Advancing Safe Medication Delivery in Community Pharmacies: A Tri-Nation Meeting Report

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INTRODUCTION

In 2020, the Canadian Institutes of Health Research (CIHR) funded a proposed meeting entitled the *Advancing Safe Medication Delivery in Canadian Community Pharmacies Workshop*. Though originally planned for Spring 2021, the COVID-19 pandemic required the workshop to be rescheduled to June 7 – 8, 2022. Facilitated by Queen's University and hosted in Glasgow, United Kingdom (UK) by the National Health Service: Education for Scotland, the hybrid in-person and virtual workshop brought together 22 pharmacy leaders, researchers, and patient partners from across Canada, United States, and the UK. Participants were provided an opportunity to systematically examine and discuss the use of existing electronic data sources for the identification of ways to advance the safe delivery of medications in community pharmacies.

Through a group consensus approach, meeting participants considered background research as well as a series of presentations and discussions to develop future research priorities. As community pharmacy practice becomes more complex, these future research priorities aim to build upon existing resources to ensure a future that fosters a safe and effective medication-use system for both patients and health professionals.

MEETING PRESENTATIONS AND PRIORITIES

SESSION ONE: WEDNESDAY, JUNE 7TH, 2022

To set the foundation for the workshop, participants from Queen's University and Dalhousie University completed a background report to guide group discussions. Their research, entitled *Understanding the Current State of Medication Incident Reporting Databases for Canadian Community Pharmacies and the Community Setting,* identified several key findings surrounding the importance of a safe and effective medication-use system:

- A significant component for advancing safe medication delivery hinges on Medication Incident (MI) reporting; however, there is **no clear outline of the current MI reporting landscape in Canadian research literature**.

- Creating an outline requires an in-depth understanding of one of MI reporting's foundational components – the existing databases existing at the federal and provincial levels that capture MIs in community pharmacies.

- Upon close examination, it is apparent that there is **considerable variation in continuous quality improvement (CQI) programs and MI reporting requirements for community pharmacies across Canada.**

- At all levels (provincial, federal, and professional), MI reporting systems are disjointed and unconnected, **which significantly hinders efforts to assess and advance medication safety in Canada.**

- **A clear need exists for standardizing CQI programs and MI reporting requirements**. Without such advances, medication incident reporting practices will remain disjointed, and efforts to assess and advance medication safety will remain limited.

The authors recommended that Canada should report incidents to one national database. In doing so, independent experts could analyze incident reports from all provinces and territories, formulate recommendations, and disseminate findings to community pharmacies across Canada. Further, routine sharing of aggregate data assessed by independent analysts would foster benchmarking and shared learning across the country, and ultimately, advance the safety of the medication-use system. In addition, what is needed is to link MI data and research to practical application. Without such advances, MI reporting practices will remain disjointed, and efforts to assess and optimize a safe medication-use system in community pharmacies will remain limited.

During Session One, participants listened to several presentations that were given to help bridge the research gaps identified in the background report and evoke reflection about future priorities areas in the field of medication safety. These presentations included findings from a community pharmacy based scoping review by Dr. Kim Sears, an overview of existing MI and continuous quality improvement (CQI) practices in the Canadian context from Dr. Neil MacKinnon and in the American context by Dr. Ana Hincapie, a research demonstration by Ehsan Etezad and Dr. Jim Barker, and finally insights into learning from incident reporting by Dr. Andrew Carson-Stevens, Laura Pozzobon, and Paul Bowie.

Dr. Kim Sears, Queen's University, Canada, began the workshop with an overview of existing MI reporting practices in Canada. Research found that pharmacists rely on regulatory bodies and professional association websites and emails as their primary source of information, yet corporate employers were found to offer better resources for communicating both internal and regulator policies to their pharmacists. When considering changes to the scope of practice, pharmacists were either unaware of where to find or did not understand available information.

Dr. Neil MacKinnon, Augusta University, USA, focused his presentation on the Canadian experience of medication safety and quality improvement in community pharmacies.

He presentation championed the progress made in MI reporting and patient safety broadly, but highlighted the on-going work required within the field. While Canada has witnessed a dramatic uptake in CQI requirements for community pharmacy over the past decade, there is an urgency to understand causal risk factors such as of pharmacist workload or stress. Further, Dr. Ana Hincapie, University of Cincinnati, presented the American experience of medication safety and quality improvement in community pharmacies. In a similar vein, research determined that only16 out of 50 states implemented MI reporting practices or CQI requirements for community pharmacies, and, even among these 16 states, most lacked a robust framework to tangibly improve patient safety or to determine the root cause of MIs.

Ehsan Etezad, St. Mary's University, Canada, and Dr. Jim Barker, Dalhousie University, Canada, shifted the focus of presentations to barriers impeding reporting. Their research highlighted that mental health is the most prevalent factor impacting risk and error in community pharmacy practice. Pharmacy professionals must manage multiple responsibilities that can drastically impact their mental health, directly affecting their ability to perform workplace duties.

Several presentations focused on learning from and utilizing MI reporting. Laura Pozzobon, Queen's University, Canada, and Dr. Andrew Carson-Stevens, Cardiff University, UK, considered how to use the data from reported incidents to identify priorities and actions within the field. Research determined that a deeper understanding of contributing incident factors through coding and an exploration of semantic relationships and thematic analysis are required to fully utilize existing data. Paul Bowie, National Health Service, UK, discussed MI reporting through the lens of a systems analysis. The presentation emphasized the need to seek multiple perspectives when attempting to understand system safety as MIs are caused by multiple,

interacting contributory factors from across the care system. Any changes or recommendations for improvement to existing reporting systems should focus on systemic change and redesign, rather than individual performance.

Session One also had participants engage in a facilitated roundtable discussion aimed at providing an overview of relevant medication safety related activities in Canada, United States, UK, and other international jurisdictions. Three core questions were used to prompt this discussion:

1. After hearing the overview of North America, what global activities surrounding medication safety and quality Improvement in community pharmacy are you aware of?

2. Do you consider these to be strengthening existing practices or maintaining the status quo?

3. How are medication safety data sources being utilized and what are the tangible impacts on patient safety?

Workshop participants touched upon several common themes:

Professional Responsibilities

Concerns surrounding mounting professional responsibilities of pharmacists, particularly in a post-COVID environment, framed most discussions. Pharmacists face rapidly expanding, complex work environments, which can dramatically influence the impact of error due to an increased potential for mistakes. While expanding the scope of practice for community pharmacists adds more care to patients, there is professional resistance as it introduces many levels of error or stress.

Barriers Impacting Regulatory Change

From a regulatory standpoint, implementing change to the scope of professional practice is a slow process. Decision-making requires balancing many competing interests. Importantly, across healthcare fields, attention must be placed on policy accessibility and comprehension. Rules and regulations lack of consistency, both in how information is presented and how professional can access these documents.

Risk Factors

Beyond the impact on the safety of the medication-use system, changes to the scope of practice within community pharmacies creates a risk-based ripple effect. Pharmacy professionals are hesitant to engage in additional workload until there is a clear outline of liability. In the absence of such, there is an increased risk to the individual. Further, creating a more complex work environment without adequate regulation or compensation has a negative

impact on job satisfaction and fulfilment. Risk increases if professionals are unsatisfied with their roles; discontent potentially leads to more errors, which impacts patient safety. While there are anecdotal examples of risk mitigation, there is no metric to evaluate the risks of new programs and innovation.

Staffing Shortages

Additions to the scope of practice requires additional time and resources; however, staffing shortages existed even prior to the COVID-19 pandemic. While some jurisdictions have implemented technological advancements (i.e., robotics), this is not yet feasible in most community pharmacies. There is pressure on community pharmacy staff to work excessive hours due to staffing levels, which has the potential to led to additional shortages due to burnout. In many cases, pharmacy technicians are an untapped resource. Their skillsets should be leveraged to mitigate the increased scope of practice, allowing community pharmacists to engage in the newly emerging clinical roles.

Cost Factors

Engaging in new safety measures and new clinical responsibilities is a costly endeavor, both in terms of time and structural implementation. Though some solutions exist, cost mitigation requires government intervention. In Scotland, through NHS subsidization, community pharmacists are compensated to prescribe and deprescribe medications. Further, some community pharmacists can claim a financial incentive to take part in quality improvement activities, particularly surrounding medication safety. Throughout the UK, family physician practices are considered private businesses and are funded by the NHS. Many of these family physician practices operate several locations. Often a single pharmacist is hired to work across multiple locations because there is benefit to the overall business. In this case, pharmacists produce better outcomes for patients and reduce the workload of doctors, creating cost savings in several areas.

Patient Trust

As the clinical scope of practice expands within community pharmacy, the impact on patients must be considered. In a hospital setting, it is a standard practice for pharmacists to fix or modify the prescribing errors of doctors. As training increases, community pharmacists are beginning to mirror these hospital standards. Patients now have a better relationship with community pharmacists than their family doctor due to access, time, knowledge, and customer service skills. This positive relationship directly effects overall patient safety.

Root Case Analysis

There is an increasing concern with the use of root cause analysis when considering CQIs and MI reporting. Industry and pharmacy professionals are wary of reporting due to the risk of

weaponization or placing the onus of blame on individuals. The Patient Safety Institute Reporting Framework (PSIRF) discourages the use of root cause analysis. While it's important to look at what is going on in the background, the idea that one root cause produced an error is not beneficial to reducing harm; however, these opinions are not shared unanimously across the field. Utilizing root cause analysis allows an individual to understand complex workforces and embrace human factors.

It is evident that the current system requires monitoring or adaption to ensure it is tangibly reducing harm while simultaneously allowing the lay person to learn what will stop incidents from happening to patients. Without adaptions to the root cause analysis model, it is difficult to see why individuals would participate in these safety practices.

The identification of themes led to an open discussion by workshop participants on priorities that could advance the field and improve outcomes in the profession. These discussions set a foundation for Session Two and the next phase: Setting Future Research Priority Areas.

Setting Future Research Priority Areas

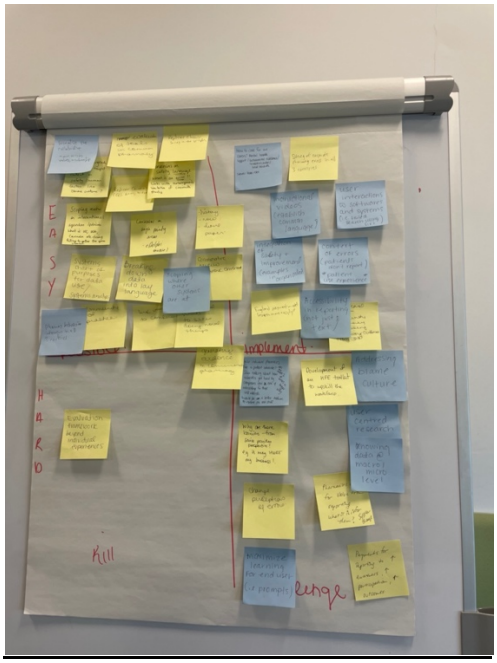
Session Two: Thursday, June 8th, 2022

Session Two of the workshop focused on creating research projects, goals, and areas based on the theme identified during Session One.

To provide context for this strategic planning session, the facilitator presented relevant themes in a tiered priority matrix:

- Immediate
- Possible
- Challenging
- Impossible (at the present moment)

As a means to help facilitate the advancement of safe delivery of medications in Canadian community pharmacies, four priority areas emerged from a wide-ranging discussion. Each priority area is followed by a list of future research streams, or projects, that are required to obtain the overall goal of the workshop:



PRIORITY 1 – UTILIZING EXISTING RESOURCES IN THE SHORT-TERM:

Research Stream 1.1

Evaluation of the existing tools actively being used in Canadian community pharmacies to understand the impact of provincial variance. Research will be able to evaluate the positives and negatives of existing electronic data sources in differing jurisdictions.

Research Stream 1.2

Develop a consensus on a safety language (i.e., what is an error). There currently exists a heterogeneity problem, or different causal mechanisms that may relate to the same issues. Consistent language will narrow the scope of contributing factors as there will be no grey area in how to categorize an incident or report.

Research Stream 1.3

Produce an in-depth history of medication-use system safety advancements in Canada, with particularly attention to each individual provincial experience. This history will act as the foundation to map the current landscape more accurately.

Research Stream 1.4

Create a scoping review of international agendas/policies related to existing electronic data sources in community pharmacies. Canadian learning systems will benefit from a catalogue of results, lessons, and improvements in the international domain (i.e., the US or UK). A secondary scoping review may be established to understand the use of electronic data sources outside of formal governance structures (i.e., WHO).

Research Stream 1.5

Engage other researchers/industry professionals to obtain a consensus on high-priority areas. This can be achieved by using the e-Delphi technique, which develops a common viewpoint by using questionnaires to gather information of interest. This technique has been extensively used within health and social science research to strengthen decision-making processes and reach consensus.

Research Stream 1.6

Present electronic data as lay language or create a systems chart of the purposes for data use. Currently, pharmacy professionals are asked to report into several electronic data systems without knowing the purpose or the overall impact on their day-to-day work environment. There is a need to present the purpose of reporting systems in lay language so that more than researchers see the benefits of the process.

Research Stream 1.7

Map existing qualitative interview methods onto pharmacy technicians as most of the research in the Canadian context looks solely at pharmacists. To fully understand the complexity of the

work environment, all members of the pharmacy team must be given a platform to discuss their unique experiences. This will allow for research that fully understands the community of practice, with the potential for a collaborative review on work environment.

PRIORITY 2 – SYSTEMS IMPLEMENTATIONS IN THE SHORT-TERM:

Research Stream 2.1
Map metal health support that exists in other healthcare professions onto community pharmacy. Especially in a post-COVID environment, there is a significant amount of focus on how to care for careers. This requires considering the types of support that exist in primary care settings (i.e., behavioural, incentive, social, or managerial) and the barriers/facilitators for application within the field of pharmacy.

Research Stream 2.2
Building on results that better represent the community of practice, qualitative research should include corporate pharmacy executives. This requires developing a new methodology to accurate capture input from non-healthcare professionals, but these efforts will broaden the scope of pharmacy research into a more interdisciplinary lens.

Research Stream 2.3
Consider user interactions with software and systems beyond error reporting data. For example, extracting tracking failed searches, incomplete forms, or other indicators systematic barriers. By identifying gaps from a user perspective, existing electronic data sources can be improved without placing additional learning responsibilities on the systems users.

Research Stream 2.4
In a similar vein, existing electronic data sources and systems must be considered in the lens of accessibility for reporting purposes. Currently, these interfaces operate with text-based reporting systems, which are inherently ableist. Research is needed on how to expand these systems into a more interactive realm.

Research Stream 2.5
While there is an enormous amount of data on errors that are reported, there is very little context of errors which patients do not report. Utilizing the patient experience to understand why something is not reported could improve patient safety, professional practice, and existing systems.

Research Stream 2.6
Building on suggested scoping reviews, there is a need to integrate safety and improvement systems by using examples from other organizations and jurisdictions.

Research Stream 2.7
As the scope of practice for community pharmacists expands, so should the system of compensation. Research is needed into hybrid payment models. For example, in Scotland, through NHS subsidization, community pharmacists are compensated to prescribe and deprescribe medications. Further, some community pharmacists can claim a financial incentive to take part in quality improvement activities, particularly surrounding the safety of the medication-use system.

PRIORITY 3 – UTILIZING EXISTING RESOURCES IN THE LONG-TERM:

Research Stream 3.1
Map research priorities from healthcare fields as there is a need for individual pharmacies to recruit patient advocates. This would be a better medium to involve patients and professionals, which would humanize error data and potentially boost user engagement with existing data sources and systems.

Research Stream 3.2
Look beyond a root cause analysis and understand why there are barriers from a service provider perspective (i.e., it will hurt business). Existing resources need to be shifted to reflect the worries of systems users, which will change perceptions of errors and mitigate the tangible fears of blame culture.

Research Stream 3.3
Once there is a lay language foundation of error data, research must focus on maximizing learning for end-users (i.e., instructional videos, teaching and learning programs, and prompts). If pharmacists know the value of reporting, or what is in it for them from a system change perspective, uptake of existing electronic data sources and systems will be positively impacted.

Research Stream 3.4
Apply research on hybrid payment models, a realistic adaption for the Canadian system that must be developed that simultaneously increases awareness, participation, and outcomes for reporting systems.

PRIORITY 4 – SYSTEMS IMPLEMENTATIONS IN THE LONG-TERM

Research Stream 4
There is a need for research to focus on an evaluation framework of existing error reporting systems beyond individual experiences of the end-user. Research would focus on the uptake of error data sources in a decision-making lens or understanding the power relationships in complex healthcare policy environments.

NEXT STEPS

The facilitators of this workshop would like to thank everyone involved in this important collaborative initiative, including our patient partners, researchers, trainees, decision-makers, and pharmacy professionals.

As this workshop was funded by the Canadian Institutes of Health Research, this outcomes report will be supplemental any final grant reporting as well as the future research identified by the workshop participants. Updates on the research streams will be gathered annually.

If you have any questions or comments about this report, or if you would like to receive email communications and be included in further collaborations and updates about the research streams, please contact Dr. Kim Sears at searsk@queensu.ca.

APPENDIX ONE: WORKSHOP AGENDA

DAY 1 AGENDA: **Current Landscape** **Facilitator: Dr. Kim Sears**	**DAY 2 AGENDA:** **Future Research** **Facilitator: Dr. Kim Sears**
1. Welcome/Introductions/Logistics (i.e., accommodations)	1. Welcome/New Introductions /Review Agenda
2. Review of Agenda: a. Current landscape in community pharmacy practice b. Discussion of background paper	2. Main Themes/ Brief Discussion from Day 1
3. Nutrition Break	3. Nutrition Break
4. SPOR Scoping Review: a. Summary of key findings b. Knowledge gaps c. Discussion	4. Presentation: *TRC Pharmapod Patient Safety Platform*
5. Medication Safety and Quality Improvement in Community Pharmacy: Canada	5. Lunch (~12:00 PM)
6. Medication Safety and Quality Improvement in Community Pharmacy: Canadian Community Pharmacy Survey	6. Medication Safety and Quality Improvement in Community Pharmacy: Making Meaning Out of Incident Reporting Data
7. Discussion	7. Facilitated Roundtable Discussion: Establishing Future Research Strategy & Priorities
8. Lunch (~12:15 PM)	8. Identify Research Opportunities: a. Chart viability b. Using existing data resources c. Using potential and existing research collaborations
9. Medication Safety and Quality Improvement in Community Pharmacy: US Background	9. Nutrition Break
10. Facilitated Roundtable Discussion: Overview of relevant activities in Nova Scotia, Ontario, and Canada	10. Facilitated Priority Setting Session: a. Identify criteria for priority setting (e.g., availability of data, relevance to decision makers, etc.) b. Establish top three research priorities c. Identify 1-2 specific projects for short- to medium-term development and implementation d. Establish timeline for next steps
11. Nutrition Break	11. Concluding Summary
12. Development Preliminary Overview of Current Landscape: a. Determine existing strengths b. Identify needed resources, additional collaborators, and critical success factors	*Post-Workshop: Survey and Course Evaluation (via email)*
13. Summary of Meeting: a. Deliverables for participants b. Agenda for day two	

APPENDIX TWO: WORKSHOP PARTICIPANTS

In-Person, Grant Applicants

Kim Sears, Queen's University:
Dr. Kim Sears is a Professor at Queen's University. Dr. Sears has over twenty years' experience as a nurse, primarily focused in neonatal intensive care units. Further she has over twenty years of teaching experience primarily in the area of health quality. Throughout her teaching experience she has been primarily involved in the area of quality and safety in healthcare. She is familiar with the e-learning environment, distance learning, virtual clinical excursions (VCEs) and simulation. Dr. Sears led the advancement of health quality education globally and has created innovate programs focused on quality, risk and safety at both the graduate and undergraduate levels. Dr. Sears conducts an active program of research in health services with a focus on advancing quality care, reducing risk and improving patient safety. The majority of her work focuses on furthering the quality and safety of medication delivery.

Neil MacKinnon, Augusta University:
Dr. Neil MacKinnon is Provost and Executive Vice President for Academic Affairs at Augusta University in Augusta, Georgia. In that capacity, he serves as the Chief Academic Officer of the university. He also serves on the board of AU Health. Prior to his current position, he was Dean of the James L Winkle College of Pharmacy at the University of Cincinnati. He was Director of the State Office of Rural Health for Arizona and a Professor at the Mel and Enid Zuckerman College of Public Health at the University of Arizona. He was also Professor and Associate Director for Research at the College of Pharmacy at Dalhousie University in Nova Scotia, Canada. A pharmacist, Provost MacKinnon has practiced in both the community and hospital settings. He is a fellow and a past president of the Canadian Society of Hospital Pharmacists. In 2010, he co-authored a national bestselling book in Canada with a primary care physician called *Take As Directed*. In 2018, he was inducted into the National Academies of Practice. As Provost, he maintains an active research program in health policy with over 190 publications and 300 presentations to date.

In-Person Participants

Sam Belbin, London School of Hygiene & Tropical Medicine and the London School of Economics & Political Science
Sam completed her Bachelor of Science in Nursing and Bachelor of Arts in Economics at Queen's University, before beginning her current Master of Science program of Health Policy, Planning, and Financing at LSHTM and LSE. Sam worked as a Registered Nurse in the Intensive Care Unit in both Kingston, Ontario and Abbotsford, British Columbia. Through working with patients at the bedside and researching health disparities faced by marginalized communities in various countries, her main area of interest is utilizing the social determinants of health to affect policy change.

Paul Bowie, NHS Education for Scotland:
Professor Paul Bowie is a Chartered Ergonomist and Human Factors specialist, safety scientist and medical educator with NHS Education for Scotland based in Glasgow, where he is Programme Director (Safety & Improvement) and Director of the Safety, Skills, and Improvement Research Collaborative (SKIRC). He has worked in the National Health Service in Scotland for over 25 years in a range of quality and safety advisory roles. He has published over 110 papers on healthcare quality and safety in international peer-reviewed journals and co-edited a book on safety and improvement in primary care. Paul is also Honorary Professor and a PhD supervisor/examiner in the Institute of Health and Wellbeing at the University of Glasgow. He is Honorary Fellows of the Royal College of Physicians of Edinburgh and the Royal College of General Practitioners, and a Registered Member of the UK Chartered Institute of Ergonomics and Human Factors. In his NHS role, he leads on the educational development and implementation of innovative research and evaluation approaches to improving the quality and safety of patient care and the wellbeing of the healthcare workforce, based on systems thinking and human-centred co-design principles and methods.

Don Cairns, Robert Gordon University:
Professor Cairns is the Head School of Pharmacy and Life Sciences, Robert Gordon University and leads the strategic planning, coordination, development and supervision of academic work. Further, he is a Senior Researcher in the Institute for Health and Wellbeing Research. Professor Cairns is a member of the Royal Pharmaceutical Society (RPS), and the Association of Pharmaceutical Scientists. In 2006 he was appointed to the British Pharmacopoeia Commission and serves on an Expert Advisory Group of the Commission on Human Medicines. In 2008, Prof Cairns was appointed as a Fellow of the Royal Society of Chemistry. Further, he has been external examiner at Strathclyde, Liverpool, Aberdeen and Belfast Schools of Pharmacy and has authored over 70 peer reviewed research papers. Professor Cairn's research interests include the Design and synthesis of selective anticancer agents, the molecular modelling of drug and DNA interactions; and the design of prodrugs for the treatment of nephropathic cystinosis.

Andrew Carson Stevens, Cardiff University:
Dr. Carson Stevens is an academic general practitioner and health services researcher leading research and pedagogical advances in how health and social care organisations learn from unsafe care experienced by patients and families. He founded and convenes the Patient Safety Research Group (the 'PISA group') in the Division of Population Medicine, School of Medicine, Cardiff University, supported by NIHR, Health Foundation, THIS Institute, Cancer Research UK, Health, and Care Research Wales. Nationally, Dr. Carson Stevens convenes the Welsh Ergonomics and Safer Patients Alliance, an interdisciplinary group of researchers and clinicians undertaking research and service evaluation to enable innovation and implementation of practices to improve patient safety in healthcare. Further, he is the Wales Primary Care Research Specialty Lead at Health and Care Research Wales and Patient Safety Work Package Lead at the Wales Centre for Primary and Emergency Care Research (PRIME Centre Wales; re-funded 2020-2025, £5.2 Million). On the international stage, Dr. Carson Stevens is the long-standing adviser to the World Health Organization on patient safety and a methodological adviser to the OECD Working Group for Patient-reported Safety Outcomes.

Denham Phipps, University of Manchester:
Dr. Denham Phipps has a background in systems engineering and human factors projects, with an academic focus on occupational psychology and patient safety. He is a researcher/lecturer at the Manchester Pharmacy School and the NIHR Greater Manchester Patient Safety Translational Research Centre. Dr. Phipps works in collaboration with the British Psychological Society, Chartered Institute of Ergonomics and Human Factors, the Health and Care Professions Council and the Higher Education Agency.

Julia Rodgers, Dalhousie University:
Julia Rodgers is a PhD candidate and Part-Time Faculty in Political Science at Dalhousie University. Her research focuses on health policy and provincial governance models, particularly community engagement, patient-oriented practices, and the evaluation of collaborative policy deliberation models through the lens of representation and power. Further, she is a dedicated community advocate who champions people-led research, acting as a lead author on a report hailed as "the most ambitious blueprint in Canada to… reinvest in community services". Julia is the current recipient of the CIHR/MSSU Student Research Award, the Nova Scotia Graduate Scholarship for Innovative Research, the Building Research for Integrated Primary Healthcare Doctoral Award, and a Junior Fellow with the MacEachen Institute for Public Policy and Governance.

Natalie Weir, University of Strathclyde, Glasgow
Dr. Natalie Weir is a Lecturer at the Strathclyde Institute of Pharmacy and Biomedical Sciences and a practicing community pharmacist. Her mixed-method research focuses on increasing the capacity of the pharmacy profession within primary care, focusing on the development, evaluation and implementation of new roles, services, and technology. Her research in conducted in collaboration with NHS and Scottish Government and has led to high-impact outputs: Patient Safety Care Bundles developed within her PhD were nationally implemented within all Scottish community pharmacies and dispensing doctors in 2018/19. Dr. Weir is currently involved in projects exploring the interface between social care and health care; the impact of COVID-19 on the primary care pharmacy workforce; the impact of ACEi/ARBs on COVID-19 related outcomes; and the role of community pharmacists in cancer screening.

Think Research: Pharmapod, represented by Carla Beaton and Chris Collenette
Since 2006, Think Research has been delivering knowledge-based digital health software solutions that empower clinicians, standardize care, and improve health outcomes. In 2021, the company acquired Pharmapod, a cloud-based platform that enables healthcare providers to easily capture and record medication-related incidents to enhance safety in pharmacies, long-term care, and hospital settings. The platform collects and analyzes critical data from around the world, enabling HCPs to monitor trends and identify causes of medication errors.

Virtual, Grant Applicants

Dr. Benoit Aubert, HEC Montreal:
Dr. Benoit Aubert is a renowned expert on information systems, analytics, risk assessment and risk management in IT implementation. He is a professor at HEC Montréal professor, a Fellow with CIRANO, and a Senior Editor of the Journal of Strategic Information Systems (JSIS). Dr. Aubert was the principal investigator in an extensive research project funded by the Government of Quebec ($1.2 M). This project sought to integrate risk assessments in multiple disciplines (notably health, finance, technology, and environment) in order to provide an integrated risk profile for organizations. In his widely published and highly cited work has investigated complex decisions, for example multinational, vertically integrated corporations like British Petroleum and Adidas.

Dr. James Barker, Dalhousie University:
Dr. Barker's is a professor in the Rowe School of Business at Dalhousie University as well as the Herbert S. Lamb Chair in Business Education, Research Lead for Dalhousie Safe Assured, and a Founding Fellow for the MacEachen Institute for Public Policy & Governance. His research interests include complex organizational behaviour, ethics, and sustainable processes with a particular focus on leadership, safety, change management and stakeholder engagement. His present research focuses on the discovery and implementation of innovative analytic frameworks, risk mitigation techniques, and public policy initiatives that enhance the safety and sustainability of Canadian community pharmacies. In 2020, Dr Barker received the Robert L. Wears Patient Safety Leadership Award, presented by the QSEN Institute to the SafetyNET-Rx Research Team.

Virtual Participants

Brian Addison, Robert Gordon University:
Dr. Brian Addison is the Academic Strategic Lead for Clinical Practice, Master of Pharmacy Course Leader, and Lecturer in Pharmacy Practice in the School of Pharmacy & Life Sciences, Robert Gordon University. Dr. Addison is a pharmacist, a Fellow of the Higher Education Academy of the United Kingdom and a Faculty Fellow of the Faculty of the Royal Pharmaceutical Society. Further, he has a role in postgraduate pharmacy education as a local Postgraduate Pharmacy tutor for NHS Education for Scotland where he organises and delivers training evenings for local pharmacists who work for the NHS in Scotland.

Hamed Aghakhani, Dalhousie University:
Dr. Hamed Aghakhani is an Associate Professor and the Acting Director of the Master of Science (Business) program in the Rowe School of Business at Dalhousie University. Further, he is a member of the Safe Assured research team, a multi-institutional consortium housed at Dalhousie University. Dr. Aghakhani's research program is characterized by two main streams that examine: (1) consumer reactions towards marketplace deception and (2) the effect of social exclusion on consumer's attitude and behaviour.

Scott Cunningham, Robert Gordon University:
Professor Scott Cunningham is the Academic Strategic Lead for Clinical Practice at the School of Pharmacy and Life Sciences, Robert Gordon University. He has the responsibility for professional and academic oversight of the development and delivery of several courses, including Clinical Pharmacy Practice, Clinical Pharmacy Service Development, and Pharmacist Independent Prescribing. At a national level, Professor Cunningham sits on several National Groups addressing Pharmacy Education issues, is an External Examiner at a number of institutions and is past Chair of the Royal Pharmaceutical Society Faculty Accreditation Panel. Internationally, he has links with higher education and healthcare providers in a number of countries developing and delivering collaborative projects related to research and course delivery including Hong Kong, Malaysia, Ghana, Serbia and Montenegro, Switzerland, Oman and Qatar. Professor Cunningham has a particular interest in the development of further international links for research and course delivery.

Vanessa Emery, Augusta University:
Vanessa Emery, MPH is a Research Associate at Augusta University in Augusta, Georgia, USA. She conducts mental health and health services research with the Office of the Provost as well as the Institute of Public and Preventative Health. Her research interests include behavioral health integration, secondary traumatic stress, and rural health.

Ehsan Etezad, Saint Mary's University:
Ehsan Etezad is a PhD student in Organizational Psychology at Saint Mary's University. In collaboration with researchers in the Rowe School of Business School and School of Medicine at Dalhousie University, his research investigates the mental health and well-being of community pharmacy staff across Canada. Recently, their research team surveyed more than 700 community pharmacy professionals across Canada and explored their mental health and occupational well-being and its association with turnover intention, safety behaviors, and patient safety culture.

Chris Hartt, Dalhousie University:
Dr. Christopher Hartt is an Associate Professor in the Department of Business & Social Sciences, Faculty of Agriculture, Dalhousie University and the Team Leader for Agriculture Sustainability Studies for Economic and Social Success. His research focuses on developing new expertise in safety information sharing and the integration of safety initiatives into pharmacy work procedures. Further, Dr. Hartt has expertise in business effectiveness, sustainable agriculture through financial and environmental planning, business history, entrepreneurship, and qualitative research.

Ana Hincapie, University of Cincinnati:
Dr. Hincapie has an established background in medication safety and quality improvement in health care. In addition to her faculty position in the James L. Winkle College of Pharmacy, University of Cincinnati, she is the coordinator for ambulatory pharmacy resources for St. Elizabeth Physicians. She has co-authored two book chapters related to medication safety and quality improvement. Further, Dr. Hincapie teaches in the several programs, including Doctor of

Pharmacy, Pharmacy Leadership, and PhD/MS in Pharmaceutical Sciences-Health Outcomes Track.

Laura Pozzobon, Queen's University:
Laura Pozzobon is a Registered Nurse working as Manager of Quality, Safety and Clinical Adoption at University Health Network. Laura earned her Master of Science in Health Quality and is working towards her Doctor of Philosophy (Health Quality) at Queen's University. Laura is a Certified Health Executive with the Canadian College of Health Leaders and is an Honorary Visiting Research Fellow with Cardiff University's School of Medicine. Laura has extensive experience in patient safety incident analysis, as well as leading organization wide quality improvement initiatives.

Heidi Weigand, Dalhousie University:
Dr. Heidi Weigand, a member of the Safe Assured research team in Dalhousie's Rowe School of Business, focusing on leadership development, communication and resiliency. She studies how leaders manage the balance of positive and negative emotions and the extent to which this practice vicariously affects an innovative mindset in followers. Dr. Weigand and the Safe Assured research team study leadership and quality improvement factors for patient safety practices in dispensing pharmaceutical medication. Dr Weigand and colleagues are extending this research to explore process improvements in quality of health care, particularly in long-term care and home care as a result of the COVID-19 pandemic. Dr. Weigand's work informs leadership development practices with a focus on inter-generational and inter-cultural dynamics that help leaders thrive in crisis or major change. The goal is to create leaders steeped in an innovative mindset to navigate the complexity of organizational change and global issues, and to inform policy development to create sustainability of these change movements.