COLLABORATION FOR OUTCOMES RESEARCH AND EVALUATION

Annual Report 2009

Collaboration for
Outcomes
Research and
Evaluation

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Collaboration for Outcomes
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A WORD FROM CORE'S DIRECTOR

We are pleased to issue our third annual report for the Collaboration for Outcomes Research and Evaluation (CORE) located within the Faculty of Pharmaceutical Sciences at the University of British Columbia.

This past year has again been a very successful one. Investigators from CORE published twenty-three peer-reviewed papers in high caliber journals such as the *Annals of Internal Medicine*, *Archives of Internal Medicine*, and *Pediatrics* to name a few. We also were very successful in obtaining peer reviewed funding from a variety of sources including the Canadian Institutes of Health Research/Health Canada (Drug Safety and Effectiveness Network), AllerGen Network Centers of Excellence, the Canadian Arthritis Network and the Canadian Rheumatology Association through the Canadian Initiative for Outcomes in Rheumatological Care. Many of these grants focus on evaluating expanded roles for pharmacists in terms of the feasibility, effectiveness and cost-effectiveness of pharmacist-initiated interventions in health care. We were also very successful in working with the British Columbia Pharmacy Association and the Ministry of Health Services in conducting an evaluation of pharmacy adaptation services in British Columbia.

CORE continued its educational mandate with the Faculty of Pharmaceutical Sciences by offering an undergraduate course in pharmacoeconomics and health technology assessment for the fifth consecutive year. We also offered the first iteration of a critical evaluation of pharmacotherapy literature course to Doctor of Pharmacy students, which was met with enthusiasm. Finally, we are planning an intensive short course in health technology assessment and economic evaluation in the fall of 2010. Details regarding this course will be posted in advance on our website (www.core.ubc.ca).

We were also thrilled to have new highly qualified personnel join our research group including Pamela Joshi as Research Manager, Adam Raymakers as a Health Economist and Natalie McCormick as a Master's student. Dr. Kelly Grindrod and Bridgette Oteng successfully defended their theses in the fall of 2009, and Dr. Mohsen Sadatsafavi (PhD student) obtained the prestigious Bisby (CIHR) fellowship award for being the top-ranked applicant in the competition. The upcoming year promises to be an exciting time for many of our PhD students as Jen Faddegon, Na Guo and John Woolcott look forward to defending their theses in the spring and summer.

We are look forward to another successful year for 2010/2011!

Respectfully Submitted,

Carlo Marra, PharmD, PhD, FCSHP
Associate Professor, Faculty of Pharmaceutical Sciences, University of British Columbia
Director, Collaboration for Outcomes Research and Evaluation
Canada Research Chair in Pharmaceutical Outcomes
Michael Smith Foundation for Health Research Scholar

A WORD FROM UBC

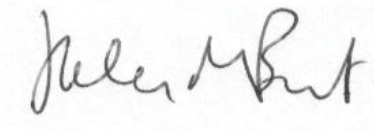
It is a great pleasure to have the opportunity to contribute to the third annual report for the Collaboration for Outcomes Research and Evaluation (CORE), located at the Faculty of Pharmaceutical Sciences at the University of British Columbia.

Since its inception, CORE has been a leader in conducting drug therapy research designed to minimize risk and maximize clinical benefits, quality of life benefits, and economic benefits. Under the leadership and guidance of Dr. Carlo Marra (Director) and Dr. Larry Lynd (Associate Director), CORE has grown over the past year and expanded its cadre of researchers, faculty members, associates and collaborations. CORE has also shown remarkable initiative in tackling current health issues, and as a result, boasts a timely and relevant program of research.

CORE's successes are not limited to attracting highly skilled staff and collaborators, publishing widely in highly respected peer reviewed journals, and having numerous conference presentations accepted nationally and internationally; CORE has also received additional recognition in the field for a number of accomplishments. Over the past year, CORE has been awarded a tri-council research grant from the Canadian Institute for Health Research for a study on pharmacist management of anti-hypertensives and pregnancy. Funds for other projects have been awarded by organizations such as the BC Pharmacy Association, Canadian Initiative for Outcomes in Rheumatology Care and AllerGen Network Centers of Excellence. These prolific research projects are consistent with CORE's mission to improve health care related outcomes to drug therapy through the application of the best in research, education and practice enhancement strategies.

This annual report summarizes the research contributions of CORE during 2009. The report highlights research themes and associated projects, as well as associates, staff, students, grants and publications. This report provides a snapshot into the commitment and dedication of the CORE team to generating new knowledge in the field of drug therapy outcomes. I applaud the accomplishments of CORE in the past year and am confident that their success will continue.

Sincerely,



Helen M. Burt, PhD
Associate Dean of Research and Graduate Studies,
Faculty of Pharmaceutical Sciences, University of British Columbia
Angiotech Professor of Drug Delivery

MEMBERS OF CORE

Leadership

Carlo A. Marra, BSc (Pharm), PharmD, PhD, FCSHP
Director, Collaboration for Outcomes Research and Evaluation; Associate Professor, Faculty of Pharmaceutical Sciences, University of British Columbia

Larry D. Lynd, BSP, PhD
Associate Director, Collaboration for Outcomes Research and Evaluation; Associate Professor, Faculty of Pharmaceutical Sciences, University of British Columbia

Faculty

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Professor and Director of the Doctor of Pharmacy Program, Faculty of Pharmaceutical Sciences, University of British Columbia

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James McCormack, BSc, BSc (Pharm), PharmD
Professor, Faculty of Pharmaceutical Sciences, University of British Columbia

Judith A. Soon, BSc (Pharm), RPh, ACPR, MSc, Dipl (Epidemol & Biostat), PhD, FCSHP
Director, Community Pharmacy Research Network;
Assistant Professor, Faculty of Pharmaceutical Sciences, University of British Columbia

Associates

Aslam Anis, PhD
Director, Centre for Health Evaluation and Outcome Sciences;
Director, Masters of Health Administration Program (MHA);
Professor, School of Public Health, University of British Columbia

John Esdaile, MD, MPH, FRCPC
Scientific Director, Arthritis Research Centre of Canada;
Professor, Division of Rheumatology, Department of Medicine, University of British Columbia

J. Mark Fitzgerald, MB, MD, FRCP(I), FRCP(C), FACCP
Scientist, Centre for Clinical Epidemiology and Evaluation, Vancouver Coastal Health Research Institute;
Professor, Faculty of Medicine, University of British Columbia;
Head, UBC Respiratory Medicine Division, Director Centre for Lung Health

Jeff Johnson, PhD
Professor & Canada Research Chair, School of Public Health, University of Alberta; Chair, ACHORD (Alliance for Canadian Health Outcomes Research in Diabetes)

Janusz Kaczorowski, BA, MA, PhD
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Associate Professor, School of Population and Public Health, University of British Columbia; Associate Director, Centre for Health Services and Policy Research

Ross T. Tsuyuki, BSc(Pharm), MSc, PharmD, FCSHP, FACC
Director, EPICORE (Epidemiology Coordinating and Research) Centre and Centre for Community Pharmacy Research and Interdisciplinary Strategies (COMPRIS); Professor of Medicine, Division of Cardiology, University of Alberta

Natalie Henrich, PhD, MPH
Research Scientist, Centre for Health Evaluation & Outcome Sciences

Research Staff

Lindsey Colley, BSc, MSc, Statistician

Maja Grubisic, BSc, MSc, AStat, Statistician

Stephanie Harvard, BAH, MSc, Researcher

Pamela Joshi, BSc, MSc, Research Manager

Jamie Thomas, BSc, Researcher

Adam Raymakers, BSc, MSc, Health Economist

Administration

Kristin Westland, BA, Administrative Manager

Salma Lalji, Developer

ABOUT CORE

The University of British Columbia's Collaboration for Outcomes Research and Evaluation (CORE) group addresses the need for clinical and economic research and education in pharmaceutical outcomes assessment. The CORE team is a multidisciplinary group of researchers with expertise in clinical pharmacy, pharmacoepidemiology, health economics, health services research, program evaluation and health promotion research.

CORE strives to provide evidence which will maximize the clinical, quality of life, and economic benefits of drug therapy, while minimizing associated risks. This is achieved through in dependent research and research collaborations with pharmaceutical and health outcomes researchers throughout North America and Europe.

MISSION

CORE's mission is to improve health-care related outcomes for drug therapy through the application of the best in research, education and practice enhancement strategies.

Pharmacy Practice Research

Evaluation of Pharmacy Adaptation Services in British Columbia

Pharmacists in British Columbia have recently seen their scope of practice expand to include prescription adaptation. In 2008, the BC government's Health Professions Amendment Act (Bill 25) formalized a pharmacist's authority to "renew existing prescriptions." This legislation led to the development of a framework by the College of Pharmacists of British Columbia or a Professional Practice Policy #58 (PPP-58) entitled, "Protocol for Medication Management – Adapting a Prescription," to guide pharmacists in the safe and effective adaptation. On January 1, 2009, pharmacists started adapting prescriptions in BC.

To ensure that changes to pharmacy services meet the needs of pharmacy stakeholders including pharmacists, pharmacy businesses, government payers, physicians and patients, the key outcomes of value and effectiveness need to be considered. This study examines 1) the costs, barriers and facilitators of providing pharmacy adaptation services in community pharmacies; 2) the impact of pharmacy adaptation services on patient health outcomes and health resource use and 3) physician's attitudes and practices as they related to pharmacy adaptation services. Through the processes and information gathered, we will contribute to a greater understanding to the role of pharmacy adaptation services and to stakeholders' perceptions of the value of these services.

With the expanded scope of practice for BC pharmacists as they take on the added responsibility of adapting prescriptions, the reactions and perceived impacts across stakeholders is diverse.

CORE's evaluation of the adaptation program yielded significant insight into the concerns that family physicians have about the program and how to address them, as well as the views of pharmacists and patients. A real strength of CORE's evaluation is their 360° approach to assessing stakeholder perspectives and experiences, which yields findings that can contribute to the acceptance and success of the adaptation program.

Dr. Natalie Henrich,
Research Scientist, Centre for Health Evaluation and Outcome Sciences

Falling through the Cracks: Using a Multidisciplinary Strategy to Improve Disease Modifying Anti-rheumatic Drugs Use in Rheumatoid Arthritis

DMARDs, or 'disease-modifying anti-rheumatic drugs', are the #1 recommended treatment for rheumatoid arthritis (RA) and rheumatologists prescribe them to most patients they see. Yet more than half of RA patients in BC do not see RA specialists. Instead, they see their family doctors, who seldom prescribe DMARDs.

Recently, we received funding from the Canadian Initiative for Outcomes in Rheumatoid Arthritis within the Canadian Rheumatology Association and the Canadian Arthritis Network to look at how to encourage family doctors to prescribe DMARDs. Since pharmacists are medication experts, and physiotherapists are trained to give physical exams, we think they can effectively support family doctors and expand DMARD use. This study examines whether a collaborative process between pharmacists, physiotherapists, and family doctors will increase DMARD prescribing and improves patient outcomes.

DMARDs are medications that have been proven to slow the progression of rheumatoid arthritis thereby reducing work disability. It is critical to improve the dismal record of DMARD use for rheumatoid arthritis patients here in BC. This initiative is poised to improve patient care through interdisciplinary collaboration and, if successful, could be a model for other provinces.

Dr. Kam Shojania,
Clinical Associate Professor,
Head of the Division of Rheumatology,
Faculty of Medicine,
University of British Columbia

Evaluating Pharmacist Prescribing of Single Inhaler Therapy in Uncontrolled Asthma: A Pilot Study

For asthma therapy and treatment, a broad range of medications are often used with the goal of providing immediate relief and preventative care. A number of studies have emerged suggesting that asthma treatment with budesonide/formoterol (or Symbicort®) may have great potential to be used to simplify therapy for patients with not well controlled asthma as well as increase their medication compliance and decrease inappropriate medication use.

In BC, there has been a shift towards expanding pharmacist's scope of practice. BC pharmacists have recently been granted the authority to adapt existing prescriptions in BC. Thus, although they cannot currently write a new prescription, legislation has been passed in other provinces giving pharmacists prescription authority.

Given that pharmacists cannot currently prescribe independently in BC, this study evaluates the use of Symbicort® in a collaborative practice, where a pharmacist has been granted prescriptive authority by a physician, who takes ultimate responsibility for the prescription and the patient.

The Feasibility of Using Community Pharmacists in Focused Surveillance for Drug Safety & Effectiveness

High blood pressure is the most common medical condition in pregnancy and the outcomes and side effects of the medications used to treat it in pregnant women are poorly understood. Community pharmacists are highly accessible health care practitioners – patients see their pharmacist seven times more frequently than their family practitioner. This is especially true for pregnant women, who often go to pharmacies to obtain over-the-counter products such as pre-natal vitamins and folic acid products. As a result of their increased contact with pregnant women, community pharmacists have a unique opportunity for examining drug safety and effectiveness outcomes among their patients.

This proof of concept study examines the feasibility of pharmacist-based recruiting and monitoring of pregnant and lactating women with hypertension and hypertension disorders during pregnancy.

Pharmacoepidemiology

Changes in Non-Steroidal Anti-Inflammatory Prescribing and Gastrointestinal Outcomes Following Rofecoxib Withdrawal

On September 30, 2004, the selective COX-2 inhibitor rofecoxib (Vioxx) was withdrawn from the market on the basis of evidence suggesting cardiac risks associated with use. This withdrawal required physicians prescribing rofecoxib to switch their patients to alternative analgesics, presumably to other selective C0X-2 inhibitors or to non-selective non-steroidal anti-inflammatory drugs (nsNSAIDS).

As nsNSAIDs are more gastrotoxic than are selective COX-2 inhibitors, increased prescribing of nsNSAIDs could increase rates of gastrointestinal events, particularly if patients originally prescribed selective COX-2 inhibitors because of susceptibility to gastrointestinal events were switched to nsNSAIDS. Consequently, we sought to describe changes in the prescribing of selective COX-2 inhibitors and nsNSAIDs and to calculate the rates of gastrointestinal adverse events among users of these two drug classes in the twelve months prior to and following the withdrawal of rofecoxib.

To do so, we accessed administrative data on a cohort of patients with rheumatoid arthritis and categorized patients as users of either selective COX-2 inhibitors or nsNSAIDs based on their most recent prescription as of September 30, 2004.

While certain studies have discussed changes in selective COX-2 inhibitor and nsNSAID prescribing patterns, our study is distinguished by relating these changes to health outcomes in an RA population and by acknowledging potential differences between selective COX-2 inhibitor and nsNSAIDs users.

Evaluating the Relationship between Medications for Lung Disease and High Cholesterol and Lung Cancer

Recent studies indicate that the most common cause of death among patients with COPD is lung cancer. It has also been demonstrated that the association between lung cancer and COPD can be attributed in part to the common exposure of tobacco smoke, which is a well known inflammation stimulant. In this regard, it has been shown that inhaled corticosteroids (ICS) decrease the local and systemic inflammation in COPD patients and along with ICS, specific cholesterol lower drugs (e.g., statins) have also been shown to potentially decrease the risk of lung cancer.

This study examines the association between both inhaled corticosteroids and statins and the development of lung cancer in COPD patients in BC through the use of linked administrative health databases.

Quantitative Risk-Benefit Analysis

A Quantitative Benefit Risk Analysis of Isoniazid for Treatment of Latent Tuberculosis Infection Using Incremental Net-benefit

In North America, contacts of active tuberculosis (TB) cases that have a positive tuberculin skin test are offered therapy with Isoniazid (INH). However, there are concerns about the adverse effects of INH versus the risk of developing active TB. The objective of this project is to undertake a quantitative benefit-risk analysis of INH treatment for latent TB infection for different groups of contacts of active TB cases. We will also determine the opportunity loss in terms of the quality-adjusted life years (QALYs) due to uncertainty in our current knowledge. A simulation model of TB will be created and used to synthesize evidence from a wide set of sources including the longitudinal database of TB contacts in BC. We will use such model to compare the treatment of latent TB infection in contacts to no treatment over a six year time horizon. Contacts will be stratified into groups based on baseline covariates and tuberculin skin test results. We will use an incremental net benefit approach by comparing the QALYs gained due to delayed or prevention of active TB via treatment of latent TB infection vs. QALYs lost due to the adverse events to INH.

This project will be one of the first works in benefit-risk literature that performs Value of Information analysis. Such analysis will be used to calculate the expected opportunity loss in terms of QALYs due to our lack of knowledge in the exact values of the parameters determining risk and benefit of INH therapy, and will highlight the areas of maximum uncertainty. Such information can be used to prioritize future research in this field.

The results of our analysis will help policy makers, healthcare professionals, and patients compare and contrast benefits and harms associated with INH therapy in a quantitative and transparent manner. It will highlight the impact of individualizing the treatment decision by incorporating a spectrum of baseline covariates that are predictive of risk or benefit of treatment. This work will also contribute to the methodology of benefit-risk analysis by incorporating Value of Information methodology within an incremental benefit-risk framework.

Measuring Patients' Preferences Using Discrete Choice Experiments

Consumer Preferences for Food Labeling for Allergens

Food allergies are a serious health challenge for many Canadians. In people with food allergies, certain foods or food additives, called 'allergens', cause allergic reactions and physical symptoms that can range from mild to severe. 'Food labeling for allergens' refers to statements on packaged foods that give consumers information about allergens.

In Canada, there are currently no official requirements around food labeling for allergens. Manufacturers are required to list all the known ingredients in a food, but this does not include ingredients that may have come in contact with the food by accident. Manufacturers are not required to test for allergens.

CORE is currently undertaking a study to learn more about how consumers, both with and without experiences with allergies, would prefer packaged foods be labeled for allergens.

Risk-benefit Tradeoffs for NSAIDS in those with Rheumatoid Arthritis

The objectives of this study are to evaluate the use of DCE methods to describe patients risk preferences surrounding the use of non-steroidal anti-inflammatory drugs (NSAIDs) in the treatment of rheumatoid arthritis (RA).

Using a DCE, we will measure the potential additional gastrointestinal and cardiovascular risk that RA patients are willing to take for a given level of improvement in their pain and functioning using a questionnaire that requires participants to choose between two hypothetical treatments that are comprised of the same treatment characteristics (e.g., risk of stroke or heart attack) but different levels of these characteristics (e.g., 1%, 2%).

Health Economics

Evaluating the Cost - Effectiveness and Economic Impact of Cognitive Behavioural Therapy versus Pharmacotherapy for the Treatment of Depression in British Columbia

This study provided an economic evaluation of cognitive behavioural therapy (CBT) specific to British Columbia (BC) to help inform the decision of whether to adopt and implement CBT in the province.

To achieve this, we undertook both cost-effectiveness and cost-utility evaluations of CBT compared to pharmacotherapy alone as the standard of care over a two year period. To this end, the analyses will explore i) the development of a decision analytic model to compare the treatment of the pharmacologic management of depression with CBT; and ii) estimate the potential budget impact of depression treatment in BC using CBT relative to pharmacotherapy alone.

Canadian clinical treatment guidelines for depression recommend both pharmacotherapy and cognitive behavioural therapy as first-line treatments for depression. While both pharmacotherapy and CBT are effective, access to CBT services in BC are insufficient to offer CBT as a first-line treatment. An important step in obtaining funding to provide CBT as a first-line treatment is to demonstrate that CBT is a cost-effective treatment. This BC Mental Health and Addiction Research Network funded project takes advantage of CORE's expertise to evaluate the cost-effectiveness of CBT in comparison to pharmacotherapy.

Dr. Mark Lau, Research Scientist and Director, BC Cognitive Behaviour Therapy Network; Clinical Associate Professor, Department of Psychiatry, University of British Columbia

Platform for Outcomes Research and Translation in Asthma and aLlergy (PORTAL)

The potential burden of asthma and allergic diseases on patients, families and society is multi-faceted, resulting in individual and societal costs, and decreased quality of life. The advent of new approaches to food labeling, program delivery, and new technologies available for disease management present challenges for clinicians, policy makers and payers, and raise complex questions necessitating cross-disciplinary evaluative research.

The **P**latform for **O**utcomes **R**esearch and **T**ranslation in **A**sthma and a**L**lergy (PORTAL), funded by AllerGen NCE, provides a mechanism for:
i) systematically evaluating outcomes including costs, cost-effectiveness, quality of life, burden of illness, and preferences for health interventions and programs; ii) translating evidence related to the identification, management, and prevention of allergy-related diseases into policy and practice; and iii) evaluating the impact of knowledge translation for policy/practice change on patient outcomes and the health of Canadians.

Genetics

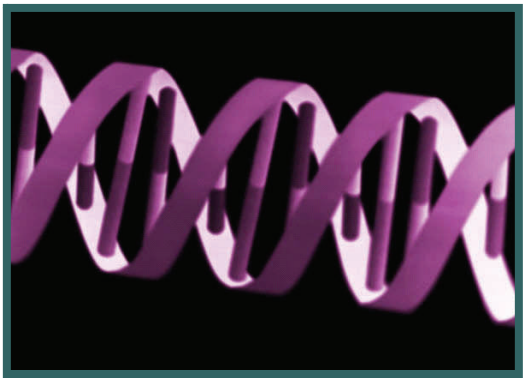
Barriers to Integrating Personalized Medicine and Genomics into Primary Care

In the not-too-distant future, it is possible that when patients visit their physicians, they may come with a request for genome sequencing, or provide such data from a third party company with the hope that this information will lead to improved, personalized treatments, or help predict disease risk and outcomes. Personalized medicine is one of the most important applications of genomics and represents a paradigm shift that will likely change routine clinical practice in the next several years.

The positive side to this approach is that physicians and patients may use this information to predict genetic risk for different diseases, or for predicting likelihood of response or experiencing a specific adverse event associated with a specific treatment option. This information may lead to tailored treatments with less adverse effects, or positive changes in harmful life style. However, In order to realize the promise of personalized medicine, there are numerous barriers that have to be overcome.

Barriers include lack of scientific and technological knowledge, lack of public knowledge, challenges with interpretation of genomic data and how individuals will apply these data to daily decision-making. In addition, front-line practitioners may not be ready to receive and interpret this information resulting in situations where important breakthroughs cannot be incorporated into routine clinical care despite the availability of this information.

This study explores barriers among family physicians in a discrete choice experience for the following hypothetical situation: 1) complete sequencing of the human genome is available within an acceptable time and at an acceptable cost; and 2) our knowledge about the association between specific genes and the risk of diseases and treatment responses has improved such that these results can be integrated into routine care.



Biomarkers in Transplantation

CORE has partnered with PROOF (Prevention of Organ Failure Centre of Excellence) to conduct a cost-effectiveness analysis of a PROOF developed biomarker for acute heart rejection in the management of heart transplant patients. The aim of the biomarker is to use a less invasive test to determine whether or not the host patient is accepting the newly transplanted heart.

The goal of this study is to demonstrate the cost-effectiveness of such a biomarker as it compares to the current standard of care: endomyocardial biopsy (EMB). We have constructed a continuous model to capture the experiences of heart transplant patients and to compare their outcomes using the PROOF biomarker with that of the current EMB standard of care. Ideally, this will show that patients' outcomes can be improved, with a cost saving, less invasive follow-up test.

We are very pleased to collaborate with Dr. Carlo Marra and his team at CORE to model and assess the cost effectiveness of molecular biomarker signatures derived from peripheral blood relative to the current standard of care for monitoring immune rejection of transplanted organs and in relation to heart, lung and kidney failure. The initial project focusing on transplant rejection will be an excellent foundation on which to pursue an understanding of the impact of novel and innovative technologies aimed at addressing important healthcare issues. Patient health outcomes are a key concern in this kind of discovery and development work and the CORE team demonstrates an impressive commitment to looking at how patient health outcomes and quality of life can be improved.

Dr. Bruce McManus, Professor, Department of Pathology and Laboratory Medicine, University of British Columbia

Director, Providence Heart + Lung Institute at St. Paul's Hospital

Director, PROOF Centre of Excellence for Commercialization and Research

Director, The James Hogg iCAPTURE Centre for Cardiovascular and Pulmonary Research

SPOTLIGHT ON NEW STAFF

Pamela Joshi

Pamela joined CORE as Research Manager in October 2009. She holds a BSc in psychology and an MSc in epidemiology and biostatistics both from the University of Western Ontario. Pamela has conducted research in a variety of fields including injury prevention and health research. She brings expertise in epidemiology, research methods and project management.

Most recently, Pamela was the project manager for the provincial framework for suicide prevention, intervention and postvention in BC. This stakeholder driven initiative addressed suicide at the systems level and program level in six priority areas.

Currently, Pamela is working on a number of projects at CORE mostly in the area of pharmacy practice research. One of her projects is the evaluation of pharmacy adaptation services in BC. This evaluation examines a variety of stakeholder perspectives (pharmacists, patients and physicians) on pharmacists' expanded scope of practice.

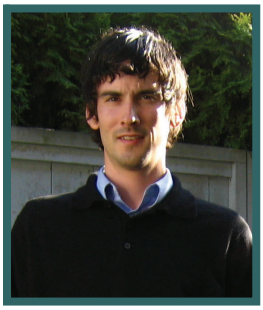
Another project that Pamela is working on is a collaborative practice study examining pharmacist prescribing for uncontrolled asthma among adults. Pamela is very pleased to join the highly productive group of researchers and staff at CORE. She looks forward to working on new and interesting projects in health outcomes research.

Adam Raymakers

Adam joined CORE as a Health Economist in September 2009. He completed his undergraduate studies in Economics at Dalhousie University in Halifax, Nova Scotia.

Adam's graduate training was done at Erasmus University in Rotterdam, the Netherlands where he completed their Health Economics Policy and Law programme. Adam also worked with the Institute for Medical Technology Assessment (iMTA) while at Erasmus working on several projects under Dr. Ken Redekop.

Adam's masters thesis work involved using a Markov model to determine the cost-effectiveness of the use of biomarkers as a surveillance tool for post-treatment bladder cancer patients. This analysis attempted to show that a less invasive test for bladder cancer surveillance was not only less expensive, but also improved patient o utcomes after treatment. This was particularly relevant as bladder cancer is among the most expensive cancers to treat.



Currently, Adam is involved with a number of cost-effectiveness analyses over a wide variety of subjects including heart-transplantation, rheumatoid arthritis, scleroderma, related pulmonary arterial hypertension and HIV. The ability to work on such a range of subjects and constantly upgrading research and analytical methods is particularly attractive to Adam and therefore he is very excited to join CORE.

SPOTLIGHT ON OUR GRADUATING PHD STUDENTS

John Woolcott

John Woolcott joined CORE as a PhD student in 2005. His doctoral research is in the area of falls in the elderly, specifically the care they receive in the emergency department. John received his Bachelor of Arts, Honours, in Economics from Wilfrid Laurier University in 1998 and his Master of Arts in Economics from Carleton University in 2000. Prior to joining CORE John worked as a Health Economist at the Centre for Health Evaluation and Outcome Sciences, and the British Columbia Centre for Disease Control. He has a number of peer reviewed publications and is active in a number of research groups. As well, John has received more than a dozen awards for scholarship, and research, including trainee funding from the Canadian Institutes of Health Research and the Michael Smith Foundation for Health Research. John's main research interests are in the areas outcomes research, health economics, and epidemiology.

With the growing population of elderly persons, falls have been identified as a significant health issue; one area of concern is the care a senior received after the presentation of a fall. Although there exist guidelines for the care to be provided to a senior, previous research by the Centre for Hip Health and Mobility found significant deficits in the care provided to the elderly faller who had presented to the emergency department. For John's PhD thesis he prospectively collected data on seniors presenting to the Vancouver General Hospital Emergency Department as result of a fall. These data allowed John to complete an Operations Research analysis of the care path received by seniors, alongside assessments of cost and identification of current care gaps.

John collected data on 100 fall related emergency department presentations at Vancouver General Hospital. Among his study participants, the most common diagnosis was hip/pelvic fracture, followed by upper body fracture and laceration. In addition, 38 fallers had injuries requiring hospital admission, with an average length of stay of 39 days. John found that less than 50% of fallers received care which would meet the recommended care for a senior presenting to the emergency department. As well it was estimated that mean cost of **one** fall causing emergency department presentation was $11,408. Extrapolating these data to the full population of seniors presenting to the Vancouver General Hospital Emergency Department gave an estimated total cost of senior falls of greater than $16.9 million. This study has been published in *The Archives of Internal Medicine.*

John also completed a meta-analysis examining the association of medications with falling. For this study, Bayesian methods were used to allow for combining the results of the previous meta-analysis with new information to estimate updated Bayesian odds ratios. From this study it was found that sedatives/hypnotics, antidepressants, and benzodiazepines demonstrated a significant association with falls in elderly people.

John's research is a significant contribution in the area of falls research identifying areas of risk, care gaps, and costs. Upon completing his PhD, John will continue working in the area of health research as a manager of Health Economics and Outcomes Research at Pfizer Canada Incorporated.

Na Guo

Na received her MD degree from Shandong University (China) and a Master of Public Health in Clinical Epidemiology from University of Alberta (Edmonton, Canada). Na started her PhD studies in Faculty of Pharmaceutical Sciences at University of British Columbia in September of 2006 under the supervision of Drs. Carlo Marra and Fawziah Marra.

Part of Na's dissertation project compared quality of life status between patients with active tuberculosis (TB) and those with latent TB infection (LBTI) using a variety of quality of life measures (SF-36, SF-6D, HUI-2, HUI-3). In comparison to those with LBTI, active TB patients had significantly lower scores on all scales.

Na also examined quality of life among active TB patients on anti-TB treatment. Although effective, the anti-TB treatment is associated with significant and serious side effects, which could diminish patients' quality of life and lead to treatment non-adherence and treatment failure. An important finding from this study was that patients' self-reported quality of life was associated with the possibility of developing side effects during the subsequent treatment. This study is to be published in the *European Respiratory Journal*, and these findings could help inform health care management to improve quality of care .

Na's current project involves the application of discrete choice experiments (DCEs) to estimate preferences for preventive treatment in terms of treatment length, treatment effectiveness, risk of side effects and the frequency of clinic visits during the treatment period. Estimates revealed that respondents were averse to higher risk of developing active TB, higher risk of developing liver damage, skin rash and fatigue, and longer period of treatment. In terms of frequency of clinic visits, respondents showed significant positive preferences for monthly clinic visits compared to no clinic visits.

Latent class analysis suggested that three different classes existed in the sample and five socio-demographic variables (i.e., the origin of birth, having children or not, education level, employment status, whether on over-the-counter medications) could significantly influence class membership. The class probabilities indicated that 1) 47% of respondents were members of class 1 who placed highest value on frequency of clinic visit and risk of developing active TB; (2) 32% were assigned in class 2 where risk of liver damage was the most important factor when making the therapeutic decision; (3) 21% were members in class three, where risk of developing active TB was considered most important. The risk of skin rash, the risk of fatigue and the length of treatment were the least important factors when respondents make the therapeutic decision in all three classes.

Na plans to complete her PhD by October, 2010, and plans to work in the pharmaceutical industry after graduation.

Jennifer Faddegon (nee Davis)

Jennifer is currently in the final year of her PhD studies under the combined supervision of Dr Carlo Marra and Dr Karim Khan. Jennifer's contribution during her PhD was to add the power of health economics instruments such as the EQ-5D to clinical outcome measures that were being used to assess health related quality of life in specific senior clinical populations. Her specific PhD thesis aims were to: 1) determine which falls prevention strategies provided the best value for money, 2) estimate internationally, the cost of falls, 3) conduct an economic evaluation alongside a randomized controlled trial 4) determine key clinical outcomes that predict healthcare resource utilization and 5) determine key clinical outcomes that predict changes in health related quality of life. Jennifer focused on quantifying the differences in health related quality of life based on a comparison between the SF-6D and the EQ-5D.

Focusing specifically on Jennifer's two recently published systematic reviews (*Osteoporosis International* 2010, *British Journal of Sports Medicine* 2010) from her PhD thesis, her research provides a comprehensive quantification of the world-wide cost of falls in community dwelling seniors. To date, falls has been largely devoid of any form of economic enquiry. This research demonstrated that the cost of fall related injuries are in the order of magnitude of hundreds of thousands of Canadian dollars, whereas pro rata these estimates should be in the millions of dollars per year (UK estimate £981 million in 2000 and US estimates billions of US dollars in 2000). This paper highlights that discrepancies in international cost of falls estimates are likely due to different methodologies and quality of included studies, Jennifer developed a list of categories that should be reported in cost of falls studies. To our knowledge, this was the first cost of falls systematic review that designed a method for detailing cost items and that categorized these estimates by geography and design of each study.

Jennifer's cost of falls study provides a benchmark for future cost of illness (falls) studies by detailing key economic components for conducting, reporting and estimating the cost of falls.

Jennifer's research has provided important data which, when managed effectively, should contribute to influencing policy. Jennifer plans to further her health economics training through a post doctoral fellowship investigating the value for money of patient reported outcome measures (PROMs). Jennifer will investigate PROMs at three levels – that of i) the patient, ii) health care professionals and iii) policy makers involved.

This three-level assessment of PROMs will identify patient needs and assess gaps in quality of care. This trajectory builds on her previous clinical research experience (MSc study in hip fracture patients) and her PhD applied health economics training which focused on specific clinical populations (e.g., seniors at high risk of falls). She will engage those groups with PROMs with the goal of determining the potential benefit of the routine use of PROMs among specific populations.

GRADUATE STUDENTS AND TRAINEES

Post-doctoral Fellow

Dr. Kelly Grindrod

Doctor of Philosophy (PhD) Candidates and Students

Mehdi Najafzadeh

Dr. Mohsen Sadatsafavi

Master of Science (MSc) Students

Katie Sweeney

Belinda Chen

Myra Wang

Natalie McCormick

Pharmacy Undergraduate Student Research Assistants

Alana Isakovic

Congratulations to the following students on their successful thesis defense:

Bridgette Oteng (MSc)

Camila Guimares (PhD)

Dr. Kelly Grindrod (MSc)

GRANTS AWARDED IN 2009

Funding Source	Project Title	Funding Period
AllerGen Network Centers of Excellence	Platform for Outcomes Research and Translation in Asthma and aLlergy (PORTAL)	2009 - 2012
AllerGen Network Centers of Excellence	Consumer Preferences for Allergen Food Labeling	2009 - 2010
Canadian Institutes of Health Research	Effects of Prescription Adaptation and Renewal by Pharmacists	2009 - 2012
British Columbia Pharmacy Association	Evaluation of Pharmacy Adaptation Services in British Columbia	2009 - 2010
United States Centers for Disease Control and Prevention (PEPFAR Program)	Cost -effectiveness Analysis of the HAART Cell Phone Adherence Trial (WelTel)	2009 - 2010
PROOF	Cost-effectiveness of a New Biomarker for Rejection in Heart Transplant	2009 - 2010
British Columbia Mental Health and Addictions Services	CBT vs. Pharmacotherapy for Depression: A Cost-effectiveness Analysis	2009 - 2010
British Columbia Clinical Genomics Network	Understanding the Barriers Among Primary Care Practitioners in the Uptake of Genomic Information	2009 - 2010
Pharmaglyph	Randomized Controlled Trial: Pharmaglyph-Enhanced Counselling in HIV and Transplantation	2009 - 2010
Canadian Institutes of Health Research	Planning and Development in Mental Health and Addiction in the Workplace	2009 - 2010

PUBLICATIONS AND PRESENTATIONS IN 2009

Selected Peer Reviewed Publications

Woolcott JC, Richardson KJ, Wiens MO, Patel B, Marin J, Khan KM, Marra CA. Meta-analysis of the impact of 9 medication classes on falls in elderly persons. *Arch Intern Med*. 2009 Nov 23;169(21):1952-60. Review.

Finckh A, Bansback N, Marra CA, Anis AH, Michaud K, Lubin S, White M, Sizto S, Liang MH. Treatment of very early rheumatoid arthritis with symptomatic therapy, disease-modifying antirheumatic drugs, or biologic agents: a cost-effectiveness analysis. *Ann Intern Med*. 2009 Nov 3;151(9):612-21.

Najafzadeh M, Marra CA, Galanis E, Patrick D. Cost-effectiveness of Herpes Zoster Vaccine in Canada. *Pharmacoeconomics*. 2009;27(12):991-1004.

Makela NL, Birch PH, Friedman JM, Marra CA. Parental perceived value of a diagnosis for intellectual disability (ID): A qualitative comparison of families with and without a diagnosis for their child's ID. *Am J Med Genet A*. 2009 Nov;149A(11):2393-402.

Rosenthal M, Grindrod KA, Lynd LD, Marra CA, Bougher D, Wilgosh C, Tsuyuki R. Pharmacist perspectives on providing chronic disease management services in the community (Part 2): Development & Implementation. *Can Pharm J* 2009 Nov/Dec;142(6): 284-288.

Grindrod KA, Rosenthal M, Lynd LD, Marra CA, Bougher D, Wilgosh C, Tsuyuki R. Pharmacist perspectives on providing chronic disease management services in the community (Part 1): Current Practice Environment. *Can Pharm J* 2009 Sept/Oct;142(5): 234-39.

Guimarães C, Marra CA, Colley L, Gill S, Simpson S, Meneilly G, Queiroz RH, Lynd LD. Socioeconomic differences in preferences and willingness-to-pay for insulin delivery systems in type 1 and type 2 diabetes. *Diabetes Technol Ther*. 2009 Sep;11(9):567-73.

Sadatsafavi M, Marra CA, Ayas NT, Stradling J, Fleetham J. Cost-effectiveness of oral appliances in the treatment of obstructive sleep apnoea-hypopnoea. *Sleep Breath*. 2009 Aug;13(3):241-52.

Guimaraes C, Marra CA, Simpson SH, Meneilly GS, Queiroz RHC, Lynd LD. A valuation of patients' willingness-to-pay for insulin delivery in diabetes. *Int J Technol Assess Health Care*. 2009; 25(3):1-8.

Tsang R, Colley L, Lynd LD. Inadequate statistical power to detect clinically significant differences in adverse events rates in randomized controlled trials. *J Clin Epi* 2009 Jun;62(6):609-16.

Regier DA, Friedman JM, Makela N, Ryan M, Marra CA. Valuing the benefit of diagnostic testing for genetic causes of idiopathic developmental disability: willingness to pay from families of affected children. *Clin Genet*. 2009 Jun;75(6):514-21.

Bahadori K, Doyle-Waters MM, Marra CA, Lynd LD, Alasaly K, Swiston J, FitzGerald JM. Economic burden of asthma: a systematic review. *BMC Pulm Med.* 2009 May 19;9:24.

Regier DA, Ryan M, Phimister E, Marra CA. Bayesian and classical estimation of mixed logit: An application to genetic testing. *J Health Econ*. 2009 May;28(3):598-610.

Selected Peer Reviewed Publications Continued

Fitzgerald JM, Marra CA. The challenge of making cost-effective asthma therapy available. *Int J Tuberc Lung Dis.* 2009 May;13(5):545.

Marra CA, Ogilvie G, Gastonguay L, Colley L, Taylor D, Marra F. Patients With Genital Warts Have a Decreased Quality of Life. *Sex Transm Dis*. 2009 Apr;36 (4):258-60.

Marra F, Oglivie G, Colley L, Kliewer E, Marra CA. Epidemiology and Costs Associated with Genital Warts in Canada. *Sex Transm Infect*. 2009 Apr;85(2):111-5.

Marra F, Marra CA, Richardson K, Lynd LD, Kozyrskyj A, Patrick DM, Bowie WR, Fitzgerald JM. Antibiotic use in children is associated with increased risk of asthma. *Pediatrics*. 2009 Mar;123(3):1003-10.

Bansback N, Marra CA. Now that we know what's BeSt, what is good value for the money? *Arthritis Rheum*. 2009 Mar 15;61(3):289-90.

Marra F, Cloutier K, Oteng B, Marra CA, Ogilvie G. Effectiveness and cost effectiveness of human papillomavirus vaccine: a systematic review. *Pharmacoeconomics*. 2009;27(2):127-47.

Bansback N, Marra CA, Finckh A, Anis A. The economics of treatment in early rheumatoid arthritis. *Best Pract Res Clin Rheumatol*. 2009 Feb;23(1):83-92.

Guo N, Marra F, Marra CA. Measuring health-related quality of life in tuberculosis: a systematic review. *Health Qual Life Outcomes*. 2009 Feb 18;7:14.

Selected Presentations

Lynd LD. Platform for Outcomes Research and Translation in Asthma and Allergy. Allergen Network Wide Research Workshop. Toronto, Ontario, December 18, 2009.

Marra CA. Social & Economic Considerations: Taking Biomarkers from Discovery to the Clinic. CIHR Biomarkers for Precision Medicine Initiative (BPMI) Workshop. Toronto, Ontario, November 19, 2009.

Marra CA. Health Economics for Pediatricians. BC Pediatric Society Advances in Pediatrics Multidisciplinary Educational Conference. Kelowna, British Columbia, November 7, 2009.

Lynd LD. Incremental net benefit case studies. US FDA/DIA: Assessing benefits and risks of medicinal products in regulatory decisions. Bethesda, Maryland, November 4, 2009

Marra CA. Economic evaluation and falls prevention. Falls Research Day, Centre for Hip Health, Vancouver, British Columbia, July 9, 2009.

Marra CA. Health economics: What value does life sciences research have? 3rd Annual Heart, Lung and Blood Research & Education FEST, Wall Centre Hotel, Vancouver, British Columbia, March 10, 2009.

Marra CA. Antibiotic use in children is associated with increased risk of asthma. Respiratory Research Rounds, Diamond Health Centre, Vancouver, British Columbia, February 2009.

Selected Conference Abstracts

Marra CA, Cibere J, Tsuyuki R, Esdaile J, Gastonguay L, Colley L, Oteng B, Embley P, Soon J, Khan K, Li LC. Pharmacist Initiated Intervention Trial in Osteoarthritis (PhIT-OA): Results of a Randomized Multidisciplinary Intervention for Knee Osteoarthritis. Canadian Arthritis Network 2009 Annual Scientific Conference, Vancouver, British Columbia. November 19-21, 2009,

Davis JC, Marra CA, Robertson CM, Khan KM, Najafzadeh M, Ashe MC, Liu-Ambrose T. Economic evaluation of dose-response resistance training in older women: a cost effectiveness and cost utility analysis. Experimental Medicine Student Research Day. Vanouver, British Columbia, November 5, 2009.

Najafzadeh M, Marra CA, Lynd LD, Sadastsafavi M, Sin DD. Economic value of potential biomarker for chronic obstructive pulmonary disease. Society for Medical Decision Making 31st Annual Meeting. Hollywood, California, October 18 – 21, 2009.

Lynd LD, Marra CA, Grubisic M, Colley L. Using density plots to illustrate preference heterogeneity derived using a mixed logit model of discrete choice data. Society for Medical Decision Making 31st Annual Meeting. Hollywood, California, October 18 – 21, 2009.

Sadatsafavi M, Marra CA, Lynd LD, Marra F, Liu J, Mendoza O, Tan M, Elwood K, FitzGerald JM. Benefit-risk analysis of isoniazid (INH) for treatment of latent class tuberculosis. Society for Medical Decision Making 31st Annual Meeting. Hollywood, California, October 18 – 21, 2009.

Oteng B, Marra F, Lynd LD, Marra CA. Societal preferences for the quadrivalent versus bivalent human papillomavirus vaccine. Health Technology Assessment International 6th Annual Meeting. Singapore, June 21-24, 2009.

Woolcott JC, Khan KM, Abu Laban RB, Sobolev B, Marra CA. Emergency department experiences of senior fallers: an operations research analysis. Joint Meeting of the Canadian Operations Research Society – Institute for Operations Research and Management Sciences. Toronto, Ontario, June 14 – 17, 2009. (podium presentation)

Marra F, Marra CA, Richardson K, Lynd LD, Fitzgerald JM. What is the magnitude and pattern of antibiotic consumption in asthmatic children? American Thoracic Society, San Diego, California, May 18 - 24, 2009.

Guo N, Marra F, Marra CA. The impact of adverse drug reactions associated with anti-tuberculosis medications on health-related quality of life. International Society for Pharmacoeconomics and Outcomes Research (ISPOR) 14th Annual International Meeting, Orlando, Florida, May 16-20, 2009.

Oteng B, Marra CA, Lynd LD, Marra F. Societal preferences for the Human Papillomavirus vaccine. International Society for Pharmacoeconomics and Outcomes Research (ISPOR) 14th Annual International Meeting, Orlando, Florida, May 16-20, 2009.

Woolcott JC, Khan KM, Abu-Laban RB, Lillies B, Marra CA. Emergency Department Experiences of Senior Fallers: An Operations Research Analysis. Canadian Association for Population Therapeutics Annual Conference, Montreal, QC. April 19-21, 2009. (poster) Abstract published in Can J Clin Pharmacol Vol 16(1) Winter 2009:e202-2233.

Grindrod K, Colley L, Marra CA, Lynd LD, Koehoorn M. Factors associated with taking antihypertensives: A population-based cross-sectional study of hypertensive individuals in the Canadian Community Health Survey. Canadian Association for Population Therapeutics Annual Conference, Montreal, Quebec, April 19-21, 2009.

Selected Conference Abstracts Continued

Sweeney K, Lynd LD, Marra CA, Kendall R, Li L. Differences in health related quality of life following total and unicompartmental knee arthroplasty. Canadian Agency for Drugs and Technologies in Health 2009 Symposium. Ottawa, Ontario, April 5-7, 2009. (Awarded best poster)

Oteng B, Marra CA, Lynd LD, Ogilvie G, Patrick DM, Marra F. Evaluating societal preferences for the Human Papillomavirus vaccines using discrete choice experiment. Canadian Agency for Drugs and Technologies in Health 2009 Symposium. Ottawa, Ontario, April 5-7, 2009.

Grindrod K, Marra CA, Tsuyuki R, Lynd LD. Expanded scope of practice: What do pharmacists want? Vancouver Coastal Health Research Institute, Celebrate Research Week. Vancouver, British Columbia, March 2009.

Grindrod K, Colley L, Marra CA, Lynd LD, Koehoorn M. Factors associated with taking antihypertensives: A population-based cross-sectional study of hypertensive individuals in the Canadian Community Health Survey. Vancouver Coastal Health Research Institute, Celebrate Research Week. Vancouver, British Columbia, March 2009.

Oteng B, Marra CA, Lynd LD, Ogilvie G, Patrick D, Marra F. Evaluating Societal Preferences for the Human Papillomavirus Vaccines Using Discrete Choice Experiment. The Second Conjoint Analysis in Healthcare Conference, Delray Beach, Florida, March 24-26, 2009.

Lynd LD, FitzGerald JM, Colley L, Soon JA. Establishing patients' preference weights for GINA criteria of asthma control using a discrete choice experiment. The Second Conjoint Analysis in Healthcare Conference, Delray Beach, Florida, March 24-26, 2009.

Marra F, Colley L, Marra CA, Elwood K, Fitzgerald JM. Measuring sensitivity and specificity of interferon gamma release assays using latent class analysis. 13th Annual Meeting of the IUATLD, Vancouver, British Columbia, February 26-29, 2009.

Guo N, Marra F, Marra CA. Measuring health related quality of life in tuberculosis: A systematic review. 13th Annual Meeting of the IUATLD, Vancouver, British Columbia, February 26-29, 2009.

Guo N, Marra F, Fitzgerald JM, Elwood RK, Marra CA. The impact of antituberculosis adverse drug reactions on health-related quality of life: a longitudinal analysis. 13th Annual Meeting of the IUATLD, Vancouver, British Columbia, February 26-29, 2009.