across the drug discovery, applied clinical practice and policy spectrum.
Methods: Key program concepts were refined through iterative dialogue and consensus at a series of meetings among experienced investigators (known as mentors) representing many scientific domains, including: biosciences, clinical therapeutics, population health, epidemiology, & biostatistics, and health services and policy research. Literature reviews were conducted to inform curriculum development. Program components will be piloted. A multifaceted evaluation process will be instituted each year using a program logic model to track outcomes related to program fidelity, trainee achievement of program goals, and mentor and trainee satisfaction with program.
Results: Mentors agreed the program should provide interdisciplinary opportunities to augment knowledge and skills through exposure to concepts from multiple scientific domains while still encouraging specialization in the trainee's focus domain. Program learning will build upon a thesis or other project the trainee is currently engaged in. Program curriculum will include foundational sessions introducing concepts across the drug discovery-use spectrum, capacity-building seminars fostering research skills, one-to-one mentorship across at least two scientific domains, group educational activities, and practicum/exposure opportunities.
Conclusions: This experience in integrating different scientific domains will better prepare future scientists for participating in interdisciplinary research and knowledge translation that addresses real-world problems across the drug discovery and use spectrum.
Keywords: *Interdisciplinary training, medication safety and effectiveness, group consensus*

22
Addendum to CADTH's guidelines for the economic evaluation of health technologies: specific guidance for oncology products

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Background: National guidance on the conduct of resource costing and economic evaluations has been available through the Canadian Agency for Drugs and Technologies in Health (CADTH) since 1994. Specific challenges are often encountered during cancer-related health technology assessments. The goal is to provide more specific guidance to analysts on the methods for the conduct of high-quality economic evaluations in oncology using CADTH's Guidelines for the Economic Evaluation of Health Technologies (third edition) as a frame of reference.
Methods: Oncology Guideline Working Group (OGWG) members consisting of oncologists, economists, analysts and decision makers participated in a facilitated workshop to identify the chapters of CADTH's Guidelines that could benefit from oncology-specific guidance. These chapters included Target Population; Perspective; Time Horizon; Comparator; Effectiveness; Modelling; Valuing Outcomes; Costs and Resources; and Equity. Formal

reviews of guidance statement by academia, government and industry were conducted.
Results: Two types of recommendations were created: 1) CADTH's Guidelines were sufficient for the conduct of oncology technology assessments. No further guidance is needed for oncology products and 2) The OGWG recommended that additional guidance for oncology-specific technology assessments be provided. Guidance highlights included the preferential use of final outcomes (overall survival) over intermediate outcomes (progression free survival, response rate); level of evidence (phase III vs. phase II) and source of evidence (clinical trial vs. database); time horizon (clinical trial based vs. survival).
Conclusions: This work highlights recommendations for the conduct of health technology analyses in the area of oncology.
Keywords: *Oncology, guideline*

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One-year drug retention in etanercept patient support program enrollees

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Background: The Enliven® Services Support Program, a Patient Support Program (PSP) for etanercept, provides services such as structured telephone follow-up, support line, and insurance assistance. PSP data was used to determine etanercept retention one year post-treatment initiation in a Canadian population, where retention was defined as continual treatment with etanercept.
Methods: Data were collected for Enliven® PSP enrollees between July 2000 and December 2007. Enrollees were included if follow-up data at 1 year or longer was available and diagnosed with active ankylosing spondylitis (AS), moderate to severe rheumatoid arthritis (RA), moderate to severe plaque psoriasis (PsO) or psoriatic arthritis (PsA). Descriptive statistics were used to characterize the information collected. Data were stratified by indication.
Results: In total, 16,037 subjects were included in the analysis. At one-year post-treatment initiation, 82% of enrollees indicated that they were still taking etanercept. Enrollees with a diagnosis of PsA had the highest retention rate (85%), followed by AS (83%), RA (81%) and PsO (80%). Individuals requiring financial assistance from government and/or private insurer had a higher retention rate (84%) compared to individuals without (53%). "Lack of efficacy", "MD recommendation" and "side effects" were the top reasons for drug discontinuation (23%, 15% and 13%). Most common reasons for delay included "waiting for provincial coverage", "awaiting special authorization", and "waiting for training" (26%, 19%, 10% respectively).
Conclusions: This analysis appears to suggest that there is a high retention rate with etanercept administration a year after therapy start date with individuals enrolled in the Enliven® Services Support program.
Keywords: *Patient support program, retention, biological therapy*

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How are breast cancer testing practices for personalised medicine documented in Ontario? A retrospective review of coded surgical pathology reports

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Background: Personalised medicine has been promoted to improve treatment effectiveness by targeting therapies to individuals who are most likely to respond. Trastuzumab therapy, a well-known example of PM in breast cancer (BC), is effective in patients whose tumours overexpress human epidermal growth factor receptor-2 (HER2). Canadian guidelines recommend HER2 testing for all early-stage BC (ESBC) patients to select patients for trastuzumab. We sought to document patterns of testing for HER2 in incident ESBC patients in Ontario in 2006 and 2007, including which patients received testing, with which test and test sequencing.
Methods: Cancer registry-coded surgical pathology reports for all female Ontario patients diagnosed with incident BC in 2006 and 2007 were reviewed for staging and HER2 test information (HER2 test provision, type of test [immunohistochemistry or fluorescence in situ hybridisation], HER2 status and actual HER2 overexpression level for initial or confirmatory tests). Tumour size, nodal status, metastasis, histologic tumour grade and histologic type data was also extracted to determine disease stage.
Results: 27,051 coded surgical pathology reports corresponding to 16,432 incident BC patients were

reviewed. All patients who were male (0.9%), metastatic (6.7%), had a non-invasive carcinoma (1.3%) or were not treated surgically within 6 months of diagnosis (8.3%) were excluded. HER2 terminology varied widely, and was not reported consistently in coded surgical pathology reports. Review of additional uncoded reports is ongoing.
Conclusions: HER2 testing is not consistently documented in coded surgical pathology reports, requiring review of additional uncoded surgical or laboratory pathology to document HER2 testing practice in Ontario.
Keywords: *Cancer, trastuzumab, personalised medicine*

25
Assessing pharmacists' preparedness for delivering the pandemic influenza vaccine in B.C.

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Background: In response to the clear indication of the second wave of the influenza pandemic arriving in North America for the Fall of 2009, the Ministry of Health Services in British Columbia proposed changes to regulations governing the scope of practice for pharmacists to include administering vaccinations. This change in the regulation was prompted by the need foreseen by the government to provide millions of doses of the H1N1 vaccine in a short period of time.
Methods: We conducted a survey to determine the pharmacist's preparedness, preferences and willingness to deliver immunizations, especially the pandemic H1N1 vaccine. Staff pharmacists and pharmacy managers/owners who are licensed to practice in British Columbia were invited to participate in the study by completing an online survey.
Results: One hundred and fifty one pharmacists participated in the study of which the majority were men (55.6%) and had practiced for over 5 years (71.5%). The majority of participants responded that they would be interested in immunizing their clients (81.5%) including H1N1 vaccine in the fall (74.8%). In general, the pharmacists had a preference to vaccinate adults rather than children, were able to provide daytime and evening or weekend clinics and understood the importance of documentation, reporting of adverse events and reporting to their local health authorities.
Conclusion: Pharmacists in British Columbia are willing to provide vaccinations to their clients and therefore those who have undergone appropriate training should be allowed to vaccinate against seasonal and pandemic influenza and pneumococcal vaccine at their pharmacy.
Keywords: *Pharmacist intervention, vaccination, survey*

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Association of co-payments with compliance and employee sick days/short-term disability (ACCESS): a real-world, randomized study

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Background: Private payers are increasingly turning to approaches such as co-payment increases for plan members in an effort to control rising drug costs. However, evidence suggests an inverse relationship between co-payment amount and medication compliance, with resulting negative clinical and economic outcomes. Given the importance of medication compliance and already existing poor compliance, more data to inform co-payment policies are warranted. The ACCESS Study is designed to evaluate whether eliminating co-payments for selected drugs is associated with better compliance. Secondary objectives are to measure the impact on persistence, sick days, and short-term disability claims. Study rationale, design, and implementation will be described.
Methods: Enrollees in the drug plan of TELUS Corporation (a Canadian telecommunications company with >26,000 employees nationally) will be randomized to "current co-payment" or "no co-payment (selected drugs)" for a period of 12 months. Outcomes include: compliance (measured by the Medication Possession Ratio), measures of persistence [i.e. days to discontinuation, 6-month discontinuation rates, and persistence rates (no discontinuations or gaps >30 days)], sick days and short-term disability claims. Data analysis will be performed using data currently collected as part of prescription claims adjudication and casual absence/short-term disability data that are currently tracked by TELUS.
Discussion: This study combines the advantages of randomization with those of real-world drug utilization patterns gained from prescription claims data. To our knowledge, this is the first Canadian controlled trial of co-payment reductions. Results may provide evidence to support policy and innovative approaches with regards to drug benefit design and delivery.
Keywords: *Co-payments, compliance, real-world randomized study*

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Atrial fibrillation: A real life observation study in the Quebec population

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Background: Pharmacological innovations in the medical treatment of atrial fibrillation (AF) have been absent in the last 15 years. Recently, dronedarone has been added to the pharmaceutical armamentarium of this very serious condition. A real life, population based, descriptive study of AF is thus of interest for the proper positioning of this drug by clinicians and drug plan managers.
Methods: A random sample of 66,540 patients (38%) first diagnosed with AF between January 1998 and April 2009 was obtained from the Régie de l'assurance maladie du Québec (RAMQ).
Results: Patient characteristics at the time of diagnosis and during the previous year were as follows - median (Q1; Q3): age: 77.5; chronic disease score: 5 (3;8); days in the hospital 1 (0;4); emergency room visits 2 (1;3); outpatient visits 9 (5;15). Main co-morbidity conditions: angina pectoris 15%, Heart failure 16%, valvulopathy 6.5%, and renal failure 4%. Mortality was 14% at one year and 36% at 5 years. During the year following the diagnosis of FA, 14% of the patients had an attempt at electric cardioversion and 25% were started on antiarrhythmic drugs: amiodarone(11.2%), sotalol(9.8%), propafenone(4.6%), flecainide(1.2%). Only flecainide is approved by Health Canada for the treatment of AF.
Conclusions: At the time of the diagnosis of AF most patients are already quite old and sick which renders them vulnerable to the significant side effects of the drugs presently available for their treatment.
Keywords: *Atrial fibrillation, database analyses, antiarrhythmics*

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Baseline characteristics & preliminary efficacy results of patients receiving biologic and traditional disease modifying anti-rheumatic drugs (DMARDs) in Ontario: results from the OBRI

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Background: The Ontario Biologics Research Initiative (OBRI) represents a collaboration of rheumatologists, patients and researchers aiming to improve the quality of care and clinical outcomes of Rheumatoid Arthritis (RA).
Methods: Patients enrolled from 18 rheumatology clinics were grouped into 3 cohorts: 1st DMARD, DMARD Change, and Biologic, and prospectively followed. Patient global assessment, the Rheumatoid Arthritis Disease Active Index (RADAI) and the Health Assessment Questionnaire (HAQ-DI) were collected through telephone interviews. t-tests of the means were used to evaluate primary efficacy.
Results: At the time of enrollment, 55% of patients were being prescribed a DMARD change, 26% a new biologic and 19% a 1st DMARD. Mean age for 1st DMARD, biologic, and DMARD change group were respectively, 60.8 (14.8) yrs., 54.4 (13.2), and 56.5 (13.4) yrs. The biologic cohort had the longest mean RA duration. The biologic patients had the highest scores on the physician global assessment (SD)[6.0 (2.1) vs. 4.9 (2.1)], patient global assessment (SD) [7.3 (2.4) vs. 5.9 (2.8)], 28 swollen joint count (SD) [8.9 (6.1) vs. 6.0 (5.2)], 28 tender joint count (SD) [9.8 (7.5) vs. 6.9 (6.3)], and CDAI (SD) [31.3 (15.1) vs. 23.0 (12.9)]. At 6 month follow up, biologic and DMARD change patients showed statistically significant improvements ($p < 0.001$) in physician and patient global assessments, 28 swollen joint count, 28 tender joint count, DAS28, CDAI, RADAI and HAQ-DI.
Conclusion: While all RA patients showed significant improvements in both physician and patient reported outcomes, the largest changes were found in the biologic cohort.
Keywords: *Rheumatoid arthritis, Ontario Biologics Research Initiative (OBRI)*

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Benefit-risk analysis of combination LABA + ICS versus increased-dose ICS in treatment of asthma using the incremental net benefit framework

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Funding Source: None

Background: Recent analyses suggest an increased risk of respiratory- and asthma-related deaths in asthma patients receiving long acting beta-agonists (LABAs). However, strong evidence indicates the addition of a LABA is more effective in improving asthma symptoms than increasing the dose of inhaled corticosteroid (ICS). In December 2008, a US FDA

panel ruled to remove the asthma indication from single-entity LABAs, but not LABA+ICS. Thus, the objective of this analysis was to estimate the incremental net-benefit (INB) of LABA +ICS relative to increased doses of ICS in asthma.
Methods: Rates of benefits and harms associated with each treatment were extracted from published meta-analyses and entered into a simulation model over a one-year time horizon. Benefit of treatment was defined by symptom-free days. The primary adverse events included in the model were asthma-related hospitalization and intubation and death. 10,000 hypothetical patients were simulated through each arm of the model, and quality-adjusted life years (QALYs) were calculated for each group.
Results: Despite the increased risk of exacerbation associated with LABA+ICS, the benefit gained from increased symptom free days appears to outweigh the loss from these exacerbations. The average per person QALYs of patients in LABA+ICS group was slightly higher than those in the increased ICS group (QALY: LABA+ICS=0.6831 (SD=0.087), increased ICS=0.6725 (SD=0.088)), resulting in a positive INB for LABA+ICS relative to increased ICS. The model was robust to plausible changes to variables.
Conclusion: From a benefit-risk perspective, LABA+ICS is preferable to an increased dose of ICS, despite increased risks associated with LABA therapy.
Keywords: *Asthma, benefit-risk, LABA*

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Benefit-risk analysis of isoniazid (INH) for treatment of latent tuberculosis infection (LTBI)

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Background: In North America, contacts of active TB cases that have a positive PPD skin test are offered preventive therapy with INH. However, there are concerns about the adverse effects of INH versus the risk of developing active TB. We undertook a quantitative benefit-risk analysis of INH prophylaxis for different groups of contacts.
Methods: We developed a Markov model to compare treatment of LTBI in contacts to no treatment over a five year time horizon. Contacts were stratified on four variables: BCG status, ethnicity, type of contact and age group. We calculated quality-adjusted life years (QALYs) gained due to delayed or prevention of active TB vs. QALYs lost due to the adverse events to INH. Risk for development of TB, compliance, and prevalence of immunization with BCG were taken from British Columbia TB contact database. Other parameters were obtained from the literature.
Results: INH was most beneficial in household Aboriginal contacts (net QALY gain 0.177 for BCG+, 0.0983 for BCG-) and household contacts<10yo (0.0872). The subgroup that benefitted least from prophylactic INH therapy was Canadian-born casual contacts (0.0062 for BCG+, 0.0098 for BCG-). The number needed to treat (NNT) to avoid one case of active TB, varied from 3.38 for pediatric Aboriginal close contacts and 996 for BCG+ Canadian born, casual contacts. The chance of INH therapy having a positive INB never dropped below 60% in the probabilistic sensitivity analysis.
Conclusion: INH prophylaxis is recommended for all contacts that are tested positive in screening, even when the risk for the development of TB was low.
Keywords: *Tuberculosis, prophylaxis, harm-benefit analysis, computer simulation*

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Chronic obstructive pulmonary disease (COPD) prevalence, disease severity, related healthcare resource utilization in Southwestern Ontario

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Background: COPD is a respiratory disorder characterized by progressive, partially reversible airway obstruction and increasing frequency and severity of exacerbations. COPD epidemiology and healthcare resource utilization in the Canadian population is very limited.
Methods: A database containing 176,000 patients records, from 53 general practice physicians, over 10 years in Southwestern Ontario, was used to extract COPD records. The timeframe of the analysis was July, 2002 to July, 2003 for patients aged 40+. Patients had a diagnosis of COPD by 1) ICD9/ICD10 codes; 2) symptoms (chart text entries); or 3) drug therapy unique to COPD (i.e. short/long acting anticholinergics) were used to determine prevalence. Disease severity stratification was based on 2008 Canadian Thoracic Society guidelines for patients with spirometric tests documenting FEV1 results and an FEV1/FVC of <0.7. Related healthcare resource utilization: referrals to specialists, ER visits and

hospitalizations were captured in those stratified patients.
Results: 76,143 records were examined and 6742 patients were identified with COPD giving a prevalence of 8.9%. 3199 patients had spirometric results; 64.0%, 25.7%, 3.9% and 6.4% had mild, moderate, severe and very severe COPD respectively. In the prior 12 months, 5.6%, 26.4%, 52.3% and 15.6% of 774 COPD related hospitalizations and 8.3%, 28.8%, 37.0% and 25.8% of the 1189 COPD related ER visits occurred in mild, moderate, severe and very severe patients respectively. Of 1412 specialist visits; 5.0%, 15.9%, 41.0% and 38.0% occurred in mild, moderate, severe and very severe COPD.
Conclusion: Results suggest COPD prevalence is high while resource utilization is significant and associated with severity of disease.
Keywords: *Chronic obstructive pulmonary disease (COPD), prevalence, disease severity*

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Conversion from epoeitin alfa to darbepoietin alfa may be cost-saving in Canadian dialysis patients

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Funding Source: Amgen Canada Inc. provided funding for the study

Background: Erythropoiesis-stimulating agents (ESA), epoetin alfa (EA) and darbepoetin alfa (DA), effectively treat anemia that occurs in almost all hemodialysis (HD) patients. Our purpose was to compare ESA utilization and achieved hemoglobin (Hb) levels before and after a switch from EA to DA.
Methods: HD patients at The Ottawa Hospital were switched from EA to DA according to a starting dose conversion ratio (DCR) of EA (I.U): DA (mcg) of 200:1, at which ratio the cost is equal. Doses were changed to achieve the same target Hb. We analyzed patients who had data for 6 months before and 6 months after the switch. The weekly dose of ESA, monthly Hb, ferritin, transferrin saturation (TSat), iron dose, and transfusions were recorded.
Results: In 193 patients the median weekly doses of EA and DA were 8154 IU and 28 mcg, respectively (median DCR = 288:1; range 193 – 428). Total doses of ESA utilized per 6 months were 54,937,000 IU EA and 192,885 mcg DA. The total ESA costs were $782,852 EA and $516,932 DA. Approximately $265,920 was saved with DA. Small increases in mean Hb (from 119.7 to 121.4 g/L; p=0.0045) and ferritin (from 376.5 to 427.7 mcg/L; p=0.017) were seen with DA. There were no significant differences in iron dose, TSat, or transfusions between treatments.
Conclusion: This real-world evaluation of the cost-effectiveness of switching HD patients from EA to DA showed the potential for significant cost-savings with no impact on achieving target anemia parameters.
Keywords: *Epoetin alfa, darbepoetin alfa, hemodialysis, anemia, cost-effectiveness, dose c*

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Cost-effectiveness analysis of sevelamer for the treatment of hyperphosphatemia in older Canadian patients with end-stage renal disease

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Funding Source: Genzyme Canada Inc.

Background: Over 80% of dialysis patients have hyperphosphatemia (serum phosphorus > 4.5 mg/dl). Calcium-based phosphate binders (CBBs) have raised concerns about increased risk of cardiovascular calcification in these patients. The aim of this study was to determine the cost-effectiveness of sevelamer compared to CBBs as first-line treatment for hyperphosphatemia in older end-stage renal disease (ESRD) patients who are at high risk of cardiovascular diseases.
Methods: A Markov model was developed to estimate life years, incremental cost per life year gained (LYG) and quality-adjusted life year gained (QALYG). Treatment-specific monthly survival rates were derived from the Dialysis Clinical Outcomes Revisited (DCOR) study and Weibull regression models were developed to project 10-year survival of DCOR patients 65 years of age and over. Resource utilization was obtained from DCOR, unit costs from Canadian sources, and utility weights from published literature. Dialysis costs were excluded from the base case analysis, as dialysis use is unrelated to phosphate binder choice. Analyses were conducted for a 10-year time horizon using Alberta Health Care System perspective with costs and outcomes discounted at 5% annually.
Results: Compared with CBBs, sevelamer resulted in a gain of 1.02 LYs and 0.62 QALYs per patient (discounted). Sevelamer was also associated with an incremental cost of CAD$21,243 per patient, producing ratios of CAD$20,847/LYG and CAD$34,175/QALYG. The results were most sensitive to hospitalization rates, patient utility and inclusion of dialysis costs.

Conclusions: Sevelamer offers good value for money compared to CBBs in the treatment of hyperphosphatemia in patients 65 years and older with ESRD.
Keywords: *Calcium-based phosphate binders, cost-effectiveness analysis, sevelamer*

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Cost-effectiveness of different modes of screening for open angle glaucoma in glaucoma high-risk populations

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Funding Source: None

Background: Glaucoma is a common cause of blindness and will become more prevalent with the aging population. Many glaucoma diagnostic devices had been evaluated for screening purposes. The objective of this study was to assess the cost-effectiveness of screening for primary open-angle glaucoma (OAG) using different devices in glaucoma high-risk populations.
Methods: A decision analysis model was created to assess screening of high risk subjects using different methods including Frequency Doubling Technology perimeter (FDT), scanning laser ophthalmoscopy (HRT3), Optical Coherence Tomography (OCT), and scanning laser polarimetry (GDx VCC). Data input of cost and effectiveness of the devices were extracted from the Mobile glaucoma screening project in high risk populations and the Régie de l'assurance maladie du Québec (RAMQ). We simulated one screening session in a population composed of 10,000 high risk subjects. The model determined the cost per new case of glaucoma diagnosed using the TreeAge Pro software.
Results: The costs of screening 10,000 subjects, the number of cases detected and the cost per case detected ratios were as follow: for FDT, $471,394, 242 cases detected and $1,944 per case detected; for HRT3, $507,833, 220 cases detected and $2,310 per case detected; for OCT, $507,833, 190 cases detected and $2,666 per case detected; and for GDx, $506,833, 91 cases detected and $5,550 per case detected.
Conclusion: Screening with FDT was the dominant option. Further studies will be determined which combination screening options may be more appropriate in a screening program for glaucoma.
Keywords: *Screening, glaucoma diagnostic devices, cost-effectiveness analysis*

35 – WITHDRAWN
Discontinuation of cholinesterase inhibitors: an administrative database study from the Netherlands

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Background: Clinical effectiveness of cholinesterase inhibitors (ChEI) in long-term treatment of dementia is uncertain. Suboptimal utilization may be associated with discontinuation of therapy.
Objectives: To assess persistence with ChEI treatment and to seek determinants of treatment discontinuation.
Methods: A retrospective cohort study was performed using data from the Dutch PHARMO Record Linkage System. Included patients were aged > 50 years, had a first ChEI dispensing between 1998 and 2008, prior medication history of 12 months and at least one subsequent dispensing of any medication. Cox regression was used to assess determinants for early discontinuation (< 6 months), and, separately, for late discontinuation during a subsequent 30 months follow-up among those who persisted for > 6 months.
Results: After 6 months, 30.8 % of 3,369 study subjects had discontinued ChEIs, compared to 59% after 3 years. Also, 35% of patients on rivastigmine reached the WHO recommended daily dose compared to 80% on galantamine. Female gender and a higher chronic disease score were associated with an increased risk of early discontinuation. Compared to high dose rivastigmine, low dose rivastigmine or galantamine was associated with an increased risk of early discontinuation, whereas high dose galantamine and concurrent use of cardiac or Parkinson medications, propulsives or SSRIs was associated with a decreased risk. Among patients who persisted for > 6 months, ChEI type and dose were less strongly associated with late discontinuation.
Conclusion: Adverse effects leading to treatment intolerance and termination may explain why ChEI dose was associated with early discontinuation, particularly for rivastigmine.
Keywords: *Cholinesterase inhibitors, dementia, discontinuation, persistence, comedication*

36 – ENCORE PRESENTATION

Discrete choice experiment to determine willingness-to-pay for gastroesophageal reflux disease (GERD) treatment

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Funding Source: AstraZeneca Canada

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Economic analysis of alemtuzumab in fludarabine-refractory and relapsed chronic lymphocytic leukemia in Canada

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Background: Alemtuzumab (ALEM) is indicated for the treatment of B-cell chronic lymphocytic leukemia (CLL) in patients who have been treated with alkylating agent and who had failed fludarabine therapy. An economic analysis was used to determine the incremental cost-effectiveness of ALEM in patients with fludarabine-refractory and relapsed CLL from the perspective of the Canadian publicly funded health care system.
Methods: A two year time horizon was used. Effectiveness and adverse event information was obtained from the literature. Resource utilization was based on guidelines, literature and expert opinion. Direct medical costs were obtained from Ontario provincial sources (2008 $CAN). A number of comparators were used: salvage therapy, fludarabine+cyclophosphamide (FC), fludarabine+cyclophosphamide+rituximab (FCR) and best supportive care (BSC).
Results: Mean survival for ALEM was 20.89 months, salvage therapy 16.32 months, FC 17.44 months, FCR 20.06 months .The incremental cost-effectiveness ratio (ICER) for ALEM vs. salvage therapy was Canadian $52,021/life year gained (LYG); ALEM vs. FC $68,165/LYG; ALEM vs. FCR $20,886/LYG. For ALEM vs. BSC, there was increased survival and cost savings for ALEM. The ICER was sensitive to four variables: treatment duration of FC; treatment duration of FCR; treatment duration of alemtuzumab; and additional survival due to rituximab for FCR patients compared to FC.
Conclusion: ALEM had a favourable ICER and provided good economic value for patients with fludarabine-refractory and relapsed CLL when compared to salvage therapy, FC and FCR. ALEM was found to be dominant over BSC.
Keywords: *Alemtuzumab, cost-effectiveness evaluation*

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Economic burden of illness study of Atrial Fibrillation (AF) in Canada

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Background: AF is estimated to affect approximately 250,000 Canadians and in light of the growing aging population, AF is likely to become even more prevalent in the future. This increase will impose a significant impact on both quality of life and the healthcare system. Thus, assessment of the resources devoted to the care of patients with AF are critical as a means of highlighting the burden the condition imposes on society, as a point of reference for economic evaluations of competing treatment strategies, and as an aid to decision makers and budget planners. The main objective of the present study is to assess the cost of treating and managing AF and its complications in Canada. Secondary objectives include: costing treatment strategies for AF; and assessing which treatments patients are receiving; tracking changes in drug prescribing practice following the publication of the AFFIRM trial in 20041.
Methods: National and provincial public data sources include the Canadian Institute for Health Information-Discharge Abstract Database (CIHI-DAD) (acute hospitalizations) and CIHI-National Ambulatory Care Reporting System (NACRS) to provide information on hospitalizations and emergency care and same day surgery, respectively. National pharmacotherapy data is being obtained from Brogan Inc. data at the provincial level for public and private drug plans. Additionally, four provinces (i.e. Manitoba, Quebec, British

Columbia, and Alberta) are providing estimates of outpatient care in addition to inpatient care and pharmacotherapy. Variations in provincial plans will be assessed and provincial estimates of outpatient care will be extrapolated to other provinces using CIHI and Brogan.Inc data.
Results: The data is expected to be ready for the conference in March.
References: Olshansky B, Rosenfeld LE, Warner AL, Solomon AJ, O'Neill G, Sharma A, et al. The Atrial Fibrillation Follow-up Investigation of Rhythm Management (AFFIRM) study: approaches to control rate in atrial fibrillation. *J Am Coll Cardiol* 2004;43(7):1201-8.
Keywords: *Burden of illness, atrial fibrillation, cost*

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Using the Cardiff Long Term Model to estimate the long-term cost-utility of adding Onglyza™ (saxagliptin) versus a thiazolidinedione (TZD) in patients with type 2 diabetes mellitus (T2DM) with insufficient glycemic control using maximal doses of metformin monotherapy and after failure or contraindication to sulfonylurea combination therapy

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Funding Source: Bristol-Myers Squibb Canada

Background: A decision analytic model was used to estimate the long-term cost-utility of adding Onglyza™, a new oral anti-diabetic agent, or TZD to metformin. The results provide information about the cost-effectiveness of Onglyza™ as third-line therapy for T2DM.
Methods: The model was populated with a cohort of T2DM patients from Ontario and the efficacy of adding Onglyza™ or TZD to failed metformin was based on a systematic review of the literature. Additionally, the TZDs were assigned relevant congestive heart failure (CHF) risk factors in the model. Based on the input data, the Cardiff Model predicted the occurrence of seven complications (e.g. myocardial infarction [MI], amputation) and death to estimate life years, quality-adjusted life years (QALYs) and cost over a 40-year time horizon. The payer perspective was taken and the costs and benefits were discounted at a rate of 5.0%. A number of variables were altered in sensitivity analyses.
Results: The Onglyza™ group experienced 3.31 per 1,000 population fewer MIs and 12.87 fewer diagnoses of CHF than rosiglitazone patients and 0.09 more MIs and 8.03 fewer CHF diagnoses compared with pioglitazone. Onglyza™ was less costly and more effective than rosiglitazone. However, compared with pioglitazone, the incremental cost-effectiveness ratio (ICER) for introducing Onglyza™ was $2,893 per QALY. Sensitivity analyses showed the results were relatively stable.
Conclusions: The model demonstrates that Onglyza™ was the dominant strategy compared with rosiglitazone and that Onglyza™ is cost-effective compared with pioglitazone, as the ICER values fall within the range considered to be of good value for money according to commonly quoted thresholds.
Keywords: *Economic evaluation, type 2 diabetes, oral anti-diabetic therapy*

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Economic impact of delays in listing decisions by provincial drug plans following a positive Common Drug Review recommendation: the case of a smoking cessation treatment (varenicline)

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Funding Source: Pfizer Canada, Inc.

Background: Delayed access to safe and effective medicines may lead to significant costs for society. Varenicline, a smoking cessation treatment (SCT), was recommended for listing by the Common Drug Review (CDR) in 2007. However, as of late 2009, no CDR-participating provincial drug plan had followed this recommendation. The study objective was to estimate the economic impact of delays in the provincial listing of varenicline in Canada.
Methods: Using data on smoking prevalence, SCT utilization, and from peer-reviewed research, a cost-benefit model was developed to estimate the net economic impact of reimbursing varenicline from a society perspective. Flows of attempted and successful quitters were projected over a 5-year period, including relapse rates, for the following scenarios: immediate varenicline listing (2007, base case); 1-year to 5-year listing delays (2008-2012); no reimbursement. Benefits and costs of delays were calculated from differential quitter flows between scenarios.
Results: Benefits of public reimbursement of varenicline would be greater in the first year (C$299M), then decrease due to the continuous erosion in smoking prevalence. The current 2-year listing delay prevented a projected 13,219 current Canadian smokers from becoming smoke-free, translating into a projected

additional lifetime burden of C$548M to society. Once reimbursement is enacted, a catch-up effect would occur (C$23M to C$52M per year), although initial delay costs would never be fully recovered.
Conclusions: Delaying reimbursement has a durable and negative economic impact that cannot be recovered. While these results pertain specifically to varenicline, the reimbursement of other SCTs would further improve public health and economic outcomes.
Keywords: *Reimbursement, smoking cessation treatments, cost-benefit analysis*

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Effect of a two-tier formulary on prescription drug-utilization and spending: evidence from Canadian employer-sponsored drug plans

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Funding Source: None

Background: Tiered formularies are commonly used in the U.S. to promote cost-effective medication use; however, they are infrequently employed in Canada. This study's objective was to evaluate the impact of implementing a two-tiered formulary on drug use and costs for two Canadian employer groups.
Methods: A quasi-experimental, pre-post analysis with comparison groups was used. Retrospective prescription claims data were collected from ESI Canada for the period January 2004-December 2008. The two-tiered formulary was implemented on January 1, 2006 for select subgroups of employer A (100%/70% coinsurance) and employer B (80%/60% coinsurance). Employer subgroups who remained on the existing drug plan acted as controls. Weighted annual drug costs by number of claimants were compared between intervention and control groups. Savings were calculated by estimating what additional employer spend would have been under the previous plan design as a percentage of total drug costs.
Results: Intervention groups experienced smaller average annual percent increases in drug spending per claimant compared to controls following the formulary change (employer A 2.5%; employer B 5.3%; controls 14.4%). Savings were generated from increased claimant cost sharing on tier-2 drugs but also from claimants switching from tier 2 to tier 1 drugs. Greater percentage switch rates were observed with employer A (39%) vs. employer B (24%). Average annual percentage savings in drug costs were 6.9% and 4.1% for employer A and B, respectively.
Conclusions: Implementation of a two-tiered formulary produced significant savings for both employer groups compared to controls. Clinical outcomes from changes in medication use require further investigation.
Keywords: *Tiered formularies, drug reimbursement, drug utilization*

42 – ENCORE PRESENTATION
Fluoroquinolone and other antibiotics delay diagnosis of tuberculosis

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Funding Source: Unfunded

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Funding IVF for infertile Canadians: a cost-effectiveness analysis

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Funding Source: The Infertility Awareness Association of Canada provided funding to conduct the study.

Introduction: Sub-fertile Canadians frequently turn to in vitro fertilization (IVF) for help where the self-pay system drives couples to transfer multiple embryos to minimize the need for future treatment. In many other countries, public funding of IVF has been successfully linked with elective single embryo transfer (eSET), dramatically reducing multiple pregnancy rates. The medical, social, and financial costs of premature delivery associated with these multiple births are huge. The purpose of this research was to determine if funding IVF in Canada, linked with a policy of eSET, would reduce these costs.
Methods: The outcomes and costs related to pregnancies resulting from IVF treatment were compared across two scenarios. The "without funding" scenario was based on current rates of IVF utilization and outcomes. In the "with funding" scenario, a three-fold rate of utilization was assumed with outcomes and costs corresponding to the eSET policy.
Results: Funding of IVF would result in a number of benefits: a child for an additional 3120 couples, 311 fewer low birth weight multiples, and total savings in hospitalization and disability costs of $34 million. The total costs per live birth were $72,440 and $96,626 with and without funding, respectively. The incremental cost per live birth with funding was $47,029.
Discussion: Funding IVF is a cost-effective strategy that would save health care resources while creating many more families for infertile Canadians. The

findings of this research are consistent with OHTAC, Ontario Expert Panel on Infertility and Adoption, and Quebec Bill 26 recommendations on IVF funding.
Keywords: *Infertility, cost-effectiveness, public funding, elective single embryo transfer*

44 – WITHDRAWN

Identifying patterns and predictors of adherence to refill amongst diabetic patients using multiple longitudinal measurements of adherence

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Background: Most studies rely on calculating a single average of adherence throughout the follow-up period. This assumes a consistent level of adherence during that period, an assumption that has never been proven. Such a method focuses on inter-individual variability and ignores intra-individual variability. Studies exploring medication intake adherence revealed varying trends and patterns over the course of the treatment which suggests similar variability in refill adherence. The advantage of using multiple longitudinal measurements of adherence has never been tested.
Objectives: 1) To describe trends and patterns in adherence to refill for antidiabetic medications over the course of the treatment. 2) To determine the predictors of refill- adherence that are available in pharmacy records. 3) To test the sensitivity of using multiple measurements by comparing the results to the single average method.
Methods: A cohort of new users of antidiabetic medications was identified from the Canadian IMS data. Age, gender, number of daily doses and comedications will be examined as predictors. Two methods of analysis were used: 1) Using a single average of adherence. 2) Using multiple longitudinal measurements. For the latter method cluster analysis will be applied.
Preliminary results: Preliminary results are available for the central Ontario region. We identified 5844 new users of antidiabetic medications. From which, 8% had consistent adherence throughout the study period, 33% had a declining adherence, while 39% had increasing adherence. 20% had unpredictable (varying) patterns of adherence over time. The complete analysis for Ontario and the other Canadian provinces will be forthcoming.
Keywords: *Patient compliance, pharmacy records, longitudinal data*

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Impact of botulinum toxin type a (BOTOX®) on health utility in patients receiving treatment for approved therapeutic indications: baseline characteristics and interim results of a large ongoing phase iv prospective observational cohort study (MDs on BOTOX® utility-mobility) in Canada

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Funding Source: Allergan Inc.

Background: BOTOX® is used for numerous therapeutic indications, however little is known on its effect on health utility. The MOBILITY project is designed to measure health utility in patients receiving BOTOX®.
Methods: Phase IV prospective observational cohort study in patients receiving BOTOX® for approved therapeutic indications. The SF-12v2 Health Survey and Global Rating Scale are administered at baseline, week 4 and subsequent clinic visits. Physical component scores (PCS), and mental component scores (MCS) are derived from self-reported SF-12v2 and SF-6D data. Continuous data were analyzed by student's t-test and dichotomous data by Chi-square test
Results: 917 patients are enrolled at 40 sites with a 94.5% retention rate. 69.7% returned the week 4 survey. Of 608 patients included in the analysis 67% were female, 93% were Caucasian, and 13% were BOTOX®-naïve. Indications include: adult focal spasticity, 27%; cervical dystonia, 24%; hyperhidrosis, 11%; 7th cranial nerve disorder, 9%; cerebral palsy, 6%; blepharospasm 5%; and other, 18%. Significant differences in self-reported SF-6D scores between baseline and week 4 (p=0.05, continuous data; p=0.0001, dichotomized data), and between baseline and week 4 on the MCS (p=0.03, continuous) are reported. Among BOTOX®-naïve patients, there was a significant difference in SF-6D scores between baseline and week 4 (p=0.03, continuous; p=0.018, dichotomous). This trend was not significant among non-naive patients.
Conclusions: This interim analysis detected significant improvement in health utility in patients receiving BOTOX® for therapeutic indications. The benefit was most pronounced in BOTOX®-naive patients and in MCS score at 4 weeks (the expected peak effect window).
Keywords: *Health utility, observational study, SF-12v2 Health Survey*

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Impact of Ontario drug formulary listing on drug utilization under privately-insured drug plans

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Funding Source: None

Background: Provincial drug programs often follow the Common Drug Review (CDR) formulary listing recommendations to cover cost-effective drugs; however, some provinces have listed drugs despite a 'Do Not List' recommendation. This study evaluated the listing of a drug given a CDR 'Do Not List' recommendation in Ontario and its impact on utilization under privately-insured drug plans.
Methods: Retrospective claims data for escitalopram (Cipralex) were collected for ESI Canada enrollees <65 years of age (n=5.5 million) between January 2007 and November 2009. Cipralex received a negative CDR recommendation however was added to the Ontario provincial formulary on November 4, 2008. Provinces that did not fund Cipralex over the report period acted as controls. Statistical analysis was performed using interrupted time-series models fitted using generalized least squares models assuming a 1-month autoregressive correlation structure.
Results: Preliminary results indicate that the number of Cipralex units dispensed significantly increased in Ontario relative to the existing trend before the Ontario listing. Our preliminary results also suggest that among provinces that did not list Cipralex, there was no significant change in either the level or trend in units claimed.
Conclusions: Listing Cipralex on the provincial formulary led to a significant increase in the number of units claimed under privately-insured drug plans in Ontario. Further research is warranted to investigate other potential impacts of listing decisions.
Keywords: *Interrupted time series analysis, escitalopram, drug utilization*

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Key learning points for physicians, pharmacists and patient groups from a clinical roundtable on subsequent entry biologics

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Background: Subsequent entry biologics have existed for a number of years. Draft guidelines from Health Canada were discussed in 2009. The Cameron Institute sought to develop an expert consensus accessible to all stakeholders who have an interest in SEBs.
Methods: A roundtable of experts from around the world with research, regulatory and policy expertise regarding SEBs was held May 27, 2009 in Toronto, Canada. Invited presentations covering international comparisons, the EU, immunogenicity, risk management, population safety, pharmacovigilance, legal liability and Health Canada's position were made; full discussion was held on each.
Results: 1) SEBs are not generic replacements. 2) SEBs should not be considered pharmaceutically or therapeutically equivalent to preceding products. 3) SEBs should not normally be deemed interchangeable. 4) SEBs cannot be safely or effectively managed by non-physicians through automatic substitution. 5) Canada should follow the EMEA process with respect to SEBs. 6) Proactive risk management, post market surveillance, and pharmacovigilance studies are needed. 7) A recognized academic subspecialization in product and patient safety is required. 8) Patient safety with respect to SEBs should focus on immunogenicity. 9) There is a need for an international centre of expertise to support the conduct of long term comparability studies. 10) There remain some important unresolved issues.
Conclusions: Practitioners in the trenches as well as patients really need to have a better understanding of all of the implications of introducing new biological products that look like but may not be exactly the same as the products they have been used to.
Keywords: *Subsequent entry biologics, clinical guidelines, patient information*

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Knowledge of your family history could save your life – using information technology to link genealogical information to prevent sudden cardiac death

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Funding Source: Atlantic Canada Opportunities Agency, Atlantic Medical Genetics and Genomics Initiative

Background: Seventeen multigenerational Newfoundland and Labrador (NL) families with a genetic subtype of arrhythmogenic right ventricular dysplasia (ARVD5) with a confirmed mutation are

known. Epidemiological studies have shown that ARVD5 causes sudden cardiac death (SCD) with 80% of males dead by 50 years (20% of females) in the absence of an implantable cardioverter defibrillator (ICD) therapy. Over 100 ICDs have been given to ARVD5 patients to date. The gene is sex-influenced, affecting women less than men so if family size is small, and comprised mainly of females, a high risk may exist that is not recognized.
Methods: Identifying extended pedigrees, the tool by which risk assessment is defined, is a painstaking process that may take years. The Population Therapeutics Research Group (PTRG) with NL Statistics Agency and Canadian Century Research Infrastructure has developed a Heritability Analytics Infrastructure (HAI) that uses Newfoundland census data and other historical records to construct pedigrees. PTRG's proprietary software, KINNECT, enables PTRG to rapidly develop extended pedigrees. These pedigrees can be used to identify individuals at risk but not currently known to health services.
Results: Additional links between the ARVD5 pedigrees were made using KINNECT. Family connections for persons living in Mainland Canada have been determined, providing accurate risk assessment for relatives, and the opportunity to avail of life saving treatment.
Conclusion: Through the use of PTRG's state of the art heritability analytics infrastructure, it is possible to identify individuals who did not know their risk status, offer testing and prophylactic therapy and prevent SCD.
Keywords: *Information technology, heritability, penetrance*

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Out-of-pocket costs for cancer related drugs: effects of multiple health services deductibles on perceived patient burden in Ontario

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Funding Source: CIHR

Background: Previous research reported out-of-pocket costs (OOPC) for Ontario cancer patients across a variety of health services, and identified that approximately 20% find OOPC burdensome. Much of this burden is associated with co-payments, deductibles and service limits. This same research effort asked patients to comment on costs not currently covered that "should be covered by government".
Methods: Descriptive statistics and linear regressions are presented using STATA v7.0.
Results: Although pharmaceuticals were the most frequently identified cost category (51 mentions), others with high frequency included: parking:43, travel costs:20, and alternative therapies:14. Thirty-eight percent identified at least one cost category, and 12.8% identified 2 or more cost categories with inadequate coverage. Patients' frequency of indicating two or more health care categories was correlated to their reported burden (R2=0.0421, p=0.001), although other unmeasured factors clearly have an impact. Those with "unmanageable" burdens reported the highest frequency of multiple cost-categories (36%), followed by those with "significant" burden (26%). While those indicating "somewhat", "slight" or "no burden" indicated multiple categories at frequencies of 9%, 7%, and 9% respectively.
Conclusions: These findings highlight the inability of means testing for specific health services to accommodate patients who receive multiple modalities of health services, as is commonly the case for cancer patients. This puts patients receiving multiple modality treatments at higher risk for unmanageable OOPC. It may prove useful to consider a more integrated way of assessing a patient's ability to pay by considering all health care service fees collectively, rather than individually, when setting means testing limits.
Keywords: *Out-of-pocket costs, deductibles, pharmaceuticals*

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Patterns in the use of benzodiazepines in British Columbia: Examining the impact of increasing research and guideline cautions against long-term use

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Funding Source: Canadian Institutes of Health Research

Background: Primarily indicated for symptoms of anxiety and sleep disorders, benzodiazepines are one of the most commonly prescribed, and controversial, types of neurological drug. Given increasing evidence of harms associated with long-term use, our objective was to describe such users and examine changes in patterns of use in British Columbia.
Methods: Our analysis uses data detailing prescription drug use and socio-demographics for BC residents in 1996 and 2006. We describe the age-sex profiles of use and long-term use, and compare the 1996 usage patterns of 2006 long-term users, users, and non-users. We performed logistic regression to examine how

socio-economic and health factors affect the likelihood of benzodiazepine use and long-term use (100 days or more in a year), and to test for changes in use and long-term use over time.
Results: In 2006, 8.4% of British Columbians used benzodiazepines, while 3.9% were long-term users. Use was positively associated with being female, lower income, older, and of poorer health status. Amongst benzodiazepine users, long-term users were more likely to be in the lowest income quintile, of poor health, and senior. While the rate of long-term use decreased from 1996 to 2006 for those over age 70, it increased in middle-age groups, and therefore (albeit slightly) overall.
Conclusions: Despite increased awareness of and cautions regarding risks associated with long-term use of benzodiazepines, rates of potentially inappropriate use have changed very little over time in BC. Policies targeting use by previously untargeted non-senior populations may be needed to decrease rates of long-term use.
Keywords: *Logistic regression analysis, benzodiazepines, long-term use*

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Personalized medicine and the translation of research into practice

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Background: Personalized medicine (PM) targets interventions based on genetic clinical markers or genomic information. Despite the importance of testing to targeting PM therapies, evidence on the effectiveness, efficiency and use of testing is limited.
Methods: The Center for Translational and Policy Research on PM (TRANSPERS), funded by the US National Institutes of Health, focuses on developing evidence-based information to objectively assess how PM can be most beneficial and efficient in improving health outcomes. Our breast cancer (BC) research includes HER2 testing, gene expression profile tests and CYP2D6. We are examining real-world utilization of HER2 testing and treatment in Ontario and modeling the cost-effectiveness of HER2 testing strategies.
Results: Trastuzumab is highly effective in the 20-30% of tumours overexpressing HER2. Canadian guidelines recommend either immunohistochemistry (IHC) or fluorescence in situ hybridisation (FISH) testing to assess HER2 status. Trastuzumab can result in heart failure, an unnecessary risk in women with false negatives, and women with false positives may miss trastuzumab treatment benefits. Adherence to the Canadian testing, treatment and monitoring guidelines and subsequent impact on patients with early-stage BC is unknown. Our preliminary findings suggest that HER2 testing is not consistently documented in pathology reports. We will document HER2 testing patterns, including who receives testing and which test(s) is performed.
Conclusions: We will evaluate the impact of guideline adherence on patient outcomes and use of cancer care services and quantify the impact of guideline adherence on patient outcomes and cancer care services using a probabilistic decision analytic cost-effectiveness model.
Keywords: *Personalized medicine, translational research, breast cancer*

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Population-based study: impact of adherence level of antihypertensive agents on onset of end-stage renal disease

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Aim: The correlation between severity of hypertension and risk of end-stage renal disease (ESRD) is well known. However, the impact of antihypertensive drug adherence on primary prevention of chronic kidney disease (CKD) has never been assessed. Our objective was to evaluate the impact of better adherence to antihypertensive (AH) therapy on ESRD.
Method: A cohort of 208,128 patients was reconstructed using RAMQ and MedEcho databases. Patients were eligible if they were between 45 to 85 years of age, had a new diagnosis of hypertension and were newly treated with AH drug between 1999 and 2007. A nested case-control design was used to study the occurrence of ESRD. Every case of ESRD was matched for age and duration of follow-up. Adherence level was assessed as a medication possession ratio. Conditional logistic regression models were used to estimate the rate ratio of ESRD adjusting for several covariables.
Results: Patients were at 65 years old and 42% male. The mean high adherence level (80%) to AH therapy was 90%. We identified 1,026 cases with ESRD during follow-up. High adherence level (80%) to AH therapy compared to lower adherence level (< 80%) was associated with a reduction of ESRD (RR: 0.81; 0.70-0.95). Risk factors for ESRD were CKD, gout,

diabetes, coronary artery disease, chronic heart failure and peripheral vascular disease.
Conclusion: The study suggests that better adherence to AH therapy is associated with risk reduction of new onset ESRD in hypertensive population.
Keywords: *Antihypertensive agents, renal disease*

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Prevalence of potentially inappropriate prescriptions (PIPs) in Québec's elderly population, 2000-2006

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Background: A drop in the percentage of people 65 and over who have had at least one potentially inappropriate prescription (PIP) was noted in some Canadian provinces. The objectives were to determine and track the prevalence of PIPs in Québec's elderly population.
Methods: A retrospective repeated cross-sectional study was conducted using data banks administered by the Régie de l'assurance maladie du Québec. For each fiscal year from 2000-2001 to 2005 2006, the study population included all users 65 and older, that is, people who had had at least one prescription paid for under Québec's public prescription drug insurance plan. The PIPs were identified using the 2002 Beers criteria; diagnosis and conditions were not taken into account. Proportions of users with at least one PIP were assessed for each fiscal year using pharmaceutical services.
Results: The percentage of users with at least one PIP of any type fell from 35.4% to 30.0% from 2000-2001 to 2005-2006. The prevalence of PIPs also dropped in the case of chronic Beers use, from 26.7% to 21.7%. The decline observed in the percentage of users with at least one PIP for a high-risk drug was much less pronounced, falling from 24.5% to 22.8%.
Conclusion: The percentage of users 65 and over who had at least one PIP of any type or for a high-risk drug, remains comparable to that observed elsewhere in Canada. The gap regarding chronic Beers use could be due to different practices for prescribing drugs or filling prescriptions in Québec.
Keywords: *Potentially inappropriate prescribing, Beers criteria, elderly*

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Preventing cardiovascular disease in primary care: priorities for action

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Background: Cardiovascular diseases (CVD) are a leading cause of death in Canada. Controlling CVD risk factors reduces CVD morbidity and mortality. However, cardiovascular prevention in primary care (PC) is not optimal, especially in patients with multiple chronic diseases. A one-day workshop was conducted to explore the perception regarding changes that should be made to the healthcare system to improve CVD prevention in these patients.
Methods: PC clinicians (physicians (6), pharmacists (6), nurses (6), dieticians (2), kinesiologists (2), psychologist (1), smoking-cessation specialist (1)), PC patients (6), family members (6), decision makers (6) and researchers (6) participated in six focus groups which plan for discussion was based in the Chronic Care Model conceptual framework. Participants made proposals to improve CVD prevention and, in four nominal groups, prioritized them.
Results: Priorities for action are related to accessibility and continuity of care. Accessibility could be improved by: collaborative practices with nurses and pharmacists; free dietician consultations; personalized health directory and interactive web site to increase resources' notoriety among patients. To improve continuity of care, it is suggested to provide patients with a personalized treatment plan including lifestyle changes, and to enhance interprofessional collaboration by having a coordination agent, preferably a liaison nurse; computerized medical charts; and multidisciplinary teams.
Conclusions: In cardiovascular prevention, maintaining the status quo is not an option. Collaborative practice models should be implemented to improve both

accessibility and continuity of care, mainly the coordination aspect. Implementing the proposals will require the involvement of the whole PC community
Keywords: *Primary care, cardiovascular prevention, chronic care model*

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Prioritizing research in evaluation

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Background: Opportunities exist for improving current methods for conducting economic evaluations. The development of new approaches should be conducted in partnership with all stakeholders involved in the production and use of evidence.
Methods: An expert panel consisting of academics, government and industry will participate in a debate on methodological issues with the purpose of identifying the issues that should receive greatest research priority. The forum is being conducted in partnership with CADTH, NICE and various industry partners.
Results: Prioritizing methodological issues would create a research agenda for advancing methodological approaches in the evaluation of medicines. Findings will be disseminated through organizational websites, academic papers and policy documents.
Conclusion: Advancing methodological approaches in the evaluation of medicines can be conducted in partnership with the stakeholders involved in the production and use of evidence.
Keywords: *Economic evaluation, development, methods*

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Programme ACCORD: disability and loss of productivity in primary care patients with non-cancer chronic pain

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Background: Non-cancer chronic pain (NCCP) is a substantial burden to society due to direct medical and indirect costs. Few studies have documented the disability and loss of productivity associated with NCCP.
Methods: In a cross-sectional survey, patients reporting NCCP with a severity of at least 4 on a 0-10 scale, at least twice weekly since six months or more, and having a active pain prescription from a family physician were recruited in a sample of 82 pharmacies from May to December 2009. They completed a telephone interview and a self-administered questionnaire. The average pain severity in the past week (measured on a 0-10 scale), working status, main source of income, number of days absent from work due to pain, and average percentage of productivity lost due to pain were reported by patients during a telephone interview.
Results: A total of 399 patients completed the questionnaires. They were mostly women (62%), their mean age was 59 years old (SD:12). They reported a mean pain score of 6.5 (SD:1.8) since an mean of 11 years (SD:10). A total of 71.2% (284) were less than 65 years old. Among those, a third (34%) reported receiving disability benefits; 36% (103) were working and reported a mean of 28 days (SD:52) absent from work in the past six months and a mean loss of productivity at work of 32% (SD:29).
Conclusions: Significant disability and lost of productivity are reported by NCCP patients recruited in a primary care setting.
Keywords: *Cross-sectional survey, non-cancer chronic pain, disability*

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Programme ACCORD: knowledge, attitudes and beliefs of community pharmacists about non-cancer chronic pain

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Background: Better clinician education is often suggested as a mean for improving the management of non-cancer chronic pain (NCCP). The KnowPain-50 is a recent validated tool measuring physician education needs and effectiveness of chronic pain educational programs. The objectives of this study were to adapt the questionnaire for use by community pharmacists and evaluate its internal consistency.
Methods: The original 50 item-questionnaire was adapted by the researchers and back-translated in French. Items related to the initial pain assessment (n=7) were replaced by questions on pharmacotherapy. Individual items were rated on a 0-5 Likert scale

(0=strongly agree, 5=strongly disagree) with a total score varying from 0-250 (higher score indicating better knowledge). Pharmacists involved in a NCCP cohort study were invited to complete the adapted questionnaire. Internal consistency was assessed using Cronbach's alpha coefficient.
Results: 257 pharmacists (82 pharmacies) were invited to participate; 144 accepted (response rate:56%). This analysis is based on the first 75 questionnaires (49 pharmacies). Most pharmacists were women (65.3%) and had graduated, on average, 15.0 years ago (SD:10.2). The overall mean KnowPain-50 score was equal to 158 (SD:19) with a range of 108-189. The internal consistency was good (f: 0.68 (95%CI:0.57-0.78)). No significant relationships were found between the KnowPain-50 scores and participants' sex or numbers of years since graduation.
Conclusion: In previous surveys of physicians, the overall mean score varied from 136 to 177. Community pharmacists showed comparable scores suggesting that their knowledge, attitudes and beliefs about chronic pain management could be improved.
Keywords: *Chronic pain, KnowPain-50, knowledge*

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Programme ACCORD: validation of a French version of the pain treatment satisfaction scale in primary care patients with non-cancer chronic pain

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Background: The Pain Treatment Satisfaction Scale (PTSS) is for use in patients with pain. It has demonstrated good psychometric properties. The objectives were to translate the questionnaire in French and assess its internal consistency reliability and ability to discriminate patients according to pain severity.
Methods: The PTSS, a self-administered questionnaire including 39 items grouped in five dimensions, was back-translated in French. Items are scored on a five-point likert scale. Dimension score ranged from 0-100 (higher score indicating higher satisfaction). 380 patients reporting non-cancer pain since 6 months or more; with a severity of at least 4 on a 0-10 scale; at least twice weekly; and with a pain prescription from a family physician were recruited in 82 pharmacies. In a telephone interview, patients evaluated pain severity on a 0-10 scale at the time of the interview, over the past week, and their most intense pain in the past week. Using the tertile distribution, pain severity was classified as low, medium or high. Reliability was evaluated using Cronbach's alpha. Correlation coefficients between satisfaction scores and pain intensity were calculated.
Results: Mean satisfaction scores were generally low on all dimensions (31.8-74.0), especially on the "Information about pain and its treatment" scale. The reliability ranged from 0.76-1.00. On all dimensions, higher satisfaction was associated with lower pain severity. The correlation coefficients were low (-0.01 to -0.22) and not statistically significant for the "Efficacy" and "Medical care" scales.
Conclusions: Compared to the original version, the French version demonstrated similar reliability and validity.
Keywords: *Non-cancer chronic pain, primary care, satisfaction questionnaire, reliability*

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Release of pharmaceuticals into the environment by consumers: a Canadian perspective

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Funding Source: None

Background: Traces of pharmaceuticals are being detected in the environment. Human excretion is believed to be the primary route to the environment followed by disposal practices. Our objective is to determine how disposal programs, which collect unused and expired pharmaceuticals from consumers, can help mitigate the entry of pharmaceuticals into the environment.
Methods: We assemble statistics to estimate the total amount of pharmaceuticals, both prescription and non-prescription, used/excreted and unused/disposed of by consumers. Then we derive estimates of the amount of pharmaceuticals that may end up in landfills and in wastewater treatment facilities. We also gather information about the amount of pharmaceuticals collected through current disposal programs.
Results: Our estimates suggest that approximately 30% of all pharmaceuticals purchased by Canadian consumers are excreted and 32.5% are unused/wasted. Out of the pharmaceuticals purchased by consumers, 13% are disposed of in the garbage and 10.5% down the drain. Disposal programs are estimated to collect approximately 4% of the unused pharmaceuticals purchased by consumers and the remaining is presumed to be retained/stored by the consumers in their homes.
Conclusions: Our findings indicate that disposal programs are important to reducing the total

environmental loading of pharmaceuticals and thus mitigating potentially hazardous environmental conditions. In addition, human health may be protected from risk of accidental poisonings, abuse, recreational use, etc. resulting from keeping unused, unwanted and expired pharmaceuticals in the home.

Keywords: *Pharmaceuticals, excretion, disposal program*

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Long-term cost-effectiveness of rosuvastatin compared with generic atorvastatin in a Canadian health care setting

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Objective: To estimate long-term cost-effectiveness of titrating rosuvastatin compared with generic atorvastatin in high-risk secondary-prevention patients according to Canadian LDL-C target (2mmol/L).
Methods: The baseline lipids of a male high-risk population (mean age 55 years) were based on a Canadian observational lipid study. Efficacy data from the STELLAR trial were used to model post-treatment lipid levels. All patients initiated on 10 mg of rosuvastatin or atorvastatin. Those not achieving LDL-C goal were titrated over one-year at quarterly intervals. The resulting TC/HDL-C ratios were entered into a probabilistic Markov model using Framingham risk equations to predict fatal and non-fatal CVD events over 20 years. Branded prices were used for rosuvastatin. Based on current expectations 50% and 65% price reductions were used for atorvastatin. Event costs and utilities were drawn from published Canadian and US sources.
Results: Over the model time-frame rosuvastatin resulted in 11.98 life years saved (LYS) and 9.39 quality adjusted life years (QALYs) per patient and atorvastatin resulted in 11.89 LYS and 9.32 QALYs respectively. In a generic atorvastatin scenario, the total costs for atorvastatin were $17,084 with 50% price reduction, $16,091 with 65% price reduction, and $19,436 for rosuvastatin. The incremental cost/QALY for rosuvastatin was $34,487 (50% price reduction scenario) and $52,725 (65% price reduction scenario). In the sensitivity analysis, accounting for future generic availability of rosuvastatin using same price reductions as for atorvastatin, resulted in further lowered incremental cost-effectiveness ratios.
Conclusions: These results indicate that rosuvastatin is cost-effective in higher-risk patient groups despite the generic availability of atorvastatin.
Keywords: *Statins, cost-effective, rosuvastatin*

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Review of studies evaluating the impact of policy-driven statin switch programs on patients

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Background: The need to maintain cost-effective health care has led to greater use of policy-driven therapeutic substitution programs for statins, however the impact of these policies on patients is often under-reported.
Methods: A review of published literature describing impacts of policy-driven statin switch programs [MEDLINE search terms: Hydroxymethylglutaryl-CoA Reductase Inhibitors (MeSH), and statin, switch, interchange, substitute, substitution (all fields); limits: English, 1989-2009] and reference lists from selected papers.
Results: 23 studies were identified: 17 evaluated the impact of a "switch down" to equal or less potent statins, 6 evaluated the impact of a "switch up" to more potent statins. With "switch down" programs, 23-47% of patients were not eligible or willing to switch (7 studies), 17-38% of patients were switched to non-equivalent (lower) doses of the new statin (3 studies), 4-11% of patients switched back to their original statin (5 studies), and switched patients were 19-33% less likely to be adherent compared to those with no switch. Persistence was significantly reduced among switch patients (2 studies). No significant trend in lipid levels was noted (12 studies) but loss of target levels was reported in 7-20% of patients (2 studies) and 3 studies reported an increase in vascular events or death after switching. Studies evaluating "switch up" programs consistently demonstrated improved reductions in lipid levels (6 studies) and greater proportions of patients achieving LDL goals (5 studies).
Conclusions: Policy-driven programs that encourage wide-spread switching of statins without consideration of patient-specific circumstances may impact the delivery of patient care and treatment outcomes.
Keywords: *Statins, therapeutic substitution, patient outcomes*

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Sex differences in one-year mortality in people with heart failure among urban and rural residences in Alberta, Canada

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Background: While it is often speculated that residents in urban and rural communities will have different access to health care and different health outcomes, whether these differences exist and their magnitude are unknown for Canadian patients with heart failure (HF).
Methods: Retrospective cohort using linked administrative data from Alberta. Patients with incident HF were identified (ICD-9 code 428.x; ICD-10 I50.x) and followed from 1-April-1999 to 31-December-2007. Urban-rural status was determined by postal code of their registered address. Our primary outcome was all-cause mortality at 1-year following initial HF diagnosis.
Results: In our cohort of 83,674 Albertans newly diagnosed with HF (mean age 72 ±15, 50% men), 15,133 (18%) died and 31,728 (38%) were hospitalized within 1-year. Although all-cause mortality rates were higher in urban compared to rural residents (18% vs. 17% at 1-year), after adjustment for demographics and comorbidities, urban men exhibited a significantly lower risk of mortality than rural men (aRR 0.88; 0.81-0.93). In contrast, urban females were at no greater risk of 1-year mortality compared to rural females (RR: 0.97; 0.90-1.04). Sex differences did not exist in secondary outcomes, although urban patients exhibited lower rates of hospitalization (aRR: 0.74; 0.71-0.76 for all-cause and 0.85; 0.81-0.88 for cardiovascular-related) and ER visits (0.65; 0.62-0.68).
Conclusions: Mortality 1-year following HF diagnosis is less common in men who live in urban areas than in rural areas; however, this difference is not observed in women. Urban HF patients are less likely to be hospitalized and less likely to visit ERs than rural patients.
Keywords: *Heart failure, urban-rural, cohort study*

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The burden of osteo-arthritis in Ontario

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Background/Objectives: Little is known about the burden of osteo-arthritis (OA) in Ontario. The study objectives were to estimate the burden of OA in Ontario using health survey and administrative data.
Methods: The records of all Ontarians who participated in the Canadian Community Health Survey (CCHS), cycle 1.1 (2000/2001) and provided consent to data linkage were linked to the Ontario Health Insurance Program (OHIP) physician claims database and the Discharge Abstract Database (DAD) In-Patient (i.e. hospitalization) and Day-Procedure databases. OA individuals (N= 4,331) were identified using CCHS 1.1. A control group matched by age and gender was created (N=1,477). Socio-demographic variables, medical characteristics, health-related quality of life (HRQoL) and one-year physician, day procedures and hospitalization costs were determined. CCHS sample weights were applied to the data to represent the Ontario population. Logistic regressions, Tobit and Generalized Linear Model models were used to identify predictors of medical characteristics, utility and cost data, respectively. Bootstrap techniques were applied for the cost analyses.
Results: The mean age of the population was 66 years old and 74% were female. Compared to the control group, OA individuals were statistically more likely to: be female, be less physically active, be overweight or obese, reside in an urban community, have more comorbidities, have a lower HRQoL and a lower household income. The 1-year physician, day procedure and hospitalization costs were statistically higher in the OA group.
Conclusion: These results indicate that the humanistic and economic burden of OA in Ontario is considerable.
Keywords: *Patient-level analysis, burden, osteo-arthritis*

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The burden of rheumatoid-arthritis in Ontario

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Background/Objectives: Little is known about the burden of rheumatoid-arthritis (RA). The study objectives were to present an overview of the burden of RA in Ontario using survey and administrative data.
Methods: Records of all Ontarians who participated in the Canadian Community Health Survey (CCHS), cycle 1.1 (2000/2001) and provided consent to data linkage were linked to the Ontario Health Insurance Program (OHIP) physician claims database and the Discharge Abstract Database (DAD) In-Patient (i.e. hospitalization) and Day-Procedure databases. Two criteria were used to identify RA patients (N=233): 1) self-reported physician-diagnosed RA in CCHS; and 2) ICD-9 diagnosis code of RA in OHIP. A control group matched by age and gender was created (N=688). Socio-demographic variables, medical characteristics, health-related quality of life and one-year physician, day procedures and hospitalization costs were determined. CCHS sample weights were applied to represent the Ontario population. Logistic regressions,

Tobit and Generalized Linear Model models were used to identify predictors of medical characteristics, utility and cost data, respectively. Bootstrap techniques were applied for the cost analyses.
Results: The mean age of the population was 59 years old and 75% were female. Compared to the control group, RA Individuals were statistically more likely to: be obese, reside in an urban community, be female, have more comorbidities and a lower HRQoL. No statistical differences were observed in terms of costs even after covariate adjustment.
Conclusion: Although drug costs were not included, these results indicate that the burden of RA is considerable.
Keywords: *Individual-level analysis, burden of RA*

65- ENCORE PRESENTATION
The economic value of a potential biomarker for chronic obstructive pulmonary disease

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The use of amiodarone in Quebec between January 1998 and April 2009. An observational study

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Background: Amiodarone is the most frequently used agent in the treatment of atrial fibrillation (AF). Unlike other agents used in this condition, it does not produce cardiotoxicity. However, potentially serious side effects such as thyroid dysfunction, pulmonary fibrosis, hepatic failure and dermatological changes often limit its long-term use. The recent availability of an amiodarone-like agent (dronedarone) devoid of organ toxicity raises the question of the real life use of amiodarone.
Methods: A random sample of 9,730 patients newly started on amiodarone for the treatment of AF between January 1998 and April 2009 was obtained from RAMQ. The index date(IDate) was the date of the first amiodarone dispensation.
Results: At the IDate the median age was 72. In 49% of the patients, the initial prescriber was a specialist. During the year prior to the index date they had on average 1.9 hospitalizations (duration of 8.8 days), 3.1 emergency room visits, 13.1 outpatient visits. The following diagnoses were present in 20% or more: hypertension, heart failure, angina pectoris, and previous myocardial infarction. The mortality was 12% and 37% at one and 5 years. After one year 50% were persistent on the drug, 22% had a cardioversion, and 4% had a pacemaker implantation. The diagnoses potentially related to amiodarone toxicity were: thyroid disease 18%, complete AV block 5%, hepatic disfunction 3%, pulmonary fibrosis 2%.
Conclusions: At the IDate most patients were already quite old and had significant co-morbidities. The incident of the known side-effects was already significant after only one year of treatment.
Keywords: *Amiodarone, atrial fibrillation, database analyses*

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The use of lipid-lowering drugs in Québec from 2004 to 2008: a cohort study

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Funding Source: None

Background: Prescriptions of lipid-lowering drugs have increased significantly over the past 20 years and numerous studies report suboptimal utilization of these drugs.
Objectives: To determine the prevalence of lipid-lowering drug use in Québec from 2004 to 2008 depending on cardiovascular risk and determine factors associated with the use among high risk individuals.
Methods: A retrospective cohort study was conducted using Régie de l'assurance maladie data banks for every adult registered under the public prescription drug insurance plan. A high cardiovascular risk was defined as the evidence of one or more of these diseases: atherosclerotic vascular disease, type I or II diabetes and chronic kidney disease using medical and pharmaceutical services. Prevalence of lipid-lowering drug use was assessed each year using pharmaceutical services. Factors associated with the use of a lipid-lowering drug were assessed using logistic regression.
Results: From 2004 to 2008, the prevalence of lipid-lowering drug use has increased from 23.4% to 28.4%. While 51.6% of high risk adults were receiving lipid-lowering drugs in 2004, this prevalence rose to 61.9% in 2008. A similar increase was observed among low to moderate risk adults. Probability to receive a lipid-lowering drug among high risk individuals was 4 to 16 times higher for those aged ≥35 compared to those aged 18 to 34, 60% higher in 2008 compared to 2004 and 30% lower for women compared to men.

Conclusion: Although the use of lipid-lowering drugs has increased from 2004 to 2008 in Québec, the prevalence of use in high risk individuals is still relatively low.
Keywords: *Lipid-lowering drugs, utilization, Québec*

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Using cost-of-illness analysis to describe the direct burden of fracture: estimates of potential savings from prevention

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Background/Objectives: Cost-of-illness (COI) analysis is used to evaluate the economic burden of illness in terms of health care resource (HCR) consumption and production losses. Incidence-based COI is useful when considering fracture prevention measures and post-fracture management from a cost distribution perspective. This analysis aimed to estimate the costs related to incident fractures in older women and men and to describe the incremental costs of fracture when compared to a sex and age matched cohort.
Methods: We used the Population Health Research Data Repository for Manitoba-- a comprehensive collection of databases including physician visits, hospitalization and pharmaceutical prescriptions-- to identify fractures and HCR costs over a 10-year period. An incidence approach was used to count fracture numbers by site and sex in Manitobans aged 50 years and older; a bottom-up approach was used to estimate costs (quantity x unit costs) in the year pre- and post-fracture. All costs expressed as 2006 dollars.
Results: Fractures of the hip and spine incurred the highest hospital costs in the year after fracture for both males (mean $23073/ $15091) and females (mean $21285/$14052). Drug costs remained stable between pre- and post-fracture periods whereas other costs (physician, hospital, personal care home and home care) increased significantly ($p<0.0001$). Overall cost increases (post-fracture minus pre-fracture) for hip and spine fractures were high for males (mean $18797/ $14769) and females (mean $20390/$13648).
Conclusions: Identifying cost-of-illness including health care resource use will help to estimate the burden of fracture and offer a cost baseline to measuring the effects of evidence-based guideline implementation.
Keywords: *Fracture, cost-of-illness, burden of disease*

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Using mixed treatment comparisons to generate recommendations for optimal use of medications

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Funding Source: CADTH is an independent, not-for-profit agency funded by Canadian F/P/T govs.

Background: Mixed treatment comparisons meta-analysis (MTC) is a powerful methodology for synthesizing evidence when a policy or therapeutic decision requires consideration of multiple treatment options. However, MTC have been used infrequently in making recommendations or policy decisions.
Methods: The Canadian Agency for Drugs and Technologies in Health (CADTH) used MTC to evaluate the comparative efficacy of drugs used for second-line treatment of type 2 diabetes when poorly controlled on metformin monotherapy, and the GRADE methodology to facilitate development of recommendations for their optimal use. The presentation will highlight our experiences in using MTC to make recommendations and identify key learnings.
Results: The presentation will introduce CADTH and the project to assess second-line antidiabetes drugs. An overview of MTC methodology will be presented along with some common perceptions about MTC and barriers to accepting this approach to evidence synthesis. The presenter will share how CADTH overcame challenges in fostering understanding and acceptance of MTC methodology by an expert committee and explain how MTC results were incorporated within the GRADE approach to developing recommendations. Finally, the processes and framework used to develop recommendations based on MTC results will be described.
Conclusions: MTC meta-analysis can be a powerful method for comparing multiple treatment options. There may; however, be a degree of discomfort on the part of decision-makers to use results from MTC. To ensure a successful outcome, a strategic approach is required to educate decision-makers, and to ensure that analyses are conducted and presented appropriately.
Keywords: *Mixed-treatment meta-analysis, anti-diabetes drugs, optimal drug use*

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Validation of a Monte-Carlo Markov model for schizophrenia

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Aim: Pharmacological strategies for schizophrenia have received increasing attention due to the development of new but costly drug therapies. To evaluate the new drug therapies for schizophrenia, we developed a Markov model using the Monte-Carlo micro-simulation in order to model the natural course of schizophrenia.
Objectives: To determinate the validity of the developed Monte-Carlo Markov micro-simulation model.
Methods: The model was based on data from the Régie de l'assurance maladie du Québec and Med-Echo databases. The cohort study includes all individuals aged 0-60 years with a new diagnosis of schizophrenia between 1998 and 2000. Each individual was followed for a maximum of 8 years. The Markov model has six discrete disease states with cycles of one year. Internal validation was conducted by comparing the number of simulated schizophrenia disease states with the number of different disease states observed in the cohort. External validation was performed by comparing the mean of the model's predicted probabilities of transition with those published in the literature.
Results: The cohort study consists of 14,318 subjects newly diagnosed with schizophrenia. The characteristics of simulated cohort were similar to those of the cohort study. After one and respectively 5 years, the number of simulated disease states was consistent with the number of different observed disease states. The mean of the model's predicted probabilities of transition found in the simulated cohort were also consistent with those published in the literature.
Conclusion: Our results show both internal and external validity of the model. This model will be appropriated to evaluate the new drug therapies for schizophrenia.
Keywords: *Schizophrenia, validation, micro-simulation*

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Validation of warfarin pharmacogenetic algorithms in real clinical practice: preliminary results

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Background: Warfarin is the most widely prescribed oral anticoagulant for the treatment and prevention of thromboembolic diseases. However, warfarin has a narrow therapeutic range and a certain dose has a large interindividual variation. Conventional warfarin dosing algorithms rely on trial-and-error dose adjustments and usually require numerous weeks of monitoring to achieve a stable dose to maintain a targeted prothrombin time using the international normalised ratio (INR). Genetic variants in the CYP2C9 and VKORC1 genes offer the much desired prospect of an eventual individualisation of warfarin therapy. The aim of this study is to evaluate the performance of two pharmacogenetic algorithms in an unselected patient population initiating warfarin treatment in a real-world clinical setting.
Methods: Data from a prospective cohort study of 544 patients initiating warfarin at the Montreal Heart Institute was used. Pearson's correlation test was used to evaluate the correlation between the predicted warfarin target doses from the two algorithms with the dose achieving the therapeutic INR in the real clinical setting. Variables included in the algorithms consist of age, gender, BMI, race, comorbidity, amiodarone use, and genetic factors.
Results: Preliminary results obtained by simulating clinical values for 100 patients indicated that the predicted warfarin doses differ by 20 % between the two algorithms. Future analyses will determine if dose prediction of the two algorithms is close to the required stable therapeutic dose, and if personalized dosing has any clinical significant impact.
Conclusions: This is a deliberate research effort to validate pharmacogenetic algorithms use in patients initiating warfarin therapy.
Keywords: *Warfarin, dosing algorithm, pharmacogenetics*

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Validity of the immunization record information system (IRIS) database for epidemiologic studies of the human papillomavirus (HPV) vaccine

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Background: Valid sources of immunizations data are needed in order to carry out epidemiologic studies of the real-world harms and benefits of the human papillomavirus (HPV) vaccine. We assessed the accuracy and precision of the HPV vaccination data within Ontario's Immunization Records Information System (IRIS) database.
Methods: We abstracted exposure data from the manual immunization records ("gold standard") of all Grade 8 girls in the Kingston, Frontenac, Lennox and Addington (KFL&A) heath unit eligible for the province's HPV immunization program between 2007 and 2009. The resulting database was compared to the electronic records of the IRIS database. IRIS databases, maintained by individual local public health agencies (LPHAs), capture detailed information on all school-based immunizations. We determined the sensitivity, specificity, and 95% confidence intervals of individuals' vaccination status in IRIS, and the ability of this database to correctly identify vaccination dates.
Results: Of the 2158 eligible girls, 2092 (96.9%) were matched between the two databases and used in subsequent analyses. The sensitivity and specificity of the IRIS database for vaccination status was 99.8% (95% CI, 99.34 - 99.95) and 95.4% (95% CI, 93.7 - 96.8), respectively. Preliminary results indicate that, depending on the dose evaluated, discrepancies in vaccination dates ranged from 4.7% to 7.2% between databases.
Conclusions: These results indicate that the IRIS database is a valid source of exposure data for epidemiologic studies of the effects of the HPV vaccine. The generalizability of these results to the immunization data of other LPHAs needs to be assessed.
Keywords: *Validation study, human papillomavirus vaccine, pharmacoepidemiology*

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Will individualized benefit-harm risk information affect patients' decisions regarding warfarin?

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Background: Benefit and harm information tailored to individual patient risks, although crucial for informed decision-making, is available for very few drugs and rarely used in clinical practice. The objective of this study was to evaluate whether the presentation of warfarin benefit and harm information based on average versus individualized risk profiles, would lead to different treatment decisions.
Methods: A randomized sequence order study in which participants > 55 years, considered 3 levels of treatment individualization presented in 5 scenarios of atrial fibrillation, with evaluation of treatment choice (warfarin vs. no treatment). The 3 levels were a) average - risks of stroke and bleeding based on randomized trials and observational practice-based data, b) individualized based on clinical prediction rules (CHADS and HEMORRHAGES) and c) individualized combined (stroke/no bleed, stroke/bleed, bleed/no stroke and no bleed/no stroke).
Results: 71 of 75 participants completed (50.7% female, mean age 69.8 yr). Although the average benefit-harm profile was simpler, most participants (63.4%) preferred the individualized risk profiles, and these significantly altered treatment choices ($p<0.001$). Even in a high benefit-low harm scenario, 38.0% chose no treatment despite avoidance of stroke being the most influential factor. More than 95% preferred some type of shared decision-making with their physician.
Conclusion: More individualized but complex presentations of information on treatment benefit and harm are preferred by patients and can dramatically change the treatment decisions that patients would make. The treatment choices are often not those recommended by the evidence or by their physicians.
Keywords: *Patient-decision making, benefit-harm assessment, individualizing therapy*

AUTHOR INDEX BY ABSTRACT