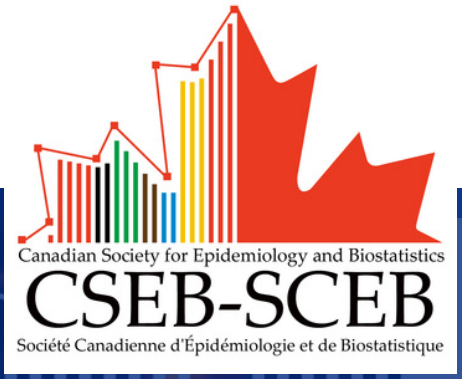
2025 CSEB CONFERENCE

Final Program and Abstracts



Event Agenda

2025 CSEB Conference

Monday, August 11, 2025

Registration Desk

8:00 AM – 6:00 PM | Location: Foyer, Ballroom (4th floor)

{Pre-Conference Workshop} Collaboratively Building Teaching Resources for EDI in Epidemiology and Biostatistics

9:00 AM – 12:00 PM | Location: Salon 7 (3rd floor)

This workshop builds on the successful CSEB 2023 workshop entitled “Incorporating EDI into the epidemiology and biostatistics curriculum and classroom.” In 2023 our half-day workshop included 23 participants who collectively discussed the importance of incorporating EDI into the curriculum. The purpose of the proposed workshop is to expand on the discussion in 2023 and collectively develop teaching materials for Canadian epidemiologists and biostatisticians that incorporate equity, diversity, and inclusion, into the modern teaching curriculum and to assess current strategies. We will develop specific teaching examples for key epidemiology and biostatistics concepts including incidence and prevalence, bias, measurement, confounding, direct acyclic graphs, statistical tests, and concepts of Indigenous data sovereignty. To conduct this workshop, we will use a consensus-based approach to developing teaching examples in small groups, followed by groups discussion and consensus building. This workshop will also consider the new Public Health Core Competencies, of which draft versions have been released and a final version will likely be available by the time of the workshop. We will work to develop and publish the teaching materials through the CSEB-EDI committee.

The learning objectives for this workshop are:

- Discuss importance of EDI in epidemiology and biostatistics teaching
- To assess and share current strategies being used to incorporate EDI in teaching
- Develop new teaching resources for EDI in epidemiology and biostatistics
- Discuss strategies for updating and keeping epidemiology and biostatistics curricula up to date with respect to EDI
- Discussion of barriers and facilitators (e.g., working within changing political climates)

Speakers

Daniel Fuller

Co-Principal Applicant | CapaCITY-CapaCITÉ

Laura Anderson

Assistant Professor | McMaster University

Todd Coleman

Associate Professor | Wilfrid Laurier University

A

Agatha Nyambi

J

Japteg Singh

{Pre-Conference Workshop} Meta-Analysis using Stata

9:00 AM – 12:00 PM | Location: Drummond Centre Room (3rd floor)

This workshop sponsored by Stata

This workshop will cover the use of Stata to perform meta-analysis. Meta-analysis is a statistical technique for combining the results from several similar studies. The workshop will provide a brief introduction to meta-analysis and will demonstrate how to perform meta-analysis in Stata 19. Stata’s meta command offers full support for meta-analysis from computing various effect sizes and producing basic meta-analytic summary and forest plots to accounting for between-study heterogeneity and potential publication bias. A number of case studies demonstrating how to conduct a meta-analysis within Stata will be provided. These examples will focus on the interpretation of meta-analysis, meta-regression and its postestimation features, subgroup analysis, small-study effect and publication bias, and various types of forest, funnel, and other plots. No prior knowledge of Stata is required, but basic familiarity with meta-analysis will prove useful.

Participants will learn how to perform meta-analysis for different types of data. For example, they will learn how to obtain an estimate of prevalence for one-sample binary data and an estimate of the odds ratio for two-sample binary data. They will also learn how to perform multilevel meta-analysis when working with effect sizes that have a hierarchical structure. Participants will learn how to explore heterogeneity at different levels of hierarchy, perform meta-regression with random slopes, and perform sensitivity analysis.
Additionally, participants will learn how to perform multivariate meta-regression for data in which multiple effect sizes were derived from the same study.

Participants who bring their own laptop will be able to interactively follow along provided they have a current version of Stata installed and a working Internet connection for downloading datasets from http://www.stata-press.com. However, interactive participation is not required. The notes will provide sufficient information to reproduce all analyses at the attendees’ convenience.

The learning objectives for this workshop are:

- Obtain an understanding of meta-analysis as a statistical procedure
- Obtain a working knowledge of Stata's tools for performing meta-analysis

- Obtain an understanding of how to assess the validity of the meta-analysis against the threat of publication bias

Data files for the workshop: 00 - MetaAnalysisWorkshop

Speaker

Gabriela Ortiz

{Pre-Conference Workshop} High-Dimensional Propensity Score & Machine/Deep Learning Extensions

9:00 AM – 12:00 PM | Location: Drummond West Room (3rd floor)

Health care claims data are often criticized for missing variables and measurement errors in confounders, leading to residual confounding in treatment effect estimates. Although digital administrative records contain extensive health-related data, much of it is overlooked in standard pharmacoepidemiologic studies. The high-dimensional propensity score (hdPS) algorithm was developed to leverage this rich, auxiliary information as proxies for unmeasured or mismeasured confounders, aiming to reduce bias. Since its introduction, several machine learning and semi-parametric extensions of hdPS have emerged to better utilize high-dimensional proxy variables. This workshop provides a practical overview of the hdPS approach and its modern variants. Specifically, we will: (i) demonstrate the logic, steps, and implementation of hdPS using an open-access dataset and reproducible R code; (ii) clarify the distinctions between traditional propensity scores and hdPS, and outline essential sensitivity analyses; (iii) describe the motivation for machine learning and double robust extensions; and (iv) review the strengths, limitations, and key reporting practices when using hdPS in research publications.

The learning objectives for this workshop are:

- Differentiate between traditional propensity scores and high-dimensional propensity scores (hdPS) and understand their respective applications in controlling residual confounding
- Gain practical knowledge of the logic, steps, and implementation of hdPS, including machine/deep learning extensions, using R
- Identify and apply best practices and reporting guidelines for hdPS in pharmacoepidemiological research

Speaker

Ehsan Karim

Assistant Professor | UBC School of Population and Public Health

{Pre-Conference Workshop} Success as a Public Health Scientist: Writing Competitive Grants and Strong Papers

9:00 AM – 12:00 PM | Location: Drummond East Room (3rd floor)

The purpose of the workshop is to equip researchers (mostly students and early career investigators) with the essential tools and know-how needed to write impactful research manuscripts and grants, as well as to appreciate the challenges and opportunities in an academic career in public health.

Speaker

Eduardo Franco

Professor | McGill University

{Pre-Conference Workshop} Unlocking the Potential of the Canadian Longitudinal Study on Aging (CLSA)

1:15 PM – 4:15 PM | Location: Drummond East Room (3rd floor)

Sponsored by the Canadian Longitudinal Study on Aging

The learning objectives for this workshop are:

- To be familiar with the CLSA methodology and available data
- To understand the process for data access and determining study feasibility
- To learn how to write a successful research proposal

Speakers

Laura Anderson

Assistant Professor | McMaster University

Christina Wolfson

Sophie Hogeveen

Canadian Longitudinal Study on Aging

{Pre-Conference Workshop} Introduction to Dynamic Transmission Models for Communicable Diseases

1:15 PM – 4:15 PM | Location: Drummond Centre Room (3rd floor)

This brief hands-on course will introduce participants to the fundamentals of epidemic modeling, including the concept underlying basic reproduction numbers, the impacts of births, deaths and loss of immunity on epidemic dynamics, and the impact of population immune status on epidemic emergence, growth and control.

The learning objectives for this workshop are:

- Participants will gain an understanding of reproduction numbers and their importance to communicable diseases

- Participants will gain an understanding of population immunity and its role in shaping the trajectory of epidemics
- Participants will gain familiarity with simple dynamic disease models through hands-on applied work.

Speakers

Ashleigh Tuite

Manager of Health Economics and Modelling | Public Health Agency of Canada | Agence de la santé publique du Canada

David Fisman

Professor | University of Toronto

{Pre-Conference Workshop} Advancing Population Health Research with Synthetic Health Data

1:15 PM – 4:15 PM | Location: Drummond West Room (3rd floor)

Synthetic health data are generated from existing electronic health datasets, so that they maintain the statistical properties of the original data. Rows of observations in synthetic datasets represent synthetic individuals, but do not correspond to identifiable individuals from the original data. Thus, synthetic data have the attributes of real patient-derived data but cannot be linked to the individuals from whom the data were derived. Producing and sharing synthetic datasets may shorten the time to conduct studies and reduce legislative and ethical barriers to data sharing. Various use cases for synthetic data have been described in research, methods development, and training, and exploring these use cases can benefit the identification of new opportunities to use synthetic health data.

This 3-hour workshop will provide participants with an overview of the creation and use of synthetic health data. It will cover such topics as choosing a model or method to generate data, technical issues associated with implementing a model or method, approaches to assess the quality of synthetic data, and potential uses and benefits of synthetic electronic health data. We will include one case study involving the generation of synthetic administrative health data for research, methods development, and/or training. The workshop facilitators are leading research about methods to create and use synthetic health data in population health studies and training initiatives.

The learning objectives for this workshop are:

- Identify competing methods or models to create synthetic health data and their strengths and weaknesses
- Explore practical uses of synthetic health data for population health research, training, and methods development
- Identify existing synthetic health resources and where to access information about their attributes and potential uses
- Describe concepts of privacy, equity, fairness, and bias within the context of generating and using synthetic health data

Speakers

Olawale Ayilara

Hassan Maleki Golandouz

Lisa Lix

Professor | University of Manitoba

Social Networking Welcome Reception (5 à 7)

5:00 PM – 7:00 PM

Join us for this social networking reception for an opportunity to reconnect with colleagues and friends as you prepare to attend the CSEB Conference.

Collect your name badge early at the registration desk and join us for a complimentary beverage and some hors-d'œuvres hosted by the CSEB to welcome you to Montreal!

Participants will enjoy access to a digital photo booth at the reception. Post your photos to the Whova app & share your conference moments!

Tuesday, August 12, 2025

Registration Desk

7:15 AM – 5:30 PM | Location: Foyer, Ballroom (4th floor)

Breakfast

7:30 AM – 8:30 AM

{Breakfast Session} Mentorship Breakfast Discussion Tables

7:30 AM – 8:30 AM | Location: Ballroom (4th Floor)

Join a table with a mentor for a lively breakfast discussion! Tables will be labeled with the mentors names.

Opening Remarks

8:30 AM – 8:45 AM | Location: Ballroom (4th Floor)

Move Over Confounding, it’s Time to Talk About Selection Bias and Measurement Error

8:45 AM – 10:00 AM | Location: Ballroom (4th Floor)

Speakers

Hailey Banack

Matthew Fox

Professor | Boston University School of Public Health

Moderator

Marie-Elise Parent

Professor | Institut national de la recherche scientifique, Université du Québec

Poster Viewing & Coffee

10:00 AM – 11:00 AM | Location: Ballroom (4th Floor)

Transition to Breakouts

11:00 AM – 11:15 AM

Breakout A1: "First Nation Data Sovereignty in Action"

11:15 AM – 12:30 PM | Location: Drummond East Room (3rd floor)

First Nations Data Sovereignty (FNDS) is crucial to ensuring that First Nations Peoples control their own data in research. As non-Indigenous researchers collaborate with First Nations communities, respecting FNDS principles and community-led governance is essential. This presentation explores strategies for implementing FNDS in health research and emphasizes the importance of adhering to the OCAP® (Ownership, Control, Access, and Possession) principles. The goal is to promote the principles of FNDS and OCAP® to ensure First Nations retain ownership and control over their data. The presentation will highlight best practices for fostering respectful, accountable partnerships based on community engagement, consultation, consent, and ongoing collaboration. This presentation will focus on the successful collaboration between ICES, the Weeneebayko Area Health Authority (WAHA), and Mamow Ahyamowen, an epidemiology alliance in Northern Ontario. These partnerships illustrate how non-Indigenous organizations can work effectively with First Nations health services, ensuring that research reflects community priorities and addresses local health needs. Through these collaborations, ICES worked with community leaders to design research that aligns with local health concerns. Examples of research outcomes will showcase how community-driven data collection, shared decision-making, and capacity-building have resulted in tangible health improvements for First Nations communities. Key lessons learned will be highlighted. This presentation underscores how non-Indigenous researchers can contribute to Indigenous health research by adhering to FNDS principles and ethical engagement. By fostering partnerships based on trust and accountability, we can work together toward better health outcomes for First Nations communities.

Speakers

Dominique Legacy

ICES

Beth Rachlis

Staff Scientist | ICES

Christina Vlahopoulos

Project Manager | Mamow Ahyamowen

Maureen Gustafson

Knowledge Translation & Exchange Specialist | Mamow Ahyamowen

Khadyn Butterfly

Breakout A2: "Leveraging the CARTaGENE Study – Applied Epidemiologic, Biostatistical and Fieldwork"

11:15 AM – 12:30 PM | Location: Drummond Centre Room (3rd floor)

This session sponsored by CARTaGENE

CARTaGENE is the largest ongoing prospective cohort study in Quebec. Given the diversity of data available, the goal of this symposium is to highlight innovative research leveraging the CARTaGENE cohort to address critical public health challenges through novel methodologies.

This symposium features a presentation on the representativity of the CARTaGENE cohort of the Quebec population. The application of different weighting methods like raking and marginal standardisation, to the established smoking-lung cancer relationship is used as an illustrative example of the application of such techniques to improve external validity. Then, an application of an expert-guided AI model to electronic health record data from CARTaGENE participants, identifying underlying risks associated with various disease phenotypes showcases the burgeoning field of AI in health research. An applied occupational epidemiology analysis on exposure to endocrine disrupting chemicals in the etiology of breast and prostate cancer serves to demonstrate the utility of existing cohort data in addressing emerging public health concerns.

The CARTaGENE biobank also serves a repository and research platform enabling longitudinal analyses of biomarkers. Health Canada researchers have recently used the CARTaGENE biobank to generate human biomonitoring data for 40 per- and polyfluoroalkyl substances (PFAS) among a sub-sample of 2,775 premenopausal women, representing the largest human biomonitoring dataset for PFAS in Canada. This presentation will examine prospective associations between baseline serum concentrations of PFAS and age at menopause, as well as numerous other health outcomes.

Finally, beyond the exploitation of data already collected, CARTaGENE can also be used as a research platform for primary data collection. An upcoming fieldwork within a subset of CARTaGENE participants in collaboration with Health Canada investigates exposures to PM2.5, wildfire smoke, and heat.

The symposium highlights how CARTaGENE's rich datasets and innovative methodologies address critical public health challenges, from improving study validity to tackling emerging issues like climate change.

Speakers

Vikki Ho

University of Montreal

K

Karim Maher

University of Montreal

L

Laura Pelland St-Pierre

Mengting Xu

Senior epidemiologist | CARTaGENE

M

Michael Borghese

K

Keith Van Ryswyk

Health Canada

Breakout A3: Methods in Causal Inference

11:15 AM – 12:30 PM | Location: Drummond West Room (3rd floor)

Speakers

Sreenath Madathil

McGill University

Belal Hossain

Statistician | St. Paul's Hospital, Vancouver

[A3.1] Navigating TMLE Variants: A Systematic Comparison of Cross-Fit and Cross-Validated Approaches for Robust Causal Effect Estimation

11:15 AM – 11:30 AM

Background: Targeted Maximum Likelihood Estimation (TMLE) is a widely used method for causal effect estimation, offering double robustness and asymptotic efficiency. Recent methodological advances include Single Cross-Fit TMLE (SCTMLE), Double Cross-Fit TMLE (DCTMLE), and various Cross-Validated TMLE implementations, which enhance its adaptability to machine learning models outside the Donsker class.

Objective: We compare SCTMLE, DCTMLE, CVqTMLE (CV for the outcome model only), and full CVTMLE, with and without repeated sample splitting. Vanilla TMLE serves as the baseline to evaluate their statistical performance and computational trade-offs for estimating the average treatment effect in complex confounding scenarios.

Method: We evaluated the TMLE variants using both large-scale simulations and a real-world application. Performance was measured using absolute bias, mean squared error (MSE), coverage probability, bias-eliminated coverage, and relative error in standard error estimation across varying numbers of repetitions.

Result: All TMLE variants produced robust estimates, with performance varying by metric. SCTMLE showed the lowest absolute bias across all replicate counts but had higher relative error compared to VanillaTMLE. DCTMLE achieved the lowest MSE overall and performed reasonably well on all metrics. CVqTMLE was a middle-ground performer, not excelling in any area but also not performing poorly. FullCVTMLE demonstrated the best performance in coverage properties and relative error comparison. VanillaTMLE generally underperformed compared to the cross-validation and cross-fitting approaches, confirming the added computational complexity provides tangible benefits. Methods with repetition almost always performed better than their non-repeated counterparts, and stabilized after approximately 25-30 replicates, with diminishing returns beyond that point.

Conclusion: DCTMLE would be recommended if minimizing overall error is the primary goal, while fullCVTMLE is ideal when uncertainty quantification is critical. For resource-limited settings, CVqTMLE offers a practical alternative. These findings emphasize that method selection should prioritize study-specific needs for reliability versus efficiency, advancing robust causal inference in epidemiology.

[A3.2] Longitudinal Trends and Causal Claims in Microbiome Research: A Topic Modeling Approach

11:30 AM – 11:45 AM

Background: The human gut microbiome has been widely studied for its potential impact on health and disease. However, the strength of causal claims in microbiome literature often varies, with some studies making strong assertions despite the lack of rigorous study designs and/or causal inference methods. This study investigates the use of causal language in microbiome research over time, analyzing trends and discrepancies between claims and methodological rigor.

Methods: We performed a topic modeling analysis on research article abstracts related to the human gut microbiota, accessible through PubMed between 2015 and 2025. Abstracts were processed using natural language processing techniques, including tokenization, stopword removal, and lemmatization. We applied Latent Dirichlet Allocation to identify 20 topics and their evolution over time. A predefined lexicon of causal linking words, rated for strength, was used to quantify the presence and intensity of causal claims in abstracts.

Results: We identified 18,500 abstracts eligible for topic modelling analysis. The analysis reveals a persistent discrepancy between the strength of causal claims and the actual methodological approaches used in microbiome research. While the use of causal language has increased over time, many studies continue to employ associational methods while making strong causal assertions. However, recent years show an encouraging trend toward improved methodological rigor, with more studies incorporating more appropriate frameworks enabling identification of average causal effects. Despite this progress, a substantial gap remains, highlighting the need for greater methodological transparency and the adoption of robust causal inference frameworks.

Conclusion: The growing demand for causal knowledge in microbiome research has yet to be matched by the adoption of appropriate research designs, inferential frameworks, and proper reporting standards. Related research fields, such as clinical epidemiology, which are at the forefront of adopting modern causal inference frameworks, could serve as valuable models for a similar methodological advancement in microbiome research.

Speaker

Albina Tskhay

[A3.3] Estimating vaccine effectiveness with the test-negative design: from study planning to data analysis, a tutorial

11:45 AM – 12:00 PM

Background: The test-negative design (TND) is a widely used observational design for estimating vaccine effectiveness (VE), enrolling individuals seeking healthcare based on specific clinical criteria. The TND recruits symptomatic individuals who are subsequently tested for the infection of interest, classifying them as cases (test-positive) or controls (test-negative).

Objectives: This talk will outline our tutorial, which aims to provide a step-by-step guide for epidemiologists and applied researchers in the design, analysis, and interpretation of TND studies estimating VE, including classical (logistic regression) and recently proposed estimation methods (inverse probability weighting [IPTW] and a doubly robust estimator [TNDDR] implemented with machine learning).

Methods: We introduce the TND sampling framework and highlight its unique features that provide potential advantages over other observational studies for evaluating VE. We outline the required data structure and use a directed acyclic graph (DAG) to illustrate relationships between variables and confounding. We define the target parameter and discuss the statistical and causal assumptions necessary for identifiability and valid interpretation. We present a working example where we provide step-by-step guidance for the design, analysis, and interpretation of TND studies. The usage of the three estimation methods mentioned above is explained in terms of model specification, estimation procedures, and interpretation of results. Additionally, we demonstrate TNDDR using both parametric generalized linear models and machine learning techniques.

Results: N/A

Conclusion

Our tutorial outlines key considerations for planning a TND study, highlights the importance of selecting an appropriate statistical approach based on study design and data structure.

Speaker

Yan Liu

[A3.4] Standardizing to Target Populations in Multisite Studies Using Inverse Odds and Augmented Inverse Probability Weighting

12:00 PM – 12:15 PM

Background: Distributed network studies are increasingly used to evaluate treatment effects across diverse populations by pooling data from multiple sites. However, differences in covariate distributions across sites complicate the transportability of treatment effects from source populations to target populations. While inverse probability of treatment weighting (IPTW) and augmented IPTW (AIPW) are commonly used to control for confounding and improve precision, they do not directly address the challenge of transporting effect estimates in the presence of covariate shifts. Previous work has combined inverse odds weighting (IOW) with IPTW to improve external validity, but this approach lacks the double robustness property of AIPW.

Objectives: To extend AIPW to the IOW setting and develop a method that improves robustness, interpretability, and efficiency when estimating treatment effects for pre-specified target populations in multisite studies.

Methods: We propose an IOW-augmented IPW (IOW-AIPW) estimator that leverages baseline covariates from all sites and treatment and outcome data from source sites to estimate average treatment effects in a target site or group of sites. The estimator includes a third model to predict source population membership. We assess its finite-sample performance in simulations under various combinations of correctly and incorrectly specified treatment and outcome models.

Results: Correct specification of the propensity score model reduces bias even when the outcome model is misspecified. When both models are correct, modest gains in precision are observed. Due to the added IOW model, the IOW-AIPW estimator does not retain traditional double robustness, and performance varies with model specification. Compared to IOW-IPTW, our approach introduces normalization to stabilize weights and improve interpretability. Meta-analysis using pooled IOW-AIPW estimates improves efficiency, particularly when targeting smaller populations.

Conclusions: IOW-AIPW offers a flexible and robust framework for transporting treatment effects across heterogeneous populations in multisite studies. Future work will address data privacy concerns and explore further robustness enhancements.

Speaker

Shiyao Tang

Graduate Research Student | Lady Davis Institute for Medical Research

[A3.5] Identifying and Estimating Causal Direct Effects Under Unmeasured Confounding

12:15 PM – 12:30 PM

Background: Causal mediation analysis provides techniques for defining and estimating effects that may be endowed with mechanistic interpretations. With many scientific investigations seeking to address mechanistic questions, causal direct and indirect effect have garnered much attention. The natural direct and indirect effects, the most widely used among such causal mediation estimands, are limited in their practical utility due to stringent identifiability requirements. Accordingly, considerable effort has been invested in developing alternative direct and indirect effect decompositions with relaxed identifiability requirements. Such efforts often yield effect definitions with nuanced and challenging interpretations.

Objectives: By contrast, relatively limited attention has been paid to relaxing the identifiability assumptions of the natural direct and indirect effects. Motivated by a secondary aim of a recent vaccine efficacy trial (NCT05168813), we propose such a set of conditions for the natural direct effect.

Methods: We present a set of conditions under which the natural direct effect is identifiable in spite of unobserved baseline confounding of the exposure--mediator pathway. We use this result to evaluate the proportion of effect mediated by putative immune correlates of protection. Along the way, we review efficient, multiply robust estimators of the natural direct effect and related parameters.

Results: The proposed analytic approach is validated by numerical experiments and in an analysis of the motivating vaccine efficacy trial with the aim of characterizing differences in activation of a well-studied immune correlate of protection for COVID-19 between non-randomized groups expected to exhibit hybrid versus vaccine immunity.

Conclusion: We outline conditions that ensure the natural direct effect remains identifiable when there is unobserved confounding of the exposure--mediator pathway. Simulation studies benchmarking causal machine learning techniques provide empirical support of this identifiability result. Our findings are used in the analysis of a vaccine efficacy trial, permitting the comparison of COVID-19 immune correlate activation across groups.

Speaker

Philippe Boileau

Assistant Professor | McGill University

Breakout A4: Genetic and Molecular Epidemiology

11:15 AM – 12:30 PM | Location: Salon 8 (4th floor)

Moderators

Amadou Barry

Assistant Professor at Institut national de la recherche scientifique (INRS) | Institut national de la recherche scientifique

Matt Warkentin

Postdoctoral Fellow | University of Calgary

[A4.1] A single-cell gene set analysis of differential expression in lung cells with the heritable risk of COVID-19

11:15 AM – 11:30 AM

Background: As living with COVID becomes a normal part of our lives, it is pertinent to assess COVID-19 from a heritability point-of-view.

Objectives: The study was conducted to analyze gene expression difference between COVID+/- status in lung cell types and heritable risk for COVID-19. Additionally, we want to test the robustness of the gene set analysis tool Liner Combination Test (LCT) against highly unbalanced sample sizes.

Methods: The study examined a single-cell lung dataset from a previous study where single-cell RNA sequencing (scRNA-seq) was used to provide expression profiles of the individual cells. In this study, we compared gene expression differences between SARS-CoV-2 RNA+/- status in lung cell types and heritable risk for COVID-19 (AT2, CD8+ T cell, macrophages) using LCT. LCT tests if any linear combination of expressions of genes in a gene set is associated with values of a given phenotype.

Results: Analysis on CD8+ T cells showed 127 gene sets (p-value and q-value <0.001) differentially expressed between SARS-CoV-2 RNA+/- status cells. Similarly, 13 gene sets for AT2 cells, and 4,829 gene sets for macrophages were differentially expressed. Pathways involving Dual-specificity phosphatase 4, CD8+ regulatory T cells, and dendritic cells-toll like receptors-macrophages were identified which potential for new treatment through mesenchymal stromal cells as well as improved vaccine efficacy, especially for the elderly and those with ‘long COVID’. While the LCT approach should be robust against unbalanced samples, validation by our team using random sampling at 1:1 to 1:4 ratios of cases and controls showed a potential elevation of Type 1 error at rations greater than 1:3.

Conclusion: The results of this study can elucidate potentially drug-targetable biological pathways that lead to heritable COVID-induced phenotypes. It also tests the robustness of LCT as well as its ability to recognize varying types of gene expression difference ‘signals’.

Speaker

Asim Thapa

University Of Alberta

[A4.2] Impact of serum vitamin D status and supplementation on inflammatory biomarkers in preschoolers with asthma: the DIVA randomized clinical trial

11:30 AM – 11:45 AM

Background: Vitamin D supplementation may improve asthma by modulating inflammation, but its effects in preschoolers with viral-induced asthma remain underexplored.

Objective: To measure the association between serum 25-hydroxyvitamin D (25(OH)D) and inflammatory biomarkers and the impact of vitamin D supplementation on these biomarkers.

Methods: We conducted a nested study within a 7-month randomized placebo-controlled trial. Children aged 1–5 years with viral-induced asthma received vitamin D3 in two oral boluses (100,000 IU) 3.5 months apart, with daily (400 IU) supplement, or placebo boluses and daily supplement. Serum 25(OH)D and C-reactive protein (CRP) were measured at baseline, 3.5 months, and 7 months, while blood cells were measured at baseline and 7 months. Primary outcomes were CRP across timepoints and change from baseline in CRP at 3.5 and 7 months, analyzed using generalized estimating equation and mixed-effects models.

Results: Among 236 (118 Vitamin D: 118 Placebo) children (64.4% male), no significant association was observed between CRP and 25(OH)D. However, neutrophils were inversely associated with 25(OH)D (Adjusted-β (95%CI)= –0.016 (–0.027 to –0.005)x10^9 cells/L, N=198). Compared to placebo, vitamin D supplementation led to a greater reduction from baseline in CRP over time (Adjusted-β (95%CI)= –3.154 (–5.978 to –0.330) mg/L, N=174), and neutrophils at 7 months (Adjusted-β (95%CI)= –0.657 (–1.288 to –0.026)x10^9 cells/L, N=110). No associations were observed with other blood cell biomarkers.

Conclusion: In preschoolers with viral-induced asthma, serum 25(OH)D was inversely associated with neutrophils, and vitamin D supplementation significantly reduced CRP and neutrophils over time, suggesting modulation of neutrophilic inflammation.

Speaker

A

Asmae El Abd

[A4.3] Longitudinal Multilevel Mediation Analysis of Genetic and Occupational Influences on Lung Function Decline in Canadian Grain Elevator Workers

11:45 AM – 12:00 PM

Background: Both genetic and environmental factors, including gene-environment interactions, influence changes in lung function over time. Certain genotypes may mediate or suppress the association between occupational exposures and lung function decline.

Objectives: This study investigates how genetic polymorphisms interact with years of exposure in the grain industry to influence longitudinal changes in forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) among Canadian grain elevator workers.

Methods: Longitudinal data from the Saskatchewan Grain Workers' Surveillance Program (1978–2005), comprising 1,195 observations from 213 individuals, were analyzed. Multilevel modeling was applied to account for repeated measures across nine data collection cycles. A stacked data approach was used, combining the dependent variable (DV) and mediator into a single stacked response variable. This variable was used to fit a mixed-effects model, incorporating indicator variables for the DV and mediator to derive all necessary estimates for the mediation analysis. Based on the levels of time-dependence for exposure (X), mediator (M), and outcome (Y), four analytical scenarios were considered: 1-1-1, 2-1-1, 1-2-1, and 2-2-1. For instance, in the 1-2-1 scenario, the M was time-independent (higher level), while X and Y were time-dependent (lower level).

Results: The TNF-alpha genotype demonstrated a suppressing effect on the relationship between years of grain industry exposure and both FVC and FEV1. No significant ($p > 0.05$) mediation or suppression was observed for other genotypes. The indirect effects accounted for 25% of the total effect on FVC and 14% on FEV1, both acting in the opposite direction of the direct effects- indicating suppression, where TNF-alpha offset the negative impact of occupational exposure on lung function.

Conclusion: The suppressive role of TNF-alpha highlights the potential for genetic factors to buffer adverse occupational exposures. Incorporating gene-environment interactions within a mediation framework may enhance risk assessment and guide occupational health policies.

Speaker

Barada Mohanty

Graduate Research Assistant | University of Saskatchewan

[A4.4] Impact of circulating microRNAs to identify high-risk adenomas among patients undergoing follow-up colonoscopy to investigate a FIT+ screening

12:00 PM – 12:15 PM

Background: Early detection and removal of high-risk adenomas (HRAs) is essential for the prevention of colorectal cancer (CRC). Circulating microRNAs (miRNAs) have emerged as potential biomarkers for CRC detection and HRAs. Understanding the relationship between miRNAs and HRAs could improve risk stratification in colorectal cancer screening.

Objectives: This study investigated associations between circulating miRNAs and HRAs, and developed risk prediction models (RPMs) incorporating miRNA data among fecal immunochemical test (FIT)-positive patients.

Methods: Plasma samples from 398 patients with a FIT-positive screening test (2018–2021) were analyzed using the NanoString nCounter® miRNA expression assay to quantify 798 miRNAs. HRAs were defined as polyps ≥10 mm, villous histology, high-grade dysplasia, or ≥3 polyps. Controls had negative colonoscopies or ≤1 small (≤10 mm) or hyperplastic polyps. Of the 398 participants, 160 (40.2%) had HRAs and 238 (59.8%) served as controls. Student's t-tests with Bonferroni correction identified significant miRNAs and penalized logistic regression identified important variables for the final model. A baseline model including age, sex, BMI, smoking status, ethnicity, family history of CRC, and alcohol consumption was created and combined with miRNA data. Model discrimination was evaluated with the area under the curve (AUC) and bootstrap internal validation using 10,000 replicates.

Results: The participants had a mean age of 60 years, and a mean BMI of 29 kg/m². 65.1% were male, 77.9% were white, and 46.2% were current or former smokers. Eleven miRNAs were significantly associated with HRA after p-value correction, and eight were selected from the penalized model. The baseline model indicated fair optimism-adjusted discrimination (AUC=0.61), where the miRNA alone showed high discrimination with AUC=0.80. Combining the miRNA data with the baseline model further increased the discrimination to AUC=0.82.

Conclusions: Circulating miRNAs improved HRA risk prediction beyond clinical risk factors. Further external validation is warranted before assessing feasibility of clinical application.

Speaker

R. Liam Sutherland

[A4.5] A functional approach to testing overall effect of interaction between DNA methylation and SNPs

12:15 PM – 12:30 PM

Background: Epigenetics explores heritable changes in gene expression without altering the DNA sequence, with DNA methylation playing a pivotal role in gene regulation and disease development. Single nucleotide polymorphisms (SNPs) are genetic variations that influence phenotypic traits and disease susceptibility. Understanding the interaction between SNPs and DNA methylation is crucial for elucidating the mechanisms underlying complex traits.

Objectives: This study aims to develop a novel statistical method to flexibly model and detect interactions between SNPs and DNA methylation across genomic regions, and to evaluate its performance in association with complex traits.

Methods: We propose a functional regression-based model that integrates DNA methylation profiles and SNP genotypes, focusing on their interaction effects. The model allows for flexible detection of interactions across genomic regions. We assess its performance through extensive simulations and apply it to a real data involving obese individuals and controls.

Results: Through extensive simulations, we show that the proposed model effectively controls type I error rates and highlights increased empirical power. We apply our method to analyze data from obesity patients and controls. Comparative analysis reveals superior performance over existing method, particularly when multiple interactions are present between SNPs and DNA methylation measures at CpG sites.

Conclusion: This approach offers deeper insights into the genetic and epigenetic mechanisms underlying complex traits, enhancing disease prediction and personalized medicine.

Speaker

Yvelin Gansou

Analyste de données | Ministère de l'Enseignement supérieur du Québec (MES)

Breakout A5: Environmental Epidemiology

11:15 AM – 12:30 PM | Location: Salon 7 (3rd floor)

Moderators

Sarah Mah

Assistant Professor | University of Vermont

J

Jannie Leung

[A5.1] Association between industrial air pollution and preterm birth: a population-based cohort study in Quebec, Canada

11:15 AM – 11:30 AM

Background: Preterm birth is the leading cause of neonatal mortality and long-term disability in infants. There is accumulating evidence linking ambient air pollution with preterm birth, but the role of specific sources such as industries remains understudied.

Objectives: We investigated whether maternal exposure to industrial air emissions during pregnancy was associated with preterm birth.

Methods: We used a retrospective cohort including all hospital births in Quebec, Canada, from 2002 to 2016. Exposure to industrial PM2.5, NO2 and SO2 emissions was estimated using an indicator combining residential proximity, emissions and wind data. We used multinomial logistic regression to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for extreme (<28 weeks), very (28 to <32 weeks), and moderate to late preterm (32 to <37 weeks). Because pollutant exposures were skewed and a substantial proportion of patients were unexposed, we estimated ORs (i) for those exposed relative to no exposure and, (ii) for each quartile of exposure relative to no exposure. All models were adjusted for infant, maternal and contextual characteristics.

Results: The analysis included 1,199,516 singleton live births and 71,699 preterm births, from which 5,066 were very and 4,424 extremely preterm. A greater risk of extremely preterm was observed in those exposed to industrial emissions as compared to those not exposed; the adjusted OR (95% CI) was 1.12 (1.04, 1.21) for PM2.5, 1.11 (1.04, 1.19) for NO2, and 1.06 (0.99, 1.13) for SO2. The analysis using quartiles revealed, for all pollutants, increased risk of very and extremely preterm birth for levels of exposure above the first quartile. Exposure to industrial emissions was not associated with a greater likelihood of moderate to late preterm birth.

Conclusion: This population-based cohort study suggests that maternal exposure to industrial air emissions during pregnancy is associated with an increased risk of very and extremely preterm birth.

Speaker

Félicité Mumbanza

Université de Montréal

[A5.2] Modelling vulnerability to extreme heat at a small spatial scale using environmental epidemiology and machine learning models

11:30 AM – 11:45 AM

Background: Extreme heat is a growing treat worldwide due to climate change and urbanization. To date, most studies have looked at heat-health relationships at a high spatial scale (e.g., cities, health regions) that is too large to explore simultaneously multiple vulnerability factors of heat impacts on health.

Objectives: We aim to explore the vulnerability factors of heat-related health outcomes at a fine spatial scale with both environmental epidemiology and machine learning (ML) models, using all 306 aggregated dissemination areas (ADA) covering the cities of Montreal and Laval, Canada, as a case study.

Methods: Data was collected from multiple sources and aggregated at the ADA level, including all-cause mortality and morbidity, weather and air pollution predictors, as well as socioeconomic and built environment characteristics. The heat-health associations were modelled at the ADA level using both an epidemiological (i.e., Distributed Lag Non-Linear Model) and a ML (i.e., Light Gradient Boosting) model. Vulnerability factors were included in the models as effects modifiers.

Results: Preliminary results from the epidemiological model showed an increased vulnerability of heat-related mortality and morbidity in ADAs of high material deprivation and low exposure to greenness. In addition, the ML model allowed to rank vulnerability factors from most to least important among a wide list of factors by using explainable artificial intelligence methods.

Conclusion: The research is the first to combine two data-driven methods to generate new evidence on vulnerability to heat at a fine spatial scale for mortality and morbidity outcomes. The results will help authorities target the most important mitigation measure for extreme heat risk in the context of climate change.

Speaker

Jérémie Boudreault

PhD candidate | Data science and environmental health | Institut national de la recherche scientifique (INRS)

[A5.3] Exposure to per- and polyfluoroalkyl substances and metabolic syndrome: a Canadian Health Measures Survey mixture analysis

11:45 AM – 12:00 PM

Per- and polyfluoroalkyl substances (PFAS) are a class of persistent chemicals used in everyday products for their water and oil repelling properties. Epidemiological studies suggest that exposure to PFAS may be adversely associated with metabolic syndrome (MetS). However, studies are limited and equivocal.

To examine associations between exposure to a mixture of PFAS and MetS among a nationally representative sample of Canadian adults.

We used cross-sectional data (cycles 2, 5 and 6) from 1564 adults aged 20 to 79 from the Canadian Health Measure Survey. We examined plasma concentrations of five PFAS (perfluorohexane sulfonate (PFHxS), perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), perfluorononanoic acid (PFNA), and perfluorodecanoic acid (PFDA)) and their sum. We examined MetS, a clinical diagnosis, as a binary outcome. We used quantile g-computation (qgcomp) to examine associations between PFAS mixture and MetS and the reported weights of individual PFAS to the overall mixture. Positive weights indicate the proportion of the positive effect for a specific exposure. We used Poisson regression with robust standard errors to estimate associations between individual PFAS exposure and MetS. We also conducted sex-stratified analyses.

Using qgcomp, we found that the PFAS mixture was not associated with MetS (prevalence ratio (PR): 0.88; 95%CI: 0.71-1.05). However, within the mixture, PFNA and PFOS showed positive effects on MetS and accounted for 78% and 22% of the positive weights, respectively. Results were similar in sex-stratified analyses. In individual models, none of the five PFAS were associated with MetS. The directions of the effect estimates in individual models were consistent with the directions of the qgcomp weights.

Using cross-sectional data from a nationally representative sample of Canadian adults we found that plasma concentrations of individual PFAS, and the mixture of five PFAS, were not associated with MetS. Further prospective studies are needed to establish temporality and corroborate these findings.

Speaker

Janice Hu

Health Canada

[A5.4] Exposure to air pollution during pregnancy and the risk of childhood cancer

12:00 PM – 12:15 PM

Background: Exposure to air pollution during the prenatal period may be an important exposure window for childhood cancers, but the epidemiological evidence remains scarce.

Objective: We investigated whether prenatal exposure to ambient fine particulate matter (PM2.5) and nitrogen dioxide (NO2; a marker of traffic-related pollution), was associated with childhood cancer incidence.

Methods: We conducted a longitudinal cohort study of 1,121,996 newborns in Quebec, Canada. Maternal exposure during pregnancy was estimated using weekly and biweekly concentrations of PM2.5 and NO2 from satellite-based and land-use regression models. Associations with any cancer, central nervous system tumors (CNS), and leukemia among children up to 14 years of age were estimated using Cox proportional hazard models adjusted for potential confounders. We examined single- and two-pollutant models, and assessed the modifying effects of maternal and infant characteristics.

Results: The cohort included 2,187 incident childhood cancers. Adjusted hazard ratios (HR) for any cancer were 1.08 (95% CI: 0.99, 1.17) and 1.06 (95% CI: 0.98, 1.15) per interquartile increase in PM2.5 (3.5 µg/m3) and NO2 (4.6 ppb), respectively. For CNS tumors, associations were observed but only in children aged ≥7 years; the HR was 1.35 (95% CI: 0.98, 1.88) for PM2.5 and 1.36 (95% CI 0.99, 1.88) for NO2. For acute lymphoblastic leukemia, the HR was 1.06 (95% CI: 0.90, 1.25) for PM2.5 and 1.15 (95% CI: 0.77, 1.70) for NO2. Though CIs were wide, a positive association was suggested between acute myeloid leukemia and PM2.5 (HR= 1.15; 95% CI: 0.77, 1.70), but not for NO2. In mothers with comorbidity, exposure to PM2.5 and NO2 during pregnancy appeared to be associated with a greater risk of childhood cancers. Associations from single and two-pollutant models were similar.

Conclusion: Maternal exposure to air pollution during pregnancy is associated with an increase in the risk of childhood cancer.

Speaker

Stephane Buteau

Université De Montréal

[A5.5] Impact of air pollution and weather on hospital and ambulatory care visits among older adults of Alberta, Canada

12:15 PM – 12:30 PM

Background: The frequency and/or intensity of extreme events such as heatwaves, wildfires, are increasing with climate change, which will disproportionately affect older adults. Older adults are potentially susceptible because of existing health conditions, mobility challenges, and social isolation.

Objective: To conduct an ecological study to investigate the effects of weather on hospital and ambulatory care visits among older adults ≥65 years in Alberta, Canada.

Methods: Outcomes included a sample (n=3,760,422) of hospital visits for respiratory and cardiovascular diseases, injuries, mental health, and neurological conditions among older adults (≥65 years) between January 1, 2011, to December 31, 2021, obtained from the Discharge Abstract Database and National Ambulatory Care Reporting System. Environmental exposures included maximum, minimum, mean temperature, diurnal temperature range, total precipitation, and fine particulate matter (PM2.5). Season-stratified negative binominal regression was conducted to explore associations across dissemination areas.

Results: Mean dissemination area PM2.5 was associated with an increased risks of hospital and ambulatory visits among older adults during winter (prevalence rate ratio (PRR)= 1.015, C.I.= 1.012-1.017) and summer (PRR= 1.002, C.I.= 1.001-1.003). Increases in dissemination area diurnal temperatures range were also associated with increased hospital and ambulatory visits among older adults during the winter (PRR= 1.012, C.I.= 1.008-1.017) and summer seasons (PRR= 1.014, C.I.= 1.009-1.017). Higher winter temperatures were likewise associated with increased hospital and ambulatory visits, although higher summer temperatures and precipitation were associated with fewer visits.

Conclusion: Higher concentrations of dissemination area PM2.5 and increased diurnal temperature range were associated with a higher risk of hospital and ambulatory visits among older adults, indicating the potential for air pollution and weather to impact older adult health in a number of ways. This finding highlights the importance of considering the specific vulnerability of older adults in relation to weather and air pollution exposures and consider health care system preparedness.

Speaker

Sachit Gurung

Graduate student at University of Alberta | University of Alberta

Breakout A6: Policy Development and Evaluation

11:15 AM – 12:30 PM | Location: Salon 6 (3rd floor)

This concurrent session stream coordinated in partnership with the International Network for Epidemiology in Policy (INEP)

Moderators

Laura Anderson

Assistant Professor | McMaster University

Anjelica Shrestha

Masters of Public Health | McMaster University

[A6.1] International collaboration for epidemiology with impact: Including children's voice in their health and right to a healthy future in policy development

11:15 AM – 11:30 AM

Background: The International Network for Epidemiology in Policy (INEP) brings together national and international volunteer professional societies and associations of epidemiologists. The Canadian Society of Epidemiology and Biostatistics (CSEB) is a member of INEP. INEP's goal is to promote integrity, equity, and evidence in policies impacting health to inform rational policy development by governments and non-governmental organizations.

Objectives: Our goal was to work as a group of representatives from different international epidemiological associations to develop a policy statement that considers the impact of health policy on children and young people. We also partnered with a lived experience expert and youth advocate.

Methods: Lead by Dr. Susan dosReis, our group identified three examples to illustrate how not prioritizing children in public health policies has adversely impacted child health and wellbeing: 1) global pandemic response policies, 2) climate change and 3) worldwide conflict.

Results: We outline the evidence in each of the areas and provide recommendations for prioritizing and enhancing children's involvement and inclusion of their voice in rights to a healthy future in policy development. We will also comment on our experiences of working as part of this international collaboration and identify methods that we used to promote and highlight the policy statement once it had been completed.

Conclusion: By working together, individual epidemiological societies and organizations can have a greater impact on health policy concerning a variety of topics (e.g. vaccine hesitancy, anti-racism, climate change). Recommendations from the International Network for Epidemiology in Policy represent a consensus that can be used to advocate at the global level. Through CSEB, Canada participates in these efforts and this opportunity is open to all Canadian epidemiologists who are members of CSEB.

[A6.2] Impact of switching from the quadrivalent to the nonavalent HPV vaccine on HPV infections and cervical cancer in Colombia: a mathematical modeling study

11:30 AM – 11:45 AM

Background: In 2022, Colombia reported 13.7 cases of cervical cancer per 100,000 women. Given the persistently low coverage of human papillomavirus (HPV) vaccines among girls, alternative interventions are being considered.

Objective: To assess the population-level impact on HPV infections and cervical cancer in Colombia of switching from the quadrivalent to the nonavalent HPV vaccine, and of increasing coverage levels to the World Health Organization's (WHO) target of 90%.

Methods: We developed a dynamic model of HPV transmission and vaccination in an open population aged 15+ years, stratified by health state, sex, age, sexual activity, and vaccination status. We evaluated gender-neutral and girl-only routine one-dose vaccination (<15 years) under current Colombian coverage levels and 90% coverage. The model was calibrated to HPV prevalence data from Colombia and Latin America. We estimated age-standardized HPV prevalence and incidence, as well as the relative reduction in infections and the impact on cervical cancer incidence over 2021-2100.

Results: Both vaccines and higher coverage levels reduced age standardized high-risk HPV infections, with greater reductions observed at higher coverage levels and with the nonavalent vaccine. A decline in HPV infections was also observed in unvaccinated populations, reflecting herd immunity effects. Switching to the nonavalent HPV vaccine at 90% coverage could prevent 29% (range: 24%-35%) of HPV prevalence in women over ten years, compared to 9% (range: 7%-11%) when only increasing quadrivalent HPV vaccine coverage to 90%. Only the nonavalent vaccine reduced projected age standardized cervical cancer incidence below the elimination threshold goal of four cases per 100,000 women, assuming no changes in cervical cancer screening practices. Moreover, if nonavalent vaccination coverage increased to 90% in both boys and girls, the elimination threshold could be reached ten years earlier.

Conclusion: Achieving the WHO cervical cancer elimination goal requires switching to the nonavalent vaccine to sufficiently reduce HPV infections.

Speaker

Romina Tejada

McGill University

[A6.3] Adoption and implementation of enhanced universal prenatal syphilis screening in Ontario public health units: A survey and difference-in-differences analysis

11:45 AM – 12:00 PM

Background: Congenital syphilis rates in Ontario increased by 1,188% between 2018-2023. Timely prenatal syphilis screening and treatment can prevent cases. Canadian guidelines recommend screening all pregnant people during the first trimester or initial prenatal visit. In response to rising rates, some Ontario public health units (PHUs) issued recommendations to enhance (repeat) syphilis screening at mid-gestation and/or at delivery.

Objectives: We described changes to prenatal syphilis screening recommendations and implementation practices across Ontario PHUs between 2018-2023 and evaluated changes in screening practices.

Methods: We disseminated a web-based survey to all 34 Ontario PHUs to identify enhanced screening recommendations and barriers to implementation. Seven PHUs consented to the provincial public health laboratory to provide their prenatal syphilis screening rates (based on the number of chemiluminescent microparticle immunoassays performed in pregnant people). The seven PHUs are comparable based on Statistics Canada criteria. We applied a difference-in-differences analysis, using a linear regression model, to determine changes in monthly screening rates.

Results: Twenty-six PHUs (76%) responded to our survey. Eight (31%) PHUs recommended enhanced screening, of which six (75%) experienced provider- and/or client-related barriers to implementing enhanced recommendations. Between 2018-2023 all PHUs included in our difference-in-differences analysis experienced increased infectious syphilis rates in females of reproductive age. Four recommended enhanced screening (exposed) and three maintained screening practices (control). Prior to recommending enhanced screening, screening rates were parallel and insignificant between exposed and control PHUs (difference of 18 tests/1,000 pregnancies/month; 95% CI -29-65). Controlling for secular trends, PHUs that enhanced screening performed 314 more tests/1,000 pregnancies/month (95% CI 202-426) with significant heterogeneity by PHU.

Conclusion: Despite high rates of infectious syphilis, uptake of enhanced prenatal screening was minimal, and among PHUs that changed recommendations, adherence rates varied. Future research will examine the effectiveness of public health implementation strategies to maximize adoption of enhanced prenatal syphilis screening.

Speaker

Amanda Featherstone

Graduate Student | Queen's University

[A6.4] A structural equation modeling approach to examine the factors influencing women's attitudes, comfort, and willingness regarding risk-stratified breast cancer screening

12:00 PM – 12:15 PM

Background: Risk-stratified breast cancer (BC) screening, in which the frequency, starting age and test modalities of screening is tailored to women's personal risk of BC, has been proposed to increase the efficiency of current aged-based programs. However, the implementation of this approach may pose challenges and requires the buy-in of the primary beneficiaries, the women themselves.

Objectives: To identify the factors influencing women's attitudes, comfort level and willingness towards risk-stratified BC screening.

Methods: We conducted an online questionnaire of women aged 30 to 69 years old in four Canadian provinces (Alberta, British-Columbia, Ontario, Quebec). Structural equation modeling was used to assess the direct and indirect effects of explanatory factors including sociodemographic variables, such as age, ethnicity and education level, as well as factors related to general health, BC risk perception, screening, and genetic testing history on each outcome (attitudes, comfort level, and willingness).

Results: A total of 4293 women equally distributed between provinces completed the questionnaire None of the three outcomes were significantly associated with women's perceived health or personal history of genetic testing for BC ($p > 0.05$). A history of mammography and family income were found to mediate the relationship between certain factors and each outcome. A history of mammography and higher income were significantly associated with more favorable attitudes ($\beta\_mammo = 0.157$; $\beta\_income = 0.098$), greater comfort level ($\beta\_mammo = 0.425$; $\beta\_income = 0.134$), and higher willingness ($\beta\_mammo = 0.471$; $\beta\_income = 0.198$) towards risk-stratified BC screening. Non-white ethnicity and older age were associated with less favorable attitudes ($\beta\_ethnicity = -0.117$; $\beta\_age = -0.071$), lower comfort level ($\beta\_ethnicity = -0.104$; $\beta\_age = -0.269$), and decreased willingness ($\beta\_ethnicity = -0.142$; $\beta\_age = -0.295$) towards risk-stratified screening.

Conclusion: Our results suggest that there are some key factors that could be targeted to facilitate the implementation of BC risk-stratified screening.

Speaker

Cynthia Mbuya-Bienge

Teaching Assistant in Epidemiology | Université Laval

[A6.5] An evaluation of the association between changes to job protection during illness leave and illness absence behaviour

12:15 PM – 12:30 PM

Background: Despite a growing body of research on sick leave policies, there remains a significant gap in research concerning job protections during illness leaves, which is critical in Canada since several provinces have recently passed job-protected leave expansions.

Objectives: To examine the association between job-protected leave expansions (17 to 26 weeks in Quebec in 2003, 0 to 17 weeks in Manitoba in 2016, and 0 to 16 weeks in Alberta in 2018) and prevalence, length and distribution of illness leaves.

Methods: We used the Canadian Labour Force Survey data spanning from 1998 to 2022. Using a difference-in-difference approach, we examined 5-year changes in leave behaviour before and after expansions in job-protected leave in the three provinces compared to changes in provinces with less than 2 weeks of job-protected leave. We analyzed the prevalence, duration, and distribution of illness/disability absences using ordinary least squares and linear probability models.

Results: We found that expanding job-protected leave in Quebec was associated with decreases in the overall length of leave by 2.9 (95% CI: -3.2 to -1.4; P < 0.001) weeks or 14.4% relative reduction. Similarly, expansions in Alberta and Manitoba were associated with decreases in the overall length of leave by 1.2 (95% CI: -2.1 to -0.3; P = 0.02) weeks or 6.4% relative reduction. Both expansions were associated with significant increases in absence duration consistent with the policy (i.e., 3-17-week leaves) (p<0.05).

Conclusions: Our results suggest that job-protected leave expansion may influence leave behaviour even in the presence of protections provided by human rights laws and without imposing large additional costs for employers or governments.

Speaker

Michael Lebenbaum

Lunch

12:30 PM – 1:30 PM | Location: Ballroom (4th Floor)

Breakout B1: "New Advances in Occupational Epidemiology in Canada"

1:30 PM – 2:45 PM | Location: Drummond East Room (3rd floor)

Occupational epidemiology in Canada is supported by a strong, inter-disciplinary, and a highly collaborative community. Our research maintains a focus on both science and prevention and is constantly evolving in terms of data sources, exposures and populations studied, and analytical methods used to develop and synthesize evidence. This session will consist of five presentations. Amy Hall will speak on the development of the Canadian Forces Cancer and Mortality Study, which includes both serving and released Armed Forces personnel. Paul Villeneuve will speak on identifying sex and gender differences in health effects due to exposure to ionizing radiation among medical workers in the National Dose Registry. Nathan DeBono will speak on using parametric G-computation to estimate the effect of exposure reduction interventions and inverse probability weighting to adjust estimates for healthy worker survivor bias in an asbestos worker cohort. Chelsea Almadin will present on the use of frequent itemset mining (FIM), a technique from the field of economics, to characterize patterns of chemical exposures in large industrial hygiene measurement databases. Chen Chen will speak on the impact of different multilevel modelling approaches for meta-analysis of dose-response data from a diverse set of epidemiological studies examining the relationship between asbestos and lung cancer.

Speakers

Paul Demers

Director, Occupational Cancer Research Centre | Ontario Health

Chen Chen

University of Toronto

Chelsea Almadin

PhD Candidate | Université de Montréal

Nathan DeBono

Paul Villeneuve

Professor | Carleton University

Vikki Ho

University of Montreal

Chrissi Galanakis

Breakout B2: "Food Insecurity Epidemiology Among Vulnerable Populations in Canada and the World"

1:30 PM – 2:45 PM | Location: Drummond Centre Room (3rd floor)

The reduction of food insecurity (FI) is a cornerstone of the United Nations Sustainable Development Goal 2.2. Climate change and rising inflation exacerbating food affordability and accessibility challenges. This mini symposium unites experienced researchers and emerging scholars to explore research wide spectrum of epidemiologic and biostatistical methods including measurements and scales of FI indicators, mediators, and health outcomes at Canadian and global context, within Indigenous and sexual minorities as well as impact n maternal and child outcomes . The event emphasizes methodological diversity, statistical/epidemiologic methodological rigor, and policy relevance to address challenges faced by vulnerable populations.

Speakers

Swarna Weerasinghe

professor | Dalhousie University

Heather Thompson

Adjunct Professor | McMaster University

A

Akash Perera

University of Toronto Mississauga

Kelly Skinner

Associate Professor | University of Waterloo

Breakout B3: Biostatistical Methods

1:30 PM – 2:45 PM | Location: Drummond West Room (3rd floor)

Moderators

Lisa Lix

Professor | University of Manitoba

M

Magatte Sylla

Student | INRS

[B3.1] Generalized fused lasso for data-driven parameter reduction in network meta-regression

1:30 PM – 1:45 PM

Background: Network meta-regression (NMR), an extension of network meta-analysis, is used to synthesize evidence on multiple treatments from randomized controlled trials while adjusting for differences in the distribution of effect modifiers across trials. There is often not enough data to estimate a full model. As such, NMR is typically limited to one covariate and employs a “shared effect modifier (SEM) assumption”: the relative treatment effect (RTE)-covariate interaction is the same within a group of treatments (e.g., drug class). However, this assumption may be based on subjective or weak biological rationale, particularly for non-pharmacological treatments.

Objectives: We aim to develop a data-driven approach to sensibly reduce the number of parameters in an NMR model.

Methods: We formulated NMR as a generalized fused lasso (GFL) problem which may be solved using a well-established and fast algorithm to determine data-driven SEM assumptions and simultaneously perform variable selection. Through extensive simulation studies, we compared the statistical performance of the GFL-NMR approach against the full NMR model and NMR models with various SEM assumptions.

Results: In ideal scenarios where there was sufficient direct evidence to estimate all parameters in a full NMR model (i.e., ten trials each), all NMR models performed similarly in terms of mean absolute error and mean bias of the basic RTEs. When there were small differences between true parameters and limited direct evidence (i.e., two trials) on the basic RTE and corresponding interaction terms for a particular treatment, mean absolute error was notably smaller among models making SEM assumptions compared to the full NMR model. As true differences between parameters increased, GFL-NMR tended to outperform NMR models that misspecified SEM assumptions.

Conclusion: GFL-NMR offers a robust, objective approach for determining which parameters may be sensibly shared when limited data are available to estimate a full NMR model.

Speaker

C

Caitlin Daly

Postdoctoral Scholar | University of Waterloo

[B3.2] A novel method for estimating longitudinal trajectories using network meta-analysis

1:45 PM – 2:00 PM

Background: Major depression (MD) during the perinatal period – the period from pregnancy to one-year post-pregnancy – can affect maternal and child health.

In the biostatistical literature, little consideration has been paid to trajectory meta-analysis nor to the effect of heterogeneity in the number and timing of outcome assessments between studies on model fit. We apply a novel method to the MD dataset with the goal of better accounting for this heterogeneity.

Methods: We propose a model for trajectory estimation: discrete-time network meta-analysis (DTNMA). This method applies network meta-analysis (NMA) to longitudinal datasets, considering timepoints as network treatment nodes. Estimated pairwise differences in prevalence are plotted to estimate the trajectory. Measures of NMA inconsistency (e.g. I2 and proportion of direct evidence by pairwise comparison) assess heterogeneity in the number and timing of assessments. We compare DTNMA to results from both aggregate and individual participant data flexible meta-regression using natural cubic splines.

To estimate the longitudinal trajectory of perinatal MD, data from an individual participant meta-analysis (IPDMA) were obtained (N=9 datasets, n=4,289 women, d=627 cases). MD was assessed through validated diagnostic interviews over seven timepoints (three pregnancy trimesters and four post-pregnancy quarters). Studies included between two and four timepoints.

Results: Estimated MD prevalence remained constant over the perinatal period. DTNMA models agreed with flexible meta-regression. Inconsistency was high (I2=66.8%. 95% CI=[35.2%,82.9%]). The percentage of direct evidence ranged from 0.0% to 95.7% by pairwise comparison.

Conclusion: We demonstrated how DTNMA can estimate trajectories in an aggregate data meta-analysis. We found no evidence for a trend in MD prevalence over the perinatal period. High levels of inconsistency and indirect evidence, estimated using DTNMA, precludes further analysis of these data. Future work using simulated data or larger networks could provide more consistent estimates of the trajectory of perinatal MD.

Speaker

Marc Parsons

[B3.3] Response shift in children with chronic physical illness: An exploratory analysis using unsupervised machine learning methodology

2:00 PM – 2:15 PM

Background: In children with chronic physical illness, an important aspect of their health-related quality of life (HRQOL) is physical well-being because it reflects their perspectives about their physical functioning, such as physical discomfort and limitations in daily activities. Patient-reported outcome measures are commonly used to evaluate longitudinal changes in HRQOL in children. However, their validity can be compromised by response shift (RS), when evaluation of HRQOL changes over time. Group-based models to test for RS in longitudinal HRQOL data make stringent assumptions that the model holds for all individuals and that patient characteristics associated with RS are known a priori.

Objectives: To investigate RS in parent-reported KIDSCREEN-27 physical well-being items in children with chronic illness using an exploratory machine learning methodology.

Methods: Data were from Multimorbidity in Children and Youth across the Life-course (MY LIFE), a prospective study of 263 children diagnosed with chronic illness in Canada. A graded response model (GRM), suitable for categorical data and based on machine learning with Bonferroni correction tested for RS at baseline and 24 months. RS is considered present if the data is partitioned on time. Specifically, reprioritization and recalibration RS are present when there are significant changes in the discrimination and threshold parameters, respectively.

Results: Of the 263 children included in the MY LIFE study, the mean (standard deviation) age was 9.4 (4.2) years, and 125 (47.5%) were female. The data was partitioned on time, and there were changes in GRM parameters over time, indicating the presence of RS. Item 3 (“Has your child been physically active?”) showed evidence of reprioritization RS, while item 5 (“Has your child felt full of energy?”) exhibited recalibration RS.

Conclusion: The presence of RS in parent-reported KIDSCREEN-27 physical well-being items indicates that comparisons of observed scores over time may not accurately capture true changes in HRQOL.

Speaker

Olayinka Arimoro

[B3.4] LIKELIHOOD RATIO TEST FOR THE PROPORTIONAL HAZARDS ASSUMPTION IN ILLNESS-DEATH MODELS

2:15 PM – 2:30 PM

Context: Proportional hazards models are widely used to analyze survival times. However, more flexible alternatives, such as illness-death models, can also be considered.

Objectives: The first objective of this study was to establish an equivalence between the maximum likelihood estimators (MLEs) of proportional hazards models with a time-varying binary covariate and those of constrained illness-death models, where the covariate encodes the illness status. The second objective was to develop a likelihood ratio test (LRT) to compare constrained and unconstrained illness-death models, assessing the need for a more flexible, unconstrained illness-death model.

Methods: We conducted theoretical investigations under various parametric baseline hazard models, as well as for piecewise linear models. The proposed methods were applied to the Stanford heart transplant dataset to evaluate how the illness-death model can be used to assess the proportional hazards assumption.

Results: We established the equivalence of MLEs and developed LRTs for the target hazard models. In our real-data application, the proportional hazards assumption was not rejected.

Conclusion: The proposed LRT provides a methodological tool for selecting between proportional hazards models with a time-varying binary covariate and illness-death models when illness risk is not the primary focus.

Speaker

C **Carmelle Chango**

[B3.5] Which policy works and where? Estimation and inference for state level treatment effects using difference-in-differences

2:30 PM – 2:45 PM

Background: New difference-in-differences (DID) estimators have been developed to estimate treatment effects in the context of staggered policy adoption. Most estimate the average treatment effect on the treated (ATT) at the treatment timing group (g) and year (t) level, or the ATT(g,t). However, this overlooks heterogeneity within groups: for example, in an analysis of state-level abortion bans, policies implemented at the same time may vary in terms of travel restrictions or gestational age thresholds. Researchers may be interested in treatment effects at the state level which map more directly to policy characteristics.

Objectives: Demonstrate how to estimate state-by-year level treatment effects (ATT(s,t) terms) using two new DiD estimators: unpooled DID (UN-DID) and intersection DID (DID-INT).

Methods: We propose methods for cluster robust inference for ATT, ATT(g,t) and ATT(s,t) terms using these estimators. The cluster jackknife and randomization inference are of broader interest, as they are valid in settings where the standard cluster robust variance estimator is not. We used Monte Carlo simulation to compare traditional DID to UN-DID/ DID-INT with and without cluster robust estimation.

Results: The new methods recover the true ATT(s,t) values. First, all over-time differences are calculated by state. Within-state differences for controls are then aggregated. Comparing this difference with a single treated state's difference yields an ATT(s,t). Conversely, if it is compared to the aggregated treated differences by timing group (g), we estimate an ATT(g,t). Our new estimators are unbiased and correctly sized in most settings.

Conclusion: In policy evaluation, the parameter of interest is often the ATT(s,t), but the ATT(g,t) is typically reported. Both are important in understanding the impact of policy shifts that are heterogeneous in terms of policy timing and characteristics.

Speaker

N **Nichole Austin**

Breakout B4: Substance Use and Mental Health

1:30 PM – 2:45 PM | Location: Salon 8 (4th floor)

Moderators

Beth Rachlis

Staff Scientist | ICES

L **Laura Pelland St-Pierre**

[B4.1] Inferring incidence rate ratios (IRR) from cross-sectional odds ratios (OR) using individual-based modelling, applied to major depression & harmful drinking

1:30 PM – 1:45 PM

Cross-sectional studies have estimated prevalence OR of 1.0–4.2 for harmful drinking and depression. If being depressed causally increases drinking (not the reverse), these associations may mechanistically derive from current depression increasing the rate of drinking onset, decreasing the rate of drinking recovery, or both. Understanding how ORs arise from IRRs can help interpret/compare OR and IRR estimates across cross-sectional and longitudinal studies.

Objective. Characterize the relationship between cross-sectional ORs and IRRs for drinking onset and recovery while depressed.

Methods. We developed a stochastic individual-based model of an open population of 10,000 individuals aged 10–59. Informed by literature review, each modelled individual can experience depression [drinking] onset//recovery at base rates of 4//100 [2//33] per-100 person-years, resulting in equilibrium prevalence of 3.8 [5.4]%. We then varied IRRs of drinking onset (IRRo: 1–8) and recovery (IRRx: 0.125–1) while depressed and examined OR-IRR relationships. In sensitivity analysis, we further varied base rates by factors of {0.5,1.0,1.5}. For each parameter set, we estimated age-adjusted ORs for drinking and depression via logistic regression from the entire population at equilibrium, and report mean ORs across 41 stochastic repetitions.

Results. ORs underestimated onset IRRs by around 4: OR ≈ 1+¼(IRRo−1), and were hardly influenced by recovery IRRs. OR bias towards 1 worsened with faster depression recovery rates (b) and slower drinking recovery rates (d), approximately per: OR ≈ (b+d·IRRo)/(b+d·IRRx). Depression and drinking onset rates had little influence on the OR-IRR relationship.

Conclusion. In this context (low-prevalence and reversible onset and exposure), ORs significantly underestimate onset effect size and provide little information on possible recovery effects. Future work will examine age effects and weighted sampling.

Speaker

Jesse Knight

Research Associate - HIV Modelling | Imperial College London

[B4.2] Cannabis Use in Pregnancy and Downstream Effects on Maternal and Infant Health (CUPiD): a Pilot Prospective Birth Cohort

1:45 PM – 2:00 PM

Background: Cannabis use in pregnancy and postpartum is increasing in Ontario due, in part, to expanded accessibility following cannabis legalization in Canada. There is a need to monitor the impact of cannabis use on birth and neonatal outcomes in Canada.

Objectives: We sought to assess the feasibility of building a contemporary multicentre prospective Canadian birth cohort reflecting the evolving cannabis environment.

Methods: We recruited pregnant individuals (aged ≥ 16 years with viable pregnancy at recruitment) from three sites in Ontario. Recruitment methods included in-patient recruitment, clinician referrals, clinical record review, community-based, and digital recruitment. Primary outcomes were feasibility parameters, including recruitment rate, level of engagement, and protocol compliance. Secondary outcomes were perinatal/neonatal outcomes, including gestational age, birth weight, and pregnancy complications. Participants were followed from recruitment to 12 weeks postpartum. Data on sociodemographics and cannabis use, as well as maternal/infant biological samples, were collected. Immunoassay and liquid chromatography-tandem mass spectrometry are underway for the detection of cannabis metabolites.

Results: We recruited 43 participants between October 2022 and September 2024, averaging two patients per month, with 96% of the planned study visits completed. Cannabis users were younger (mean age of 29 vs. 33 years for non-users), and 13% had parity 0 (vs. 6% for non-users). Nearly 24% of cannabis users had preterm deliveries, and 38% of these neonates required admission to special care nurseries (6% of non-users). Among the cannabis users, 35% smoked dried herbs at recruitment, 36% vaped cannabis, and 50% used dried herbs mixed with or rolled in tobacco. All methods of cannabis consumption declined across the study period.

Conclusion: We established a pilot Canadian birth cohort, albeit with lower recruitment than anticipated. Ongoing analyses of biological samples will provide novel insights into the placental transfer of cannabinoids and their pharmacokinetics in pregnancy and lactation.

Speaker

Justin Poplove

[B4.3] Cannabis-related characteristics associated with a history of anxiety symptoms among young male and female adults

2:00 PM – 2:15 PM

Background: Many people report using cannabis to relieve anxiety. However, no studies have explored whether a history of anxiety symptoms is linked to how or why cannabis is used, whether it is perceived to affect mental health, or problematic use.

Objective: To describe (i) the context of cannabis use (using alone, self-medicating, simultaneous co-use with tobacco or alcohol); (ii) its perceived effects on mental health; and (iii) problematic use, by history of anxiety among young adult males and females.

Methods: Data were drawn from a longitudinal study which recruited 1294 grade 7 students in Montreal, Canada in 1999-2000. The current analysis included 316 cannabis users (mean age 35 years; 52% female). Anxiety symptoms were measured with the Generalized Anxiety Disorder (GAD-7) scale at 3 timepoints (2017-20, 2020-21, 2022-23). Participants were categorised as having a history of moderate/severe anxiety symptoms if they scored ≥10 on GAD-7 at 2-3 timepoints. The context of cannabis use, its perceived effects on mental health, and problematic use were measured in 2022-23. All analyses were stratified by sex.

Results: 4% of males and 11% of females had a history of moderate/severe anxiety symptoms. Compared to males without symptoms, more males with a history of anxiety symptoms reported frequent use alone, co-use of cannabis with tobacco or alcohol, self-medicating for depression symptoms and pain, effects of cannabis use on mental health, and higher problematic use. A higher proportion of females with history of anxiety symptoms reported frequent use alone, co-use with tobacco but not alcohol, self-medicating for depression symptoms, negative perceived effects on mental health, and higher problematic use.

Conclusion: Differences in context, perceived effects on mental health, and problematic use were observed in cannabis users based on a history of anxiety symptoms. Future research should consider investigating these cannabis-related characteristics to better understand the anxiety-cannabis association.

Speaker

Annie Pelekanakis

Université de Montréal

[B4.4] Does multimorbidity moderate the relationship between psychosocial factors and suicidality among youth in Canada?

2:15 PM – 2:30 PM

BACKGROUND Suicidality is a major public health concern, and the second leading cause of death among youth and young adults in Canada. Evidence has shown strong associations between morbidity status and suicidality, as well as evidence of poor psychosocial outcomes among youth who report suicidality. However, few studies have explored the role of physical-mental multimorbidity in moderating associations between psychosocial factors and suicidality.

OBJECTIVES This study investigated whether multimorbidity moderates associations between psychosocial factors and suicidality.

METHODS Data come from 6,915 youth aged 15 to 17 enrolled in the 2019 Canadian Health Survey on Children and Youth. Youth or the person most knowledgeable in each household provided responses to survey questions regarding their sociodemographic characteristics, psychosocial behaviours, suicidality, and morbidity status. The prevalence of past-year hopelessness, past-year suicidal ideation, and lifetime suicide attempts were determined. Psychosocial outcomes included bullying (within the past year), life satisfaction, drinking status, poly substance use, life stress, and life happiness. Product-term interactions in logistic regression models were used to test whether multimorbidity moderated these associations.

RESULTS Youth had a mean age of 15.9 years, and 48.6% were female. Hopelessness, suicidal ideation, and suicide attempts were commonly reported by youth with multimorbidity (44%, 28%, and 19%, respectively). Results indicated that multimorbidity moderated associations between hopelessness and bullying (□: 0.586; p<0.001), life satisfaction (□: -0.251; p<0.001), life stress (□: 0.463; p<0.001), and life happiness (□: 0.911; p<0.001). Multimorbidity also moderated associations between suicidal ideation and life satisfaction (□: -0.282; p<0.001), and suicide attempts and life satisfaction (□: -0.382; p<0.001).

CONCLUSION Findings support the need for routine screening of suicidality among youth, particularly among those with multimorbidity. Such efforts to help identify at-risk youth will facilitate better allocation of resources to support youth who struggle with suicidality and help promote the best possible psychosocial outcomes.

Speaker

Danielle Fearon

[B4.5] Sex and age differences in the temporal relationships between COVID-19 stressors and depressive symptoms in the Canadian longitudinal study on aging (CLSA): A cross-lagged panel network analysis

2:30 PM – 2:45 PM

Background: This study employs a longitudinal network approach to investigate the dynamic relationships between COVID-19-related stressors and depressive symptoms among the Canadian elderly, with a focus on sex and age differences.

Method: The study utilized data from the Canadian Longitudinal Study on Aging (CLSA), a large, national, long-term study of Canadian adults aged 45 and older. Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D), and COVID-19-related stressors were evaluated using a standardized stress inventory adapted for the pandemic context. The cross-lagged panel network analysis (CLPN) modeling technique was employed to examine the temporal relationships and dynamic interactions between depressive symptoms and COVID-19-related stressors.

Results: Significant variations in network structures and strengths were identified across demographic groups. Individuals aged between 45 to 65 years and females exhibited stronger connections between stress and depressive symptoms. Central symptoms such as “feeling unhappy” were consistent across groups, while “feeling depressed” was more central for males and “increased verbal or physical conflict” for females. Additionally, health-related stressors and family separation emerged as critical bridge symptoms for males and individuals under 65, respectively.

Conclusions: This study highlights the need for tailored mental health interventions in response to COVID-19-related stressors and depressive symptoms. Individuals under 65 and females show greater vulnerability, with “feeling unhappy” as a central symptom across groups. Besides, different demographic groups exhibit distinct key central and bridge symptoms. These findings highlight the need for tailored strategies to address depression, taking into account the specific stressors faced by different demographic groups.

Speaker

Yingying Su

Associate Researcher | Southern University of Science and Technology

Breakout B5: Parental and Child Health

1:30 PM – 2:45 PM | Location: Salon 7 (3rd floor)

Moderators

Sarah Edwards

Harsimran Singh Kapoor

PhD Trainee, McGill University

[B5.1] The longitudinal association between parent anxiety and child physical and mental illness

1:30 PM – 1:45 PM

Background: Numerous children experience chronic physical illness (CPI) and are highly susceptible to developing a co-occurring mental illness. Likewise, parents of children with CPI are vulnerable to substantial stress and mental illness, particularly anxiety. Children of parents with anxiety are predisposed to both internalizing and externalizing mental illnesses, an association likely exacerbated among children with CPI. Research regarding this familial relationship of mental illness largely focuses on non-clinical samples, and in the context of child CPI, studies are predominantly cross-sectional and illness-specific.

Objectives: This research examined the 48-month association between parent anxiety and child mental illness, in a clinical sample of children with CPI.

Methods: Data come from a longitudinal study of 263 children with a range of CPI, aged 2 – 16 years, and their parent. The Generalized Anxiety Disorder-7 Scale measured parent anxiety and the Emotional Behavioural Scales measured parent-reported child internalizing and externalizing symptoms. Linear mixed-effects modelling assessed the 48-month association between parent anxiety and child internalizing and externalizing symptoms, while controlling for several sociodemographic, clinical, and parental covariates. Results: Parent anxiety was associated with child internalizing symptoms (Beta=0.32, p<0.001), and the magnitude of this association did not change over 48-months. Older child age, greater child disability, and higher parent stress were significantly associated with higher internalizing scores. Parent anxiety and child externalizing symptoms were also associated (Beta=0.08, p=0.027), and the magnitude of this association increased over time (Beta=0.03, p=0.031). Male child sex, female parent sex, lower household income, greater child disability, and higher parent stress were significant correlates of higher child externalizing scores.

Conclusions: Parent anxiety and child mental illness were associated over 48-months and predictors of children at-risk of poor mental health were identified. Findings bolster support for the prioritization of family-centred healthcare, wherein parent mental health is considered as part of pediatric healthcare.

Speaker

Melissa Elgie

[B5.2] The association between child abuse and the developmental attainment in three- to four-year-old children in Bangladesh: role of sex and religion

1:45 PM – 2:00 PM

Background: The first five years are crucial for child development, yet 220 million children aged 2–4 experience physical discipline worldwide. Although caregivers commonly discipline children in Bangladesh, it remains understudied. This study, therefore, examined the associations between child abuse and early childhood developmental (ECD) outcomes and explored how sex and religion may modify these associations.

Methods: Data were drawn from 9431 children aged three to four years in the Bangladesh Multiple Indicator Cluster Survey (MICS) 2019. The global early childhood development index (ECDI), including four domains of ECD (physical growth, literacy-numeracy, socio-emotional development, and learning skills), was assessed using a 10-item validated questionnaire administered to mothers. Child abuse was categorized as physical punishment, severe physical punishment, psychological aggression, and any violent discipline. Multilevel mixed-effects Poisson regression with a robust variance estimator was used to estimate covariate-adjusted prevalence ratios (aPRs) and 95% CIs. Effect measure modification (EMM) by sex and religion was assessed using a p-difference from the Wald test for the product term.

Results: Overall, 25.3% of children were developmentally delayed (global ECD). Any violent discipline was experienced by 93.1% of children, with 90.4% experiencing psychological aggression. Compared with children who did not experience any discipline, those exposed to physical violence (aPR: 1.16, 95% CI: 1.06–1.28) and severe physical punishment (aPR: 1.23, 95% CI: 1.14–1.33) had higher prevalence of delays in global ECD. Similarly, socio-emotional development delays were strongly associated with all subdomains of child abuse. Sex modified the relationship between physical discipline and global ECD (p-difference=0.04). Religion modified the associations between psychological discipline (p-difference=0.009) and any violent discipline (p-difference=0.032) with learning cognition.

Conclusion: Targeted public health and cultural programs should be implemented to halt disciplinary child supervision practices, with particular focus on boys and Muslim families.

Speaker

Toufica Sultana

[B5.3] Developmental outcomes in children of mothers with adult congenital heart disease: a population-based cohort study

2:00 PM – 2:15 PM

Background: With improved survival rates for congenital heart disease (CHD), more women with CHD are now reaching reproductive age. While maternal adult CHD is associated with increased risks of adverse pregnancy and neonatal outcomes, its impact on longer-term child developmental outcomes are not yet known.

Objectives: To investigate if maternal adult CHD is associated with child development.

Methods: This population-based cohort study included all singleton infants born between 1995 and 2016 in British Columbia (BC), Canada, who had the teacher-rated Early Development Instrument (EDI) data in kindergarten around 5 years of age. Children were categorized as developmentally vulnerable if their score was <10th percentile in any of the five EDI domains: physical wellbeing, social competence, emotional maturity, language and cognitive development, and communication skills. The association between maternal CHD ever diagnosed before conception and the outcome was examined using modified Poisson regression models, adjusted for maternal sociodemographic characteristics. We also performed causal mediation analysis to test if the association was mediated by gestational age, birthweight-for-gestational age, child's CHD, and major malformations.

Results: We analyzed data of 245,145 children (51.4% female), of whom 623 were exposed to maternal CHD. Children exposed to maternal CHD had 21% higher risk of developmental vulnerability (adjusted Risk Ratio [aRR]: 1.21; 95% Confidence Interval [CI]: 1.11, 1.32) compared with the unexposed. In the analysis stratified by specific development domains, maternal CHD was associated with vulnerabilities related to physical wellbeing (aRR 1.31; 95% CI: 1.14, 1.51), emotional maturity (aRR 1.16; 95% CI: 1.00, 1.36), and communication skills (aRR: 1.34; 95% CI: 1.11, 1.59). The neonatal complications jointly mediated 15% of the association between maternal CHD and child developmental vulnerability.

Conclusion: In this cohort study, maternal CHD was associated with poor child developmental outcomes at school entry. Neonatal complications did not adequately explain the biological mechanisms.

Speaker

Zakir Hossin

Postdoctoral research fellow | University of British Columbia

[B5.4] Promoting postnatal psychosocial functioning and mental health: The Toi-Moi-Bébé randomized control trial

2:15 PM – 2:30 PM

Background: Maternal perinatal mental health problems impair postpartum psychosocial functioning. Several prevention programs have been developed, however the mechanisms underlying their effectiveness are understudied.

Objectives: To compare the effect of a virtual, self-directed, prevention program (Toi-Moi-Bébé, TMB) with/without supportive telephone-coaching on women's psychosocial functioning. To identify mechanisms through which coaching may improve mental health.

Methods: We conducted a randomized controlled superiority trial with 510 participants allocated 1:1 to either TMB with coaching (TMB-coaching) or TMB-only (2021-2023; Quebec). Participants were pregnant women ≥ 14 years in their 2nd trimester, with mild-to-moderate depressive symptoms (Edinburgh Postnatal Depression Scale scores from 9-16). Exclusion criteria included psychosis or substance abuse. All outcomes were continuous measures calculated from self-report questionnaires. Psychosocial functioning outcomes were perceived self-efficacy and self-compassion at 3 months' postpartum. Mental health outcomes were anxiety, perceived stress, and depressive symptoms at 6 months' postpartum. We compared psychosocial functioning between trial groups using Mann-Whitney tests. We estimated mediation models to identify average indirect effects of coaching on mental health through psychosocial functioning.

Results: Our sample included >80% of participants born in Canada, <20% had >1 child, 70% were university educated, and 42% reported clinically significant anxiety symptoms at baseline. Intention-to-treat analyses included 214 TMB-coaching and 211 TMB-only participants. Perceived self-efficacy scores were higher in TMB-coaching (median = 34, interquartile range (IQR) = 30-37) than TMB-only (median = 32, IQR = 29-36); 95%CI 0.53 to 0.64. The average indirect effect of coaching through perceived self-efficacy was -0.24 for anxiety symptoms (95%CI: -0.47 to -0.02); -0.53 for perceived stress (95%CI: -1.14 to -0.06); -0.31 for depressive symptoms (95%CI: -0.64 to 0.22). No other group differences were observed.

Conclusion: Virtual, self-directed prevention programs with added supportive telephone-coaching may improve personal self-beliefs about parenting and promote perinatal mental health.

Trial registration: Recherche Santé Québec, #2021-3210.

Speaker

Tatiana Dessy

PHD Candidate | Centre de recherche Azrieli du CHU Sainte-Justine

[B5.5] Impact of migraine and comorbidity on risks of severe maternal and neonatal morbidity and mortality: A retrospective cohort study in Ontario, Canada

2:30 PM – 2:45 PM

Background: Individuals with migraine often have multiple comorbid conditions. Migraine and comorbidities are independent risk factors for adverse maternal and neonatal outcomes. However, the additive effects of migraine and comorbidity on severe maternal morbidity/mortality (SMM-M) and severe neonatal morbidity/mortality (SNM-M) are unexplored.

Objectives: Examine the separate and combined impacts of migraine and comorbidities on risks of SMM-M and SNM-M.

Methods: This population-based cohort study identified pregnancies in Ontario, Canada, 2007-2022. We compared SMM-M and SNM-M in females with (1) pre-pregnancy migraine and ≥1 physical or psychiatric comorbidities ('other chronic conditions [CC]'), (2) migraine only, (3) other CC only, and (4) neither migraine nor other CC (referent). Modified Poisson regression controlled for maternal sociodemographic characteristics and infant sex. We tested for additive interaction between migraine and other CC by calculating relative excess risk due to interaction. We also considered interactions between migraine and physical and psychiatric CC, separately.

Results: Among n=2,643,335 pregnancies, 6.8% had migraine and other CC, 3.2% migraine only, 45.7% other CC only, and 44.3% neither migraine nor other CC. Risk of SMM-M was highest among those with both migraine and other CC (aRR 1.60, 95%CI 1.56-1.65), followed by other CC only (aRR 1.40, 1.38-1.42), and migraine only (aRR 1.15, 1.10-1.20). For SNM-M, risk was highest in those with both migraine and other CC (aRR 1.43, 1.40-1.46), followed by other CC only (aRR 1.30, 1.28-1.32), and migraine only (aRR 1.08, 1.04-1.11). We found no additive interaction between migraine and other CC for either outcome. Results were similar for physical CC and psychiatric CC.

Conclusion: Individuals with migraine and other CC had the greatest risks of SMM-M and SNM-M. Although synergistic effects were not observed, findings still suggest individuals with migraine and other CC could benefit from targeted preconception and perinatal healthcare supports to reduce attendant effects of these conditions.

Speaker

Melina Albanese

PhD Candidate (Epidemiology) | University of Toronto

Breakout B6: Infectious Diseases and Immunization

1:30 PM – 2:45 PM | Location: Salon 6 (3rd floor)

Moderators

Mira Johri

Professor | Université de Montréal (University of Montreal)

Nana Ama Tiwaa-Boateng

Programs Officer | Effect Hope

[B6.1] The effects of orphanhood and lack of parental care on child vaccination: analyses of 189 cross-sectional household surveys from 82 low- and middle-income countries, 2005 to 2022

1:30 PM – 1:45 PM

Background: The 2019 UN Resolution on the Rights of the Child highlighted an urgent need for evidence on children lacking parental care. These children may tend to miss out on essential services, especially in low- and middle-income countries (LMICs).

Objectives: We investigated whether community-dwelling orphans (children with one or both parents deceased) and children without parental care (residing with no biological parents) were at risk of sub-optimal vaccination.

Methods: Cross-sectional study of 189 population-representative UNICEF Multiple Indicator Cluster Surveys from 82 LMICs, conducted from Jan 1, 2005 to Dec 31, 2022. We used two-level logistic fixed-effects models with individual community-dwelling children aged 12 to 59 months nested within MICS sampling cluster to estimate the effects of orphanhood and lack of parental care on missed vaccinations. We report the confounder-adjusted odds of being a "zero-dose" (ZD) child (failure to receive any diphtheria-tetanus-pertussis-containing (DTP) vaccine doses), an under-immunised child (failure to receive three DTP doses), failure to receive any measles-containing vaccine (MCV), and failure to receive all eight basic vaccine doses. Sensitivity analyses explored uncertainties in model parameters and assumptions.

Results: The analysis included 739,506 children of which 20.6% (n=152,314) were ZD, 50.4% (n=372,568) were under-immunised, 50.3% (n=372,089) had not received any MCV, and 57.8% (n=427,558) had not received all 8 basic vaccine doses. Orphans had a consistently higher risk of sub-optimal vaccination. Confounder-adjusted odds ratios were similar for all binary outcomes ZD (ORadj 1.59; 95%CI: 1.48 to 1.71, p<0.001), under-immunised (ORadj 1.46; 95%CI: 1.38 to 1.54, p<0.001), and no MCV and basic incomplete (ORadj 1.42; 95%CI: 1.34 to 1.50, p<0.001) for both). Children lacking parental care experienced similarly elevated risks of sub-optimal vaccination (p<0.001 for all outcomes).

Conclusion: To support children at risk and uphold their rights, vaccination programmes should prioritise service delivery to community-dwelling orphans and children lacking parental care.

Speaker

Mira Johri

Professor | Université de Montréal (University of Montreal)

[B6.2] Insights and Challenges from the First North American Pertussis Controlled Human Infection Model (CHIM)

1:45 PM – 2:00 PM

Background: Pertussis is an acute respiratory tract infection caused by the Bordetella pertussis bacteria. Despite effective vaccines, pertussis remains poorly controlled. Controlled human infection models (CHIMs) are clinical trials that intentionally expose healthy volunteers to an infectious agent in a controlled environment to cause infection. CHIMs can offer valuable insights into pertussis that field studies cannot provide.

Objectives: The primary objective of the study is to establish a B. pertussis CHIM by determining a reproducible and safe infectious bacterial dose that achieves mild symptomatic infection in healthy adults.

Methods: The clinical trial consists of two studies. The first study was a dose identification study to determine a dose that induces pertussis mild symptomatic/clinical infection among 70%–90% of the volunteers (HID70-90). An algorithm was used to determine escalation/de-escalation of challenge dose level according to the infectious outcome. The second study was a confirmation study to verify and confirm that the infectious endpoint has been reached to establish the pertussis CHIM.

Results: 42 subjects were challenged in study 1 with dose level ranging from 10^4 CFU to 10^7 CFU. HID70-90 was observed at 10^7 CFU (92% infection) and confirmed at the same dose level in study 2 (82% infection). An algorithm was developed to classify outcomes as not infected, asymptomatic infection, or symptomatic infection based on participants' clinical and laboratory profiles, eliminating the need for expert review. Subsequent analyses include a clustering analysis to explore potential structure in the data. A sensitivity analysis is also planned to refine and optimize the sampling type, frequency, and assay method while ensuring high accuracy in outcome classification.

Conclusion: We established a pertussis CHIM at 10^7 CFU with an overall infection rate of 87% and a mild symptomatic infection rate of 70%. This model provides the potential for evaluating candidate pertussis vaccines.

Speaker

Lingyun Peter Ye

[B6.3] Association between naturally induced HPV16 seroreactivity and viral load in young women: a group-based trajectory model analysis

2:00 PM – 2:15 PM

Background: While naturally induced humoral immunity provides little to no protection against subsequent human papillomavirus (HPV) infections, its impact on viral load remains unclear.

Objectives: We examined the association between natural HPV16 seroreactivity and viral load trajectories in young women, considering vaginal HPV exposure recency.

Methods: We analyzed data from 398 HPV-unvaccinated women aged 18-24 years enrolled in Montreal (2005-2011) in the HPV Infection and Transmission Among Couples Through Heterosexual Activity (HITCH) cohort study. Women attended six visits over two years, providing self-reported sexual history, and blood and vaginal samples tested for type-specific L1 antibody titers and HPV DNA, respectively. Viral load was quantified using real-time PCR. We applied group-based trajectory modelling (GBTMs) to longitudinal HPV16 seroreactivity and viral load measurements, categorizing participants into serostatus (low/intermediate/high) and viral load (low/high) groups. We estimated odds ratios (ORs) and 95% confidence intervals (CIs) to assess the association between serostatus and viral load for all women and separately for those with recent (i.e., sexual relationship with their only lifetime vaginal sex partner occurred within the last 6 months pre-enrollment) and previous (i.e., all others) vaginal HPV exposure.

Results: Overall, 14.6% had recent and 85.4% had previous vaginal HPV exposure. Compared to women with low serostatus, those with intermediate serostatus had higher odds of high viral load (OR=4.20, CI=2.35-7.51), with a stronger association in women with high serostatus (OR=8.83, CI=4.74-16.45). This trend persisted across exposure histories, but associations were weaker in women with recent (intermediate serostatus: OR=2.88, CI=0.26-32.26; high serostatus: OR=5.75, CI=0.42=78.10) versus previous (intermediate serostatus: OR=4.00, CI=2.18-7.33; high serostatus: OR=8.36, CI=4.37-16.00) exposure.

Conclusion: The significant positive associations observed between natural HPV16 seroreactivity and viral load suggests that natural humoral immune responses do not indicate effective viral control, reinforcing the importance of HPV vaccination for optimal protection.

Speaker

Kristy Ng

McGill University, Division of Cancer Epidemiology

[B6.4] Patterns of hospitalization rates due to the ‘tripledemic’ of COVID-19, influenza, and RSV in Ontario, Canada

2:15 PM – 2:30 PM

Background: Managing the spread of respiratory infectious diseases (RIDs) is a perennial concern for public health officials. Such diseases are often studied in isolation and, consequently, the effects of cocirculating RIDs are poorly understood.

Objectives: The objective of our study is to examine the seasonal variation of three RIDs---namely COVID-19, influenza, and RSV---and explore the impact of the COVID-19 pandemic on RSV and influenza. This study is a retrospective analysis of an administrative dataset of the ‘tripledemic’ of these three RIDs.

Methods: The dataset was provided by the Institute for Clinical Evaluative Sciences (ICES) and contained hospitalization rates, normalized by population size, due to these three RIDs across Ontario, Canada. The hospitalization rates for the three RIDs were further broken down by age group, sex, location (urban vs rural environment), marginalization index, or community diversity. We first apply a locally estimated scatterplot smoothing (LOESS) technique before comparing different subgroups and testing for statistically significant differences.

Results: We find that, across all three RIDs, hospitalization rates tended to be significantly higher in urban compared to rural environments, in more marginalized compared to less marginalized groups, and in more diverse compared to less diverse communities. Moreover, by analyzing data on influenza and RSV hospitalizations both before and after the introduction of COVID-19, we found a significant shift in both the timing and duration of seasonal waves of these RIDs which could necessitate changes in the timing of annual public health interventions.

Conclusions: Our study found significant disparities in hospitalization rates for COVID-19, influenza, and RSV when stratified by rurality, marginalization, and community diversity. Understanding how RIDs progress and interact over time can guide public health policymakers to design targeted interventions to mitigate the impacts of epidemics.

Speaker

Evan Mitchell

University of Waterloo

[B6.5] Test-adjusted estimation for incidence of pertussis in adults of Southern Ontario, Canada

2:30 PM – 2:45 PM

Background:

Pertussis imposes a significant disease burden on infants and incidence of this disease may be increasing in Canada. Although mild or asymptomatic adult cases can transmit to children, its incidence in adults is not well characterized. Most identified pertussis cases in Canada occur in young children, but they are also the most likely to be tested for pertussis. A test-adjustment method accounting for testing rates by age group can estimate pertussis incidence in adults.

Objectives:

We aimed to estimate the test-adjusted distribution of pertussis incidence by age group and assess the extent of undiagnosed cases contributing to transmission.

Methods:

Data included number of tests, cases, and population from 1993 to 2007 in the Greater Toronto Area. Age categories included infants (<1 year), toddlers (1-4 years), children (5-9 years), teens (10-19 years), and adults (≥20 years). We used a meta-regression-based method for test-adjustment of cases, which estimates the case count in each age group if it were tested at the same rate as the most tested group (for pertussis: infants). We used ratio of adjusted to reported cases to estimate the proportion of undiagnosed pertussis cases in adults.

Results:

Before adjustment, the incidence rate was highest in infants (referent); incidence rate ratio decreased with age (0.28, 0.17, 0.13, 0.01 for toddlers, children, teens, and adults, respectively; all p <0.001). After adjustment, there was no trend in incidence for increasing age for children and teens, but IRR was lower for adults (0.24, 95% confidence interval 0.166-0.356, P<0.001). Estimated undiagnosed cases per reported case were 10.81, 12.45, 7.11, and 25.74 across age groups, respectively.

Conclusion:

Our use of a novel test-adjustment method suggests, consistent with modeling and sero-epidemiological studies, that pertussis is substantially under-diagnosed in older children and adults. Under-diagnosed pertussis in adults may play a key role in sustaining pertussis transmission.

Speaker

Clara Eunyoung Lee

Postdoctoral fellow | University of Toronto

Break

2:45 PM – 3:15 PM | Location: Foyer, Ballroom (4th floor)

Breakout C1: "Advancing Causal Inference through Machine Learning Approaches for Longitudinal Epidemiological Data"

3:15 PM – 4:30 PM | Location: Drummond East Room (3rd floor)

This mini-symposium brings together cutting-edge research at the intersection of machine learning and causal inference, with a focus on longitudinal epidemiological data. As public health and clinical research increasingly rely on real-world data, the complexity of time-varying exposures, confounders, and outcomes presents significant analytic challenges. This session highlights innovative approaches that leverage modern machine learning tools to address these challenges and enhance causal effect estimation over time. Presentations will feature methods incorporating flexible, data-adaptive models suited to high-dimensional and dynamic settings. Topics include longitudinal adaptations of highly adaptive LASSO for outcome modeling, incremental propensity score methods for evaluating treatment retention effects, and sequential target trial frameworks for emulating clinical decision-making over multiple time points. Applications span critical areas of public health including opioid use and maternal outcomes during pregnancy and postpartum, and breast cancer treatment personalization.

Speakers

Ehsan Karim

Assistant Professor | UBC School of Population and Public Health

Mireille Schnitzer

Denis Talbot

Professor | Université Laval

Ashley Naimi

Associate Professor | Emory University

Robert Platt

Professor | McGill University

Breakout C2: "Statistics Canada: Exploring Opportunities for Epidemiology and Biostatistics Research"

3:15 PM – 4:30 PM | Location: Drummond Centre Room (3rd floor)

This session is delivered in partnership with Statistics Canada.

This symposium will explore Statistics Canada's data systems, methodologies, and tools that support epidemiological and biostatistical research. It will provide a broad overview of StatCan data holdings and how to access them, showcase the potential of individual surveys, describe the increased power achieved by linking data, and explore the added value of simulated data. Throughout, there will be a focus on the approaches used to support data disaggregation and its contribution to equity-focused analyses.

Speakers

Shawn Brule
Manager | Statistics Canada

Maikol Diasparra

Steve Trites
Statcan

Harriet Richardson
Epidemiologist | Queen's University

Breakout C3: Occupational Epidemiology

3:15 PM – 4:30 PM | Location: Drummond West Room (3rd floor)

Moderators

Daniel Rainham
Full Professor | Dalhousie University

Nasiba Ahmed
Data Science Platform, George & Fay Yee Centre for Health Care Innovation, University of Manitoba

[C3.1] Silica exposure and risk of respiratory and autoimmune outcomes among two million Ontario workers

3:15 PM – 3:30 PM

Background: Respirable crystalline silica is a prevalent exposure in Canadian workplaces and has been linked to several adverse health outcomes.

Objectives: This study aimed to examine the exposure-response relationships between silica exposure and lung cancer, silicosis, pulmonary fibrosis (PF), rheumatoid arthritis (RA), and sarcoidosis among Ontario workers.

Methods: Workers with work information linked with administrative health records (1983-2019) were identified in the Occupational Disease Surveillance System. Silica exposure estimates were applied using CANJEM job-exposure matrices (JEMs) based on worker occupation. Cox proportional hazard models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CI) for: 1) exposure to silica (yes/no, yes=exposure prevalence threshold of 25%, where ≥ 25% of workers in the occupation are exposed) and 2) increasing categories of exposure frequency, intensity, and frequency-weighted-intensity.

Results: Among 2,368,216 workers, those exposed to silica had an increased risk of lung cancer (HR:1.11, 95%CI:1.07-1.15), silicosis (HR:2.59, 95%CI:2.12-3.15), and PF (HR:1.08, 95%CI:1.02-1.14). No significant increase was observed for RA and sarcoidosis; however, an increased risk of RA was observed when exposure prevalence threshold was increased to 50% and 75%. Exposure-response relationships with increasing frequency (<12hrs, 12-39hrs, 40+hrs) and intensity (low, medium, high) of exposure were observed for lung cancer (frequency HR: 1.00, 1.29, 1.27; intensity HR: 1.07, 1.18, 1.33), silicosis (frequency HR: 1.01, not reportable, 5.82; intensity HR: 0.86, 5.94, not reportable), PF (frequency HR: 0.99, 1.02, 1.26; intensity HR: 0.98, 1.22, 1.64) and RA (frequency HR: 0.97, 1.00, 1.20; intensity HR: 0.98, 1.15, 1.24). Similar increasing trends were observed when evaluating risk by frequency-weighted intensity of exposure.

Conclusion: This study found an increased risk of lung cancer, silicosis, and pulmonary fibrosis among silica-exposed workers as well as a dose-response relationship with increasing levels of silica exposure. Findings also suggest a possible association with rheumatoid arthritis, however further research is needed.

Speaker

Jeavana Sritharan
Scientist | Occupational Cancer Research Centre, Ontario Health

[C3.2] Multiple Bias Modelling of Unmeasured Confounding and Exposure Measurement Error for Associations with Lung Cancer Incidence in the Ontario Asbestos Workers Registry Cohort Study

3:30 PM – 3:45 PM

Background: The burden of asbestos-related lung cancer is projected to increase in Canada as the working population exposed to asbestos ages. The Ontario Asbestos Workers Registry (OAWR) is an exposure surveillance program for the prevention of asbestos-related diseases among construction trades workers in the province. However, suspected confounding due to smoking and underreporting of exposure may limit the informativeness of the OAWR for policy decision-making.

Objectives: We sought to estimate the association between asbestos work-hours and lung cancer incidence among 25,257 workers in the OAWR cohort applying quantitative bias methods to adjust for unmeasured confounding due to smoking and exposure measurement error.

Methods: Workers were followed for lung cancer from 1999 through 2018 in the provincial cancer registry. Cox models were used to calculate hazard ratios (HR) for lung cancer risk by cumulative asbestos work-hours. The relative hazards negative control outcome (NCO) method was used to adjust for confounding due to unmeasured smoking. Misclassification was adjusted using an established probabilistic bias analysis algorithm. Serial multiple bias adjustment combining the smoking and the misclassification adjustment concurrently, was examined through 5,000 simulations.

Results: Smoking-adjusted HR for lung cancer were heterogeneous between the NCOs examined (emphysema 1.01 (95% CI 0.92, 1.11) vs. bladder cancer 1.14 (95% CI 1.01, 1.27), at 100 asbestos work-hours). HRs adjusted for measurement error were modestly attenuated towards the null compared to the unadjusted. Serial multiple bias adjusted results showed more strongly positive associations with longer duration of asbestos exposure compared to the unadjusted results.

Conclusion: Serial multiple bias modelling produced adjusted estimates of lung cancer risk suggesting a modest downward bias in unadjusted results, although results for confounding by smoking were sensitive to the choice of NCO. Quantitative bias assessment methods may support policy decision making by ruling out assumptions regarding the magnitude and direction of suspected biases.

Speaker

Louis Everest

[C3.3] Cross-sectional associations between occupational exposure to endocrine-disrupting chemicals and sex-hormones levels in the UK Biobank

3:45 PM – 4:00 PM

Background: Sex hormones have been shown to affect the development of various cancers. Endocrine-disrupting chemicals (EDCs) can interfere with sex hormone balance and may contribute to cancer development. Workers in certain sectors are exposed to higher levels of EDCs compared to the general population.

Objective: To evaluate the association between occupational exposure to EDCs and sex hormone levels.

Methods: A cross-sectional study was nested within the UK Biobank cohort. Participants with a previous diagnosis of cancer (except non-melanoma skin cancer), endocrine disorders or who were pregnant were excluded from this study. Sex hormones (i.e., serum estradiol, testosterone [nmol/L]) were measured at baseline. Occupational exposure to EDCs was estimated using a job-exposure matrix (JEM) for participants' jobs at baseline. Participants were categorized as "Unexposed", "Possibly exposed" and "Exposed" for ten groups of EDCs: polycyclic aromatic hydrocarbons (PAHs), polychlorinated organic compounds, pesticides, phthalates, organic solvents, bisphenol A, alkylphenolic compounds, brominated flame retardants, metals, and miscellaneous. Multivariable linear regression models were used to estimate betas (β) and 95% confidence intervals (CI) for estradiol and testosterone levels with occupational exposure to EDCs while adjusting for confounders identified with directed acyclic graphs. All models were stratified by men, pre-menopausal women and post-menopausal women.

Results: Occupational exposure to any of the groups of EDCs was not associated with estradiol levels. Among men, possible exposure to PAHs (β=-0.12, 95%CI=-0.20, -0.03) and metals (β=-0.10, 95%CI=-0.17, -0.03) was associated with a reduction in testosterone levels. Among pre-menopausal women, possible exposure to pesticides (β=-0.12, 95%CI=-0.21, -0.04) and exposure to metals (β=-0.07, 95%CI=-0.13, -0.004) was associated with a reduction in testosterone levels. Among post-menopausal women, exposure to phthalates (β=-0.06, 95%CI=-0.12, -0.01) was associated with a decrease in testosterone levels.

Conclusion: Occupational exposure to certain groups of EDCs was associated with a reduction in testosterone levels.

Speaker

Laura Pelland St-Pierre

[C3.4] Lung cancer risk among 2.2 million Ontario workers: Exposure-response associations and joint effects of five carcinogens by sex

4:00 PM – 4:15 PM

Background: Several occupational exposures cause lung cancer, but studies on the effect of joint exposures and sex-specific differences are limited.

Objectives: This study aims to investigate the independent and joint effects of exposure to five occupational carcinogens—asbestos, chromium-VI, nickel, polyaromatic hydrocarbons (PAHs), and silica— on lung cancer risk by sex and histologic subtype.

Methods: A prospective open cohort of 2.2 million Ontario workers was followed for lung cancer diagnoses from 1983 through 2019 in the Ontario Cancer Registry. Baseline occupational exposures were assessed using the Canadian job-exposure matrix (CANJEM), including measures for exposure status (exposed, non-exposed), intensity (low, medium, high) and frequency (<8h/week, 8-40h/week, 40+h/week) for each carcinogen. Cox proportional hazards models estimated independent associations of carcinogen exposure on lung cancer risk overall, by sex, and by subtype, controlling for age, sex, and birth-year. Joint effects will be analyzed using pairwise interaction models assessed on multiplicative and additive scales.

Results: Overall, 36,125 lung cancer cases were identified among 2,223,408 workers. Exposed workers had significantly higher lung cancer risks for all carcinogens (HR_chomium-VI=1.12, 95% CI:1.06–1.18; HR_nickel=1.05, 95% CI:1.01–1.10; HR_PAHs=1.18, 95% CI:1.16–1.21; HR_silica=1.10, 95% CI:1.06–1.14) except asbestos (HR_asbestos=1.00, 95% CI:0.97–1.03). Females had higher risks than males for all carcinogens, ranging from 3% (Silica: HR_females=1.12, 95% CI:0.96–1.31; HR_males=1.09, 95% CI:1.05–1.13) to 28% (Nickel: HR_females=1.31, 95% CI:1.10–1.56; HR_males=1.03, 95% CI:0.99–1.08). Positive exposure-response relationships for exposure frequency and intensity were observed for all carcinogens, with stronger associations among females. Subtype-specific results were similar for adenocarcinoma, squamous cell, and small cell lung cancer.

Conclusions: These findings reinforce the evidence that these five carcinogens increase lung cancer risk, while also suggesting stronger associations among female workers. Ongoing joint effects analysis will improve the understanding of potential interaction effects (e.g., synergistic) of co-occurring exposures on lung cancer risk.

Speaker

Fatima Ali

Research Assistant | Occupational Cancer Research Centre, Ontario Health

[C3.5] The Northwestern Ontario Workplace and Worker Health Study: Preliminary findings

4:15 PM – 4:30 PM

Background: The Canadian workforce is facing a profound workforce crisis, with many workers opting to leave, reduce work hours, or retire prematurely due to workload and unfavourable working conditions. Anecdotally, this is one of Northwestern Ontario's (NWO's) greatest challenges. Yet, we do not have clear estimates of the burden of workplace mental health disorders, nor factors associated with this burden, particularly by sector and other groupings.

Objectives: To determine the prevalence and incidence of mental health outcomes by sector, sex, age and race; and identify workplace risk factors associated with these outcomes in NWO workplaces.

Methods: We designed a prospective cohort study of NWO workplaces and workers. Information on workplace demographics, mental and physical health, workplace factors, personal factors and personal demographics are being collected with standardized instruments, where available.

Results: Data collection for the study started in Sept 2023 and is ongoing. We currently have baseline responses from 68 workplaces and 1,673 workers, with half of the sample from the health care and social assistance sector. Prevalence estimates for mental health disorders vary from 13.4% (95% CI: 11.0, 16.3) to 60% (95% CI: 56.5, 64.6) depending on the method of participation in the study and mental health outcome.

Conclusion: This study will represent the largest cohort study ever conducted in Northwestern Ontario. Our presentation will describe the study design, selected preliminary findings, and how we envision this study to be used as a community research tool for all NWO.

Speaker

Vicki Kristman

Director, EPID@Work Research Institute; Professor, Dept of Health Sciences | Lakehead University

Breakout C4: Indigenous Health and Research on Equity

3:15 PM – 4:30 PM | Location: Salon 7 (3rd floor)

Moderators

Dominique Legacy

ICES

Barada Mohanty

Graduate Research Assistant | University of Saskatchewan

[C4.1] Effects of Public Health Crises on Emergency Department Visits by First Nations Residents of Wood Buffalo, AB: Results from a Retrospective Cohort Study with Interrupted Time Series Analysis

3:15 PM – 3:30 PM

Background: First Nations in the Regional Municipality of Wood Buffalo (RMWB), Alberta, continue to face compounded impacts from multiple traumatic local and global events, including the 2016 Fort McMurray wildfire and the COVID-19 pandemic. These events significantly affected community well-being, with mental health and primary care access as a major priority for recovery and support.

Objectives: This study aimed to assess the impacts of the 2016 wildfire and the COVID-19 pandemic on Emergency Department (ED) use by First Nations residents of the RMWB.

Methods: In collaboration with First Nations partners and health authority staff, and in compliance with OCAP® principles, we conducted a retrospective cohort study using linked administrative health data (2014-2023) from the Alberta Health Ambulatory Care Dataset to evaluate ED visits by First Nations in the region. We applied interrupted time series analysis to assess overall ED trends, with a focus on mental health and primary care-sensitive conditions.

Results: Both crises disrupted health service utilization. The wildfire resulted in a short-term increase in ED visits, particularly for mental health, but had no lasting impact, aside from accelerating the percentage of visits that could be managed in primary care. In contrast, the pandemic caused a sharp (>60%) decline in total ED visits, while mental health-related visits remained steady. After the pandemic, ED visits recovered and continued to rise more quickly than in the pre-pandemic period.

Conclusion: The 2016 Fort McMurray wildfire and the COVID-19 pandemic had significant impacts on ED utilization among First Nations residents of the region. Findings highlight vulnerabilities in primary care access during public health crises and a continued reliance on EDs for mental health care. Strengthening community-based, culturally responsive health services will be critical to improving resilience and ensuring more equitable access to care in future public health emergencies.

Speaker

Erynne Sjoblom

PhD Student | University of Alberta

[C4.2] Age, sex, income and immigration status and lung cancer survival in Canada: a population-level intersectional multilevel analysis

3:30 PM – 3:45 PM

BACKGROUND: Inequalities in cancer survival vary across social identities, including socioeconomic status and immigration status, in Canada. However, social identities do not exist in isolation—they intersect in ways that may shape cancer survival uniquely. Despite increasing research on individual social determinants, little is known about their combined effect.

OBJECTIVES: This study examines intersectional strata based on four social identities to predict lung cancer survival, assess survival distribution across strata, and determine whether each stratum's survival deviates from the additive effect of each social identity (i.e., intersectional effects).

METHODS: All individuals diagnosed with lung cancer were identified from the Canadian Cancer Registry (2002-2010), which was linked to other databases. We applied an intersectional multilevel analysis of individual heterogeneity and discriminatory accuracy (I-MAIHDA) to assess 1-year survival probabilities across 72 strata based on age, sex, income, and immigration status.

RESULTS: Among 183,350 individuals diagnosed with lung cancer, 1-year survival probabilities ranged from 23.3% to 66.9% across intersectional strata. Low-income, long-term resident men generally showed the lowest survival probabilities compared to other strata, conditional on age. In contrast, immigrant women exhibited the highest survival probabilities. Only 5.7% of the total variance in 1-year survival was represented by between-strata variance, with 98.2% of it explained by additive effects. Stratum-specific estimates revealed that low-income, long-term resident men under 60 and low-income immigrant women aged 80 or older had survival probabilities that were 2.8 percentage points lower than expected based solely on additive effects (95% CI: -5.0 to -0.5 and -5.40 to -0.28, respectively). Most intersectional effects diminished after accounting for stage at diagnosis.

CONCLUSION: This study underscores the value of intersectional analyses in identifying populations facing social disadvantages in lung cancer outcomes. These findings are essential for advancing research on cancer inequities and guiding targeted interventions and policies to reduce disparities and improve outcomes.

Speaker

Samia Qureshi

PhD in Epidemiology | McGill University

[C4.3] Prevalence of Multimorbidity and Chronic Diseases in citizens of the Métis Nation of Ontario

3:45 PM – 4:00 PM

Background: Multimorbidity is the co-existence of two or more chronic diseases, with no single condition necessarily being predominant. It is associated with higher healthcare utilization and a lower quality of life. Indigenous Peoples in Canada experience higher rates of multimorbidity and chronic diseases than non-Indigenous populations, yet population-based analyses of multimorbidity among Métis in Canada remain limited.

Objective: This study aimed to examine the prevalence of chronic diseases and multimorbidity in Métis Nation of Ontario (MNO) citizens from 2009 to 2022.

Methods: Registered MNO citizens were linked to administrative health data held at ICES. An existing data algorithm identified individuals with multimorbidity (2+ chronic conditions) among MNO citizens and the Ontario population aged 18+. Annual age-and-sex adjusted prevalence rates of multimorbidity were calculated. In addition, crude age, sex and income quintile-specific rates in the latest year were examined.

Results: The age- and sex-adjusted prevalence of multimorbidity among MNO citizens increased from 54.9 per 100 (CI: 53.7-56.2) in 2009 to 59.6 per 100 (CI: 58.6-60.6) in 2022, remaining consistently higher than in non-MNO citizens. Additionally, female MNO citizens had a higher prevalence of multimorbidity compared to males in both years. The highest prevalence was observed in those aged 65 and older (88.7 per 100), followed by the 45 - 64 age group (68.5 per 100), and those aged 18-44 (38.7 per 100). An income gradient was evident with MNO citizens in the highest income quintile having the lowest prevalence of multimorbidity (55.3 per 100) compared to those in the lowest income quintile (64.8 per 100).

Conclusion: Understanding the burden of multimorbidity in MNO citizens is essential for the MNO to guide program and policy planning, as well as support decision-making related to resource allocation.

Speaker

Noel Tsui

[C4.4] Trends in inequalities in mental health and well-being in Canada 2007-2022: Identifying priority populations and key health inequalities using matrix heat mapping

4:00 PM – 4:15 PM

Background: Identifying priority populations and key health inequalities is essential for guiding public health decision-making.

Objective: Using national surveillance data, we aimed to identify populations facing the highest mental health burden and the greatest worsening of mental health, between 2002 and 2022.

Methods: We analyzed nationally representative data from the Canadian Community Health Survey (CCHS) (2007/2010, 2020/2022) and the Mental Health and Access to Care Survey (MHACS) (2002, 2022). Age-standardized prevalence rates across time points were estimated for 16 indicators of mental illness, healthcare access, and well-being, across 69 disaggregated population groups (defined by 20 social determinants of health). These determinants included age, sex, markers of socioeconomic status, access to healthcare, and racial and social identity. Four estimates were calculated: per time point (1) prevalence and (2) absolute inequalities (prevalence difference, PD), and absolute change in (3) prevalence and (4) in PDs between earliest and latest periods. Benchmarking deviation scores summarized how each group's estimate varied from the most favourable observed estimate, for each outcome. Four heatmaps were generated to visualize disparities in each of the four estimates, respectively, ranking outcomes (columns) by deviation scores, and population groups (rows) by estimate values.

Results: The greatest declines in mental health, the most significant widening of inequalities, and the largest burden and inequities at the latest period were observed among those with food insecurity, low community belonging, who identified as lesbian, gay or bisexual (LGB), and young adults (15-29 years).

Conclusion: Findings align with documented social determinants of mental health. Populations facing life stress regarding basic needs (food insecurity), discrimination and marginalization (LGB), social isolation (low community belonging), and economic, social, and COVID-19-related stressors (ages 15-29 years) were at highest risk of mental health vulnerability. These represent key populations for future research and prevention efforts to reduce disparities and improve well-being.

Speaker

Julia Mazza

Senior Epidemiologist | Public Health Agency of Canada | Agence de la santé publique du Canada

[C4.5] Impact of the COVID-19 Pandemic on Tuberculosis Incidence in Northern Saskatchewan First Nations Communities: A Retrospective Study

4:15 PM – 4:30 PM

Background: Northern Saskatchewan First Nations communities are working towards Canada's tuberculosis (TB) pre-elimination target by 2035, with the goal of reducing active TB incidence by 50% between 2016 and 2025. However, the impact of the COVID-19 pandemic on TB trends in these communities remains unclear.

Objectives: Our study aims to assess the effect of the COVID-19 pandemic on active TB incidence in Northern Saskatchewan First Nations communities.

Methods: We conducted a retrospective secondary analysis using de-identified data from the Northern Inter-Tribal Health Authority (NITHA) TB database. The study period was divided into two phases: pre-COVID-19 (2015-2019) and COVID-19 (2020-2024). We assessed demographic factors such as age, sex, and geographic zone, and calculated annual TB incidence. Statistical differences between phases were examined using chi-squared tests and Student's t-tests. Binary logistic regression further explored the influence of demographic factors on TB notifications during the COVID-19 phase.

Results: We documented a total of 362 active TB cases during the study period. The average TB incidence significantly increased from 63.72 to 117.24 cases per 100,000 population between the pre-COVID-19 and COVID-19 phases ($p = 0.031$). Specifically, TB incidence among children aged ≤14 years increased from 47.15 to 139.74 cases per 100,000 population ($p = 0.034$), and the Far North Central zone incidence rose from 232.47 to 621.20 cases per 100,000 population ($p = 0.043$). Our multivariable analysis revealed significantly higher odds of TB notification during the pandemic among children ≤14 years (AOR = 1.9, 95% CI: 1.13–3.24) and residents of the Far North Central zone (AOR = 5.08, 95% CI: 1.13–22.9).

Conclusion: The COVID-19 pandemic hindered TB prevention and control in Northern Saskatchewan First Nations communities, causing a surge in incidence especially among children and in the Far North Central zone, emphasizing the need for strategies to meet the pre-elimination targets.

Speaker

Emmanuel Dankwah

Lead Epidemiologist | Northern Inter-Tribal Health Authority

Breakout C5: Clinical and Pharmaco-Epidemiology

3:15 PM – 4:30 PM | Location: Salon 8 (4th floor)

Moderators

Anita Koushik

Professor | McGill Division of Cancer Epidemiology

Ifunanya Modebelu

University of Waterloo

[C5.1] Sedative Co-Medication Patterns Across Frailty States in People with HIV: A Network-Based Study

3:15 PM – 3:30 PM

Objective: To describe sedative co-medication patterns across frailty states (robust, prefrail, frail) in people living with HIV using network-based analysis, aiming to identify key medication interactions and network drivers that can guide safer therapeutic approaches.

Methods: This cross-sectional study analyzed 321 participants using sedatives from the Positive Brain Health Now Cohort (mean age: 53 years), categorized as robust (30.2%), prefrail (47.0%), or frail (22.7%). Sedative use was classified using the Sedative Load Model, and frailty was assessed with a modified Fried Frailty Phenotype. Co-medication networks were constructed for robust, prefrail, and frail groups, with metrics such as Neighborhood Shift Scores (NESH) and Delta Betweenness used to evaluate network dynamics. Edge-level Observed-to-Expected (O/E) ratios highlighted significant co-prescription patterns and associated drug-drug interactions.

Results: Frail individuals exhibited the most interconnected network, characterized by higher graph density and average degree compared to robust and prefrail groups. Key ”driver” medications identified were mirtazapine (robust-to-prefrail, NESH score of 2.05), gabapentin (robust-to-frail, NESH score of 2.46), and pregabalin (prefrail-to-frail, NESH score of 2.55). In frail individuals, medication pairs with high O/E ratios (e.g., hydromorphone-clonazepam , O/E: 3.07), posed a potential risk for severe drug interactions requiring therapy modification. Robust individuals displayed fewer and less severe drug interactions, whereas prefrail individuals exhibited an intermediate level of complexity.

Conclusion: Sedative co-medication patterns vary significantly across frailty states in people with HIV, with frailty amplifying risks of severe drug interactions. Identifying key medications as network drivers provides actionable insights to optimize therapeutic approaches, particularly for depression and neuropathic pain management in prefrail and frail stages.

Speaker

Henry Michael

Postdoctoral Associate | University of Calgary

[C5.2] Influence of blood transfusions on postoperative pulmonary complications in liver transplant

3:30 PM – 3:45 PM

Background: Liver transplantation (LT) is the definitive treatment for end-stage liver diseases and select malignancies. Despite advances in surgical care, postoperative pulmonary complications (PPCs), including pulmonary edema and pneumonia, occur in 35–50% of LT recipients. Blood transfusions, while lifesaving, are associated with complications such as Transfusion-Associated Circulatory Overload (TACO), Transfusion-Related Acute Lung Injury (TRALI), and Transfusion-Related Immunomodulation (TRIM), which may exacerbate PPCs.

Objectives: This study evaluated the association between intraoperative transfusions and PPCs within the first postoperative week and their impact on one-year graft and recipient survival. Secondary objectives mirrored the primary objective but focused on perioperative transfusions.

Methods: We conducted a single-center cohort study of adult LT recipients for ESLD (2008–2021). Intraoperative transfusions were analyzed using Fine and Gray models, while perioperative transfusions were assessed as cumulative, time-varying exposures with Cox models. Outcomes included PPC incidence within the first week and one-year graft and recipient survival. Confounders included demographics, preoperative hematologic profiles, preoperative care setting, central venous pressure, phlebotomy, piggyback anastomosis, blood loss, crystalloids/colloids administration, and transplant year. We reported adjusted hazard ratios (aHR) and 95% confidence intervals (CI).

Results: We included 640 LT recipients, of whom 388 (60.6%) were not transfused intraoperatively, while 252 (39.4%) received 1065 transfusions. Including 7-day postoperative transfusions, 422 patients (66%) were transfused. Perioperative transfusions significantly increased PPC risk (aHR: 1.77, 95% CI: 1.18–2.64), particularly pulmonary edema (aHR: 2.30, 95% CI: 1.38–3.82), while intraoperative transfusions alone were not significant. Cumulative RBC units amplified pulmonary edema risk (aHR: 1.12, 95% CI: 1.01–1.26). Perioperative HBPs increased one-year graft loss or death risk (aHR: 1.17, 95% CI: 1.04–1.31).

Conclusion: Perioperative transfusions significantly contribute to PPCs. PPCs should be viewed as part of a broader continuum beyond frameworks like TRALI, TACO, and TRIM. Residual confounding and reverse causality cannot be ruled out. Randomized controlled trials are warranted.

Speaker

Eva Amzallag

[C5.3] Antimuscarinic Medication Use and Risk of Glaucoma: A Literature Review and Disproportionality Analysis Using FAERS

3:45 PM – 4:00 PM

Background: Antimuscarinic medications are first-line treatments for overactive bladder (OAB). Concerns exist regarding their potential association with glaucoma, but evidence remains inconclusive.

Objectives: To review existing literature on the association between antimuscarinic medications for OAB and glaucoma and assess the risk of glaucoma associated with these drugs compared to mirabegron using FAERS data.

Methods: A literature review was conducted using MEDLINE and EMBASE (inception–November 14, 2024). Active-comparator restricted disproportionality analysis (ACR-DA) in FAERS (2004Q1–2023Q4) compared oxybutynin, fesoterodine, darifenacin, solifenacin, tolterodine, and trospium to mirabegron. Reporting odds ratios (ROR), proportional reporting ratios (PRR), adjusted ROR (accounting for age, sex, and weight), and information components (IC025) were calculated for the MedDRA term 'glaucoma.' Analysis followed READUSPV guidelines.

Results: The review identified 11 studies linking oxybutynin and tolterodine to significant increases in intraocular pressure (IOP) and acute angle-closure glaucoma (AACG). In contrast, only 3 studies found an association between fesoterodine, darifenacin, and trospium and an increased risk of glaucoma. Our disproportionality analysis using FAERS data identified 196 antimuscarinic-related glaucoma reports. Compared to mirabegron, antimuscarinic drugs were associated with a threefold higher glaucoma risk (ROR 3.03, 95% CI 2.04–4.50). Tolterodine (ROR 7.75, 95% CI 4.97–12.07), fesoterodine (ROR 4.00, 95% CI 2.45–6.53), and darifenacin (ROR 4.19, 95% CI 2.18–8.08) and solifenacin (ROR 2.42, 95% CI 1.51–3.85) showed significant safety signals, while trospium (ROR 0.72, 95% CI 0.10–5.27) and oxybutynin (ROR 0.73, 95% CI 0.36–1.46) did not.

Conclusion: Antimuscarinic OAB medications, particularly tolterodine, fesoterodine, and darifenacin, may increase glaucoma risk. Clinicians should be aware of potential glaucoma risks when prescribing antimuscarinic drugs, especially for older adults. However, these findings represent a signal that requires confirmation through further pharmacoepidemiological studies before refining prescribing guidelines.

Speaker

Mohammad Ali Omrani

Western University

[C5.4] Risk of severe exacerbation associated with gabapentinoid use in patients with chronic obstructive pulmonary disease: a population-based cohort study

4:00 PM – 4:15 PM

Background: Gabapentinoids have been linked to adverse respiratory events, with particular concern for individuals with risk factors such as chronic obstructive pulmonary disease (COPD). However, real-world evidence on the risk of adverse respiratory outcomes associated with gabapentinoid use in this population remains limited.

Objective: We assessed the risk of severe COPD exacerbation associated with gabapentinoid use in patients with COPD.

Methods: We assembled a base cohort of patients aged ≥ 55 years newly diagnosed with COPD between 1993 and 2021 using the UK's Clinical Practice Research Datalink, linked to the Hospital Episode Statistics, and Office for National Statistics datasets. Using a time-conditional propensity score (TCPS)-matched new-user design, patients prescribed gabapentinoids with an indication of epilepsy, neuropathic pain, or other chronic pain were matched 1:1 with non-users with the same indication on age, sex, calendar year, COPD duration, and TCPS. Cox proportional hazards models were used to estimate the hazard ratio (HR) and 95% confidence interval (CI) of severe exacerbation associated with gabapentinoid use compared to non-use in the overall cohort, and by indication.

Results: The study cohort comprised 29,882 gabapentinoid users, including 1256 with epilepsy, 19,155 patients with neuropathic pain, and 9471 with other chronic pain matched 1:1 with non-users. Patients were followed up for a mean duration of 1.25 years in the overall cohort. Compared with non-use, gabapentinoid use was associated with an increased risk of severe exacerbation in the overall cohort (HR 1.43; 95% CI: 1.35-1.52), and among patients with epilepsy (HR 1.39; 95% CI: 1.11-1.74), neuropathic pain (HR 1.43; 95% CI: 1.32-1.54), and other chronic pain (HR 1.45; 95% CI: 1.31-1.60).

Conclusion: In this large population-based cohort study, gabapentinoid use was associated with an increased risk of severe exacerbation among patients with COPD. This risk remained consistent among patients with neuropathic pain, epilepsy, and other chronic pain.

Speaker

Omotayo Olaoye

Doctoral Candidate | Centre for Clinical Epidemiology, Lady Davis Institute for Medical Research, Jewish General Hospital, Mon…

[C5.5] Reoperation Rates and Pain-Related Outcomes Following Hysterectomy in Patients with Pathologically Confirmed Endometriosis by Oophorectomy Status

4:15 PM – 4:30 PM

Background: Oophorectomy during hysterectomy for endometriosis may reduce repeat operations, but existing evidence is mixed and has not been generated in cohorts of patients with pathologically confirmed endometriosis.

Objectives: This study aimed to provide insights into the rates of reoperations and pain-related healthcare utilization after hysterectomy for endometriosis using a cohort of patients with histopathologically confirmed disease.

Methods: We conducted a population-based retrospective cohort study of 990 patients aged 19-50 with pathologically confirmed endometriosis who underwent hysterectomy in British Columbia, Canada, between 2001 and 2016. The primary outcome was reoperation. Secondary outcomes were physician visits for endometriosis and prescriptions for opioids, oral contraceptives (OCPs), and endometriosis medications. We also examined rates of hormone replacement therapy (HRT) in those rendered prematurely menopausal. Kaplan-Meier curves and Cox proportional hazards models, adjusted for age, income, surgical history, and route of surgery, were used for analysis.

Results: Hysterectomy with bilateral salpingo-oophorectomy (BSO) was associated with significantly lower reoperation rates compared to hysterectomy alone (4.9% vs. 19.2%, respectively). The commonest indications for reoperation included pelvic adhesions, recurrent endometriosis, and endometrioma. No significant differences were observed in physician visits, as well as the use of opioids, OCP and endometriosis medications. Only 67.2% of the patients rendered prematurely menopausal due to BSO received HRT.

Conclusion: Hysterectomy with BSO was associated with lower reoperation rates but did not demonstrate improvements in pain-related healthcare use. The low uptake of HRT among patients undergoing BSO raises concerns about the long-term health impacts of premature surgical menopause. Given these risks, the decision to perform oophorectomy at the time of hysterectomy for endometriosis should carefully weigh the benefits of reduced reoperation rates against the potential drawbacks of early menopause and suboptimal HRT use

Speaker

Ali Salmanpour

UBC

Breakout C6: Nutrition and Physical Activity

3:15 PM – 4:30 PM | Location: Salon 6 (3rd floor)

Moderator

Daniel Fuller

Co-Principal Applicant | CapaCITY-CapaCITÉ

[C6.1] Adjusting for meal caloric intake vs. density to assess the quality of specific meals: implications for meal-based nutritional analyses

3:15 PM – 3:30 PM

Background: Nutritional epidemiology commonly examines the quality of the overall diet consumed by individuals, but assessing the quality of specific meals can help identify intervention targets to inform the upcoming National School Food Program. Yet meal-based analyses rarely adjust for differences in meal size and composition.

Objectives: We examined whether the choice of a covariate (i.e., meal caloric intake vs. density) affects the estimates of diet quality and dietary outcomes.

Methods: Dietary data were derived from a school-based survey of 2,366 students (9-14 years, 49% girls) from 32 schools in Alberta and Ontario, Canada. Students completed a 24-hour diet recall, indicating foods/drinks for each meal/snack (breakfast, lunch, dinner, morning/afternoon/evening snack). We employed hierarchical linear models (meals clustered within students) to assess associations between meals (reference: breakfast) and log-transformed dietary outcomes (vegetables & fruit, dairy, free sugars), while adjusting for sociodemographic characteristics. Separate models were adjusted for meal caloric intake and density.

Results: When adjusting for meal caloric density, lunch and dinner were associated with 11.3 (95% CI 4.6-18.5) and 16.1 (95% CI 8.8-23.9) percent higher dairy consumption, as expected, since milk is a staple in children's main meals. The associations reversed when adjusting for meal caloric intake. Similar unexpected findings were noted for the associations between lunch and dinner and vegetables & fruit consumption: -32.8 (95% CI -38 to -27.1) and -20.7 (95% CI -26.9 to -14.1) percent, respectively. However, snacks (particularly evening snacks) were positively associated with consumption of free sugars, regardless of the covariate selected.

Conclusion: Adjusting for meal caloric intake may introduce bias in meal-based analyses, the extent of which appears to depend on the caloric density of the dietary outcome of interest. Meal-based studies should justify their choice of covariates to account for differences in meal size and composition and include sensitivity analyses with both covariates.

Speaker

Julia Dabravolskaj

Senior Research Associate | St. Michael's Hospital

[C6.2] Comparison of dose-response association between the duration of physical activity and cardiovascular disease across three wearable-derived measures of physical activity: a cohort study.

3:30 PM – 3:45 PM

Background: Physical activity is a preventive factor in reducing cardiovascular disease risk. While the dose-response relationship between physical activity duration and cardiovascular disease incidence has been extensively studied using wearable devices, findings remain inconclusive due to the lack of standardized measures of physical activity derived from wearable device signals. This study is the first to compare dose-response associations estimated from three derived measures of physical activity: activity count (the most commonly used measure), vector magnitude (a recently developed measure), and machine learning (the least commonly used measure).

Methods: We computed three derived measures of moderate-to-vigorous physical activity from 7-day accelerometer data collected in 2013 from the UK Biobank accelerometer sub-cohort. The outcomes examined were incident stroke and myocardial infarction, with follow-up until December 2022. Cox proportional hazard models with restricted cubic splines were used to estimate associations for each physical activity measure. We evaluated the agreement of these measures with the gold standard: camera-recorded and manually annotated 24-hour physical activity duration.

Results: Among the 92,854 outcome-free participants of the 2013 accelerometer sub-cohort, 3,311 developed cardiovascular diseases. The agreement with the gold standard (Spearman's correlation coefficient) was 0.37, 0.50, and 0.78 for activity account, vector magnitude and machine learning, respectively. The shape of the association varied across the derived measures, with hazard ratios declining up to approximately 500–700 minutes/week for vector magnitude and activity count, while machine learning showed a nearly linear decrease. The association suggested greater cardiovascular benefits of physical activity for females than for males.

Conclusions: The association markedly differed in machine learning from the two commonly used measures. Although least commonly used to derive physical activity from wearable devices, machine learning may be the most accurate method to estimate the association. Current evidence measures of the association may need to be revisited for cardiovascular disease prevention.

Speaker

Yacine Lapointe

Competition Law Officer | Competition Bureau Canada

[C6.3] Clinical and Participant-Reported Outcomes of an Online Motivational Interviewing Intervention for Young Adults: Results from the MOTIVATE Pilot RCT

3:45 PM – 4:00 PM

Background:

Establishing healthy behaviors in young adulthood is essential to reducing long-term risk for chronic disease and promoting population health. This life stage presents an opportunity to support individuals in developing sustainable habits related to physical activity, nutrition, and mental well-being. Motivational interviewing (MI) is a collaborative, counselling style that strengthens a person's own motivation for change.

Objectives:

To evaluate the impact of a 6-month online MI-based intervention on clinical outcomes and participant-reported experiences in young adults aged 18-29.

Methods:

We conducted a pilot randomized controlled trial (RCT) with 101 university students (intervention = 52; control = 49). The intervention group received monthly online MI sessions and educational materials based on national guidelines; the control group received educational materials only. Clinical outcomes included BMI, physical activity, dietary behaviors, quality of life (QOL), and mental health, assessed at baseline and every two months via wearable trackers, self-reported weight, and validated surveys. Participant satisfaction and qualitative feedback were collected at study completion. Analyses followed CONSORT recommendations for pilot trials.

Results:

Overall, participant satisfaction was high, with a mean score of 3.9 (SD = 0.99) on a 5-point Likert scale. Modest BMI reductions were observed in both the intervention group (–0.3 kg/m², 95% CI: –0.56, –0.04) and the control group (–0.5 kg/m², 95% CI: –0.97, –0.03). Improvements in physical activity, dietary behaviors, and QOL domains (particularly self-care and anxiety reduction) were not statistically significant. No changes were observed in depressive symptoms or anxiety. Feedback highlighted perceived benefits including regular check-ins, habit tracking, and increased self-awareness, while suggested improvements included more tailored feedback and strategies for long-term support.

Conclusion:

This RCT suggests that an online MI-based intervention is acceptable to young adults and may contribute to modest improvements in health-related outcomes. Participant feedback offers valuable insights to refine future interventions.

Speaker

Taylor Incze

MD/PhD(c) | McMaster University

[C6.4] Health by Association: The Potential Influence of Personal Social Networks on Health Behaviours

4:00 PM – 4:15 PM

Background : Personal social networks (PSNs) may influence health behaviours both favourably and unfavourably.

Objective: To estimate the associations between compositional and structural features of PSNs and health related behaviours in young adults.

Methods: Data were from the QUALITY study (n=630 families). In this ongoing sub-study, participants (egos) mapped their PSNs using a name generator to identify people with whom they feel close and discuss important matters (alters). Egos reported the times/week they did physical activity (PA) during their leisure time (≥3 Vs. <2), and the usual nutritional quality of food consumed (good/excellent Vs. poor), for themselves, and for each of their alters. Network proportions for alter behaviours were ranked (low/middle/high). All network features were analyzed continuously. We used multivariable logistic regression to estimate the odds of healthy behavioural outcomes in egos associated with network compositional (tertiles of active and healthy eating alters) and structural (size, density, degree) features, in separate models, controlling for ego's age, gender and education.

Results: Of the 103 egos (61F/40M/2 other) recruited to date, 43% were active and 67% had a healthy diet. On average, PSNs comprised 46% friendships, 38% kin, 13% partners, and 3% other. Median (IQR) was 7 (4-9) alters for network size, 76% (60%-96%) for density, and 4 (2.4-6) average ties/alter for degree. A one-tertile increase in the network proportion of active alters was associated with greater odds of the ego being physically active (OR=3.38; CI=1.87–6.51). A one-tertile increase in the proportion of healthy eating alters was associated with greater odds of the ego eating healthfully (OR=2.14; CI=1.22–3.88). Network structural features were not meaningfully associated with ego health behaviours.

Conclusions: PSN composition appears to be implicated in shaping young adult health behaviours. Greater consideration of social influence may be warranted when designing health interventions.

Speaker

Tannis Nelson

[C6.5] Can we classify natural health products using the Licensed Natural Health Products Database and machine learning?

4:15 PM – 4:30 PM

Background: Natural health products (NHP) encompass a variety of substances (e.g., fish oil, vitamins) that are widely used in Canada, especially by people with chronic conditions. Very little and outdated information is available on which products are used, for what reasons, and how much they cost. This is a limitation for reproducible pharmacoepidemiological studies. A classification index of NHPs, similarly to the WHO Anatomical Therapeutic Chemical (ATC) classification for drugs, would help standardize and enable large-scale analyses of usage and outcomes. A major challenge lies in the fact that the information available for NHPs is heterogeneous.

Objectives : This project aims to establish a classification index for NHP using available data from Health Canada.

Methods : Using web scraping and relational database tools (scrappy, postgresql), we extracted data from the Licensed Natural Health Products Database (LNHPD) of Health Canada. We used natural language processing (spacy) to organize the information about risks and recommended use of products.

Results: A total of 140,979 NHPs were retrieved from the LNHPD, containing 6,232 distinct medicinal ingredients and 11,034 distinct nonmedicinal ingredients. NHPs contained a mean of 3.6 medicinal ingredients, with great variability as there were a minimum and a maximum of 1 and 110 respectively. The three most frequent medicinal ingredients were vitamin C (included in 7.1% of NHPs), vitamin D (6.1%), and vitamin B6 (5.4%). Per NHP, a mean of 1.94 and 3.75 recommended use and risk information respectively were documented.

Conclusion and future work: We extracted and organized NHP registered in the LNHPD to produce descriptive statistics. Further work is needed to establish hierarchical relationships as in the WHO ATC and to delineate distinct risks. Our proposed classification will facilitate studies regarding medications and NHP interactions.

Speaker

Yohann Moanahere Chiu

Transition to Plenary

4:30 PM – 4:50 PM

Rapid Fire Presentations

4:50 PM – 5:00 PM | Location: Ballroom (4th Floor)

Factors Associated with Lower-Risk Cannabis Use in Prime Working-Age Adults

4:50 PM – 4:55 PM

Background: Harm reduction strategies encourage cannabis users to adopt lower-risk behaviors, such as refraining from daily or intensive use or limiting simultaneous use with other psychoactive substances. However, little is known about characteristics of lower-risk users. This study compared the characteristics of lower-risk cannabis users with those of non-users and problematic users.

Methods: Cross-sectional data on 731 adults (mean [SD] age 35 [0.6] years; 57.5% female) were drawn from the Nicotine Dependence in Teens study, collected in 2022–23. Problematic cannabis use was assessed using the Cannabis Abuse Screening Test (CAST). Sociodemographic, mental health, and lifestyle factors, as well as patterns of cannabis use, were compared across non-users, lower-risk, and problematic users using cross-tabulations and log-binomial regression models controlling for age, sex, and education.

Results: Of 731 participants, 44% reported past-year cannabis use; of these, 63% were lower-risk users. Compared to problematic users, lower-risk users were more likely to be female, use cannabis less frequently, use alcohol and cannabis simultaneously, and report no mental health impact from cannabis. Problematic cannabis use was associated with daily cannabis use and regular cigarette smoking. However, daily/weekly users who used cannabis and alcohol simultaneously and those employing avoidance-coping strategies were more likely to report lower-risk cannabis use.

Conclusion: Lower-risk cannabis users resemble non-users more than problematic users. While use frequency is key, other factors, such as cigarette smoking, distinguish problematic from lower-risk use. Findings underscore the importance of harm reduction strategies and evidence-based education for cannabis-related policies.

Speaker

Guillaume Dubé

Université De Montréal

Population Attributable Mortality Associated with Respiratory Viruses in Ontario

4:55 PM – 5:00 PM

Background: Respiratory illnesses pose a significant health burden and can cause substantial mortality. Many respiratory viruses are vaccine-preventable or have effects that can be attenuated through vaccination. Prioritizing vaccination programs depends on understanding their potential to prevent morbidity and mortality. While cause-specific death data exist, coding limitations in assigning accurate causes are well known. Regression-based approaches offer an indirect method to estimate population-attributable fractions (PAF). Objective: We aimed to calculate the PAF for influenza A and B, and respiratory syncytial virus (RSV) from 1993 to 2024, and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from 2020 to 2024 in Ontario, Canada.

Methods: Laboratory surveillance data for influenza A, B, and RSV were available from 1993 via FluWatch. SARS-CoV-2 percent positivity was available from September 2022 to August 2024, and test-adjusted case data from March 2020 to September 2022. Death data were obtained from Ontario Vital Statistics (1994-April 2024) and StatCan (1993). Negative binomial models accounted for baseline trends and seasonality. Virological coefficients were added, and PAFs with 95% confidence intervals (CIs) were estimated by setting virus model coefficients to zero.

Results: Before 2020, influenza A had the highest predicted deaths (39,565, PAF=0.018 [95% CI: 0.014-0.022]). After 2019, SARS-CoV-2 surpassed influenza A in predicted deaths (18,051, PAF=0.035 [95% CI: 0.023-0.048] while influenza A declined during the pandemic (4,257, PAF=0.008 [95% CI: 0.006-0.010]). PAFs for influenza B and RSV were low and declined with SARS-CoV-2's emergence. Predicted SARS-CoV-2 deaths aligned with reported COVID-19 deaths in Ontario (18,602).

Conclusion: SARS-CoV-2 has surpassed influenza A as the leading cause of attributable respiratory mortality in Ontario. Model-based estimates closely matched reported COVID-19 deaths, suggesting high completeness of reporting. These findings highlight the importance of vaccination programs against SARS-CoV-2 and influenza A to prevent substantial excess mortality.

Speaker

Alicia Grima

PhD Candidate | Teaching Assistant | Dalla Lana School of Public Health, University of Toronto

Working Together: Applying Community-Engaged and Epidemiological Methods to Understand Immigrant and Refugee Health and Wellness

5:00 PM – 6:15 PM | Location: Ballroom (4th Floor)

This collaborative presentation with community partners and epidemiologists will share experiences exploring immigrant and refugee health and wellness using large, linked administrative health databases and epidemiological methods alongside community-engaged participatory action research.

Speakers

Susitha Wanigaratne

Senior Research Associate | Edwin S.H. Leong Centre for Healthy Children, SickKids Research Institute

Marcelo Urquia

Professor | University of Manitoba

Manvir Bhangu

Lead, System Strategy, Planning, Design & Implementation | Ontario Health | Santé Ontario

Kripa Sekhar

Executive Director | South Asian Women's Centre

Organizers

Sarah Edwards

Jeavana Sritharan

Scientist | Occupational Cancer Research Centre, Ontario Health

Moderator

Nathan Nickel

Professor | University of Manitoba

Free Time to Socialize and Network!

6:15 PM – 10:30 PM

With such a fabulous, jam-packed line up of incredible presentations throughout the conference, we have arranged for Tuesday night to be a **free night** with no organized conference activities. Get together with friends and colleagues!

We invite participants to use the **Meet-Up** function of the conference app to organize dinners or activities together and enjoy an evening of socializing.

Enjoy a nice meal in beautiful Montreal. **Need restaurant ideas**? The conference co-chairs have put together an extensive list of recommended restaurants! The downtown restaurants are relatively close to the Sheraton. Those with a "chic" label are more upscale. Some require reservations. Bon appétit! CLICK HERE

Wednesday, August 13, 2025

Breakfast

7:30 AM – 8:30 AM | Location: Ballroom (4th Floor)

Breakfast Session: Meet the Editors (limited seating available)

7:30 AM – 8:35 AM | Location: Drummond East Room (3rd floor)

Join this session for a lively breakfast discussion.

Eduardo L. Franco is a Distinguished James McGill Professor and Interim Director of the School of Population and Global Health, former Director of the Division of Cancer Epidemiology (1994-2024), and former Chairman (2011-2023) of the Department of Oncology at McGill University in Montreal. Since 1985, he has conducted epidemiologic research on the causes of cancer and the means to prevent it or improve patient survival, on which he has published over 600 articles and two books. He is the Editor-in-Chief of the Journal of the National Cancer Institute, Editor-in-Chief Emeritus of Preventive Medicine, and Senior Editor of eLife. He is an Officer of the Order of Canada and a Fellow of the Royal Society of Canada and the Canadian Academy of Health Sciences.

Dr. Laura C. Rosella is a Full Professor at the Dalla Lana School of Public Health, University of Toronto, and holds a Canada Research Chair in Population Health Analytics. She founded the Population Health Analytics Laboratory, pioneering data-driven approaches to improve population health. She is the Chief Scientist at the Institute for Better Health, Trillium Health Partners, and has authored over 310 peer-reviewed publications. She is the Editor-in-Chief of the Canadian Journal of Public Health. She has received numerous recognitions for her health system impact, including Canada's Top 40 under 40, member of the Royal Society of Canada's (RSC) College of New Scholars, and winner of the CIHR Institute of Population and Public Health (IPPH) Mid-Career Trailblazer Award.

Robert Platt is Professor in the Departments of Epidemiology, Biostatistics, and Occupational Health, and of Pediatrics, at McGill University. He holds the Albert Boehringer I endowed chair in Pharmacoepidemiology. Dr. Platt is Principal Investigator of the Canadian Network for Observational Drug Effect Studies (CNODES). His research focuses on improving methods for the study of medications using administrative data, with an emphasis on methods for causal inference and a substantive focus on medications in pregnancy. Dr. Platt is an editor-in-chief of Statistics in Medicine and is on the editorial boards of the American Journal of Epidemiology and Pharmacoepidemiology and Drug Safety. He has published over 400 articles, one book and several book chapters on biostatistics and epidemiology. Dr. Platt is a fellow of the American Statistical Association and of the International Society for Pharmacoepidemiology

Speakers

Robert Platt

Professor | McGill University

Eduardo Franco

Professor | McGill University

Laura Rosella

Dalla Lana School of Public Health - Division of Epidemiology

Registration Desk

7:30 AM – 4:30 PM

Rapid Fire Presentations

8:35 AM – 8:45 AM | Location: Ballroom (4th Floor)

Infant mortality rates by immigration status among Black and White individuals in the United States

8:35 AM – 8:40 AM

Background: While racial disparities in infant mortality in the United States (US) have been well established, the intersection between race and nativity status has not been well-studied in the context of infant mortality.

Objective: We aimed to examine the association between nativity status and infant mortality among Black and White individuals in the US.

Methods: We conducted a population-based, retrospective cohort study on US live births (2016-2022) with data obtained from the National Vital Statistics System linked Natality and Infant Death files. Maternal race and nativity status were self-identified and collected at time of birth. Infant death was defined as death within 364 days of life. Logistic regression was used to quantify the relationship between maternal nativity status and infant mortality among Black and White individuals, adjusting for maternal demographic and socioeconomic characteristics. Additional models were fit in cohorts restricted to preterm and term births.

Results: Among 16,639,709 births, 21.6% and 78.4% were born to Black and White individuals, respectively. Overall, the rate of infant mortality was 5.5 per 1,000 births. Among Black individuals, the odds of infant mortality were higher among US-born compared to non-US-born individuals (10.6 vs 6.7 per 1,000; aOR: 1.52, 95% CI: 1.47-1.58). While the infant mortality rate was substantially lower, the same relationship was seen among White individuals (4.3 vs 3.0 per 1,000; aOR: 1.36, 95% CI: 1.31-1.42). When disaggregated into preterm and term cohorts, these patterns persisted among term births but were not apparent among preterm births.

Conclusion: US-born individuals have higher odds of infant mortality in both Black and White individuals compared with non-US-born individuals. The rate of infant mortality is two-fold higher among Black individuals. These results highlight the impact of nativity status and race on infant mortality, emphasizing the need for further investigation into the underlying factors contributing to these disparities.

Speaker

Nicolette Christodoulakis

Research Assistant | McMaster University

Examining the Relationship Between Oral and Cardiovascular Age Using Deep Learning

8:40 AM – 8:45 AM

Background: Aging is a complex, multifactorial process that affects each organ system differently. Organ-specific aging can provide insights into the health status of these systems. Although strong evidence supports an association between oral health and cardiovascular health, the distinct aging processes of the oral cavity and cardiovascular system remain poorly characterized. Therefore, this study aims to address this gap by examining the relationship between oral and cardiovascular age.

Objectives: (1) to estimate oral and cardiovascular age using deep learning models based on respective health measures and (2) to estimate the association between the oral and cardiovascular age gaps.

Methods: We utilized data from 1312 participants in NHANES 2001–2003. Deep learning models were trained to predict oral age from oral health measures and cardiovascular age from cardiovascular health measures, with epigenetic biomarkers and demographic variables included in both models. Model performance was evaluated using root mean square error (RMSE) and correlation coefficients. Age gaps were calculated as the difference between predicted and chronological age. Linear regression, adjusted for chronological age and sex, was used to examine the association between oral and cardiovascular age.

Results: Both the oral and cardiovascular age estimation models demonstrated strong predictive performance, with test RMSE of 1.6 and 1.3 and correlation coefficients of 98.7% and 99.1% respectively. The mean oral and cardiovascular age gaps were 0.03 years and 0.32 years, respectively. Adjusted regression analysis revealed that for each one-year increase in oral age gap, the cardiovascular age gap increased by 0.68 years (95% CI: 0.60–0.77).

Conclusion: Preliminary findings suggest an association between oral and cardiovascular aging, reinforcing the systemic link between oral and cardiovascular health. Future work will validate these findings, explore additional biomarkers, and assess its potential as early predictor of cardiovascular risk based on oral health.

Speaker

Harsimran Singh Kapoor

PhD Trainee, McGill University

Inspiring the Next Generation of Epidemiologists & Biostatisticians: Why Effective Teaching and Mentoring Matter to All of Us

8:45 AM – 10:00 AM | Location: Ballroom (4th Floor)

Panel members will share their personal experiences and strategies to teach, mentor, and inspire students to excel in epidemiology and biostatistics.

Speakers

Lisa Sullivan

Associate Dean for Education, Professor of Biostatistics | Boston University School of Public Health

Josée Dupuis

McGill University, Department of Epidemiology, Biostatistics and Occupational Health

Yutaka Yasui

Organizer

Cheryl Currie

Professor | Professor, Department of Epidemiology & Biostatistics; Director, Interfaculty Program in Public Health, Schulich Schoo…

Break

10:00 AM – 10:30 AM | Location: Foyer, Ballroom (4th floor)

Breakout D1: "Canada's Health Data Landscape, Present and Future: Impacts on Research, Policy and Decision-Making"

10:30 AM – 11:45 AM | Location: Drummond East Room (3rd floor)

This session is delivered in partnership with Statistics Canada.

Canada's health data landscape is highly fragmented: complementary data are collected and held by various federal, provincial-territorial, and other organizations, with different access options. This sometimes poses major challenges to researchers and analysts, who are not always aware of the data available or how to access them. Consequently, we are not reaching the full potential of these data for research, policy development and decision-making, and are therefore not doing as well for health outcomes for Canadians as we could. By bringing together representatives from leading health data organizations, this panel will provide clarity on the data landscape and where it is going, empowering researchers to better leverage Canada's health data. Starting the panel, Statistics Canada will discuss the current situation and the plans for increased collaboration and alignment that will achieve a more coherent landscape, improved health data, and better access options. Next, each organization will situate themselves within this discussion, describing their roles, data holdings, and other key features of their work: Statistics Canada for the health of Canadians, determinants of health, and access to care; and the Canadian Institute for Health Information for health care and health systems. Finally, the Health Data Research Network Canada will discuss its Data Access Support Hub, a one-stop data access service portal that provides an inventory of data holdings and tools to facilitate data access. Through this panel, the audience will better understand Canada's current health data landscape, engage in discussion about its future direction, and be better able to find and access the key data they need for their projects. This will improve equitable data access among researchers and analysts from all backgrounds and help deliver insights that contribute to improved health outcomes and equity in Canada.

Speakers

S

Steve Trites

Statcan

Jennifer DSilva

CIHI

J

Jordan Hunt

Breakout D2: "Advancing Public Health with AI: Applications and Innovations in Epidemiology"

10:30 AM – 11:45 AM | Location: Drummond Centre Room (3rd floor)

Speakers

Laura Rosella

Dalla Lana School of Public Health - Division of Epidemiology

Darren Brenner

Dan Lizotte

Associate Professor | Western University

L

Lief Pagalan

Matt Warkentin

Postdoctoral Fellow | University of Calgary

M

Marshall Lloyd

Breakout D3: Bayesian Methods

10:30 AM – 11:45 AM | Location: Salon 7 (3rd floor)

Moderators

Cindy Feng

Omotayo Olaoye

Doctoral Candidate | Centre for Clinical Epidemiology, Lady Davis Institute for Medical Research, Jewish General Hospital, Mon…

[D3.1] Uncertainty aware deep learning for oral cancer diagnosis

10:30 AM – 10:45 AM

Background: Oral cancer is one of the ten most common cancers worldwide, with most cases detected at late stages leading to poor survival. Accurate diagnosis of oral lesions, some of which may be malignant, is essential to lessen the disease burden. Deep learning (DL) methods have recently succeeded in image recognition, prompting its use to reduce diagnostic delays and uncertainty. However, most DL models do not produce any estimate of their predictive uncertainty and often perform poorly in out-of-distribution settings.

Objective: We develop an evidential deep learning (EDL) model that accurately classifies oral lesion types from intra-oral images while providing uncertainty estimates. We also compare the EDL model with a Bayesian DL approach in uncertainty quantification.

Methods: A retrospective cohort of electronic health record gathered by an oral pathologist during routine examinations, was used. Ground truth labels were obtained via biopsy or expert diagnosis. The dataset includes 12,865 images of 66 oral lesions from 6000 patients. Model: An EfficientNet-B5 pretrained on ImageNet served as the backbone. Two approaches were compared: (i) Evidential Deep Learning (EDL), which uses the Dempster-Shafer Theory to estimate Dirichlet distribution parameters, and (ii) MC-DropConnect (MCDC), an approximate Bayesian method that produces samples from the posterior predictive distribution.

Results: The EDL model achieved an average F1-score of 71.4% versus 69.7% for MCDC. Both models had similar discrimination (AUC = 0.94 and 0.92, respectively), though the EDL produced better-calibrated probability estimates.

Conclusion: Our study shows that both uncertainty-aware DL approaches perform comparably for oral lesion diagnosis. However, the EDL model offers the benefit of reliable uncertainty quantification without requiring multiple forward passes. These findings highlight the potential of uncertainty-aware DL models to improve decision-making in oral cancer diagnosis.

Speaker

Sreenath Madathil

McGill University

[D3.2] Bayesian Group-Sequential Design in Cluster Randomized Trial: Impact of Type I Error Control

10:45 AM – 11:00 AM

Group-sequential designs (GSDs) reduce expected sample sizes by allowing early stopping at interim analyses. While both Frequentist and Bayesian frameworks can implement GSDs, Bayesian GSDs offer greater flexibility by incorporating external information like historical data, improving efficiency and interpretability. Despite their potential to address challenges in cluster randomized trials (CRTs) with limited clusters, their application in CRTs has been minimal.

This study evaluates Bayesian GSDs in cross-sectional multiple-period CRTs with a baseline period, where outcomes are measured at regular intervals before and after the intervention. We focus on two scenarios:

1.Comparing Bayesian GSDs with non-informative priors (normal prior, mean = 0, precision = 0.001) to Frequentist fixed designs, managing Type I error rates.

2.Assessing Bayesian GSDs with informative priors (normal prior, mean = effect size, precision = 0.5), both with and without Type I error control.

Results show Bayesian GSDs with non-informative priors achieved similar power and controlled Type I error rates compared to Frequentist designs, while reducing expected sample sizes by up to 40%. When using informative priors with Type I error control, performance mirrored that of non-informative priors. Without Type I error control, statistical power increased by up to 17% (Type I error = 0.09). Results varied with prior informativeness.

In conclusion, Bayesian GSDs in CRTs allow for reductions in sample size primarily due to the sequential design, not informative priors, when Type I error control is required. These findings align with prior studies in individually randomized trials. Informative priors reduce sample sizes further only if Type I error rates are relaxed. Regardless of Type I error control, Bayesian methods enhance efficiency and enable the integration of existing evidence, increasing interpretability.

Speaker

Yongdong Ouyang

Roswell Park Comprehensive Cancer Center

[D3.3] Semi-implicit variational inference as an alternative to MCMC for geostatistic models

11:00 AM – 11:15 AM

Background: Environmental quantities such as concentration of PM 2.5 or temperature are commonly measured at geocoded locations across a defined region. In a spatial analysis, we want to incorporate the potential for correlation between locations. In such problems, it is often assumed that the spatial structure (i.e., the correlation between locations) is captured by a Gaussian Process (GP) over the region of interest. The estimation of the parameters of a GP can be computationally expensive when using the Bayesian paradigm as each iteration of a standard Markov Chain Monte Carlo (MCMC) algorithm involves operations of order $O(n^3)$, where n is the sample size. Hence, it becomes impracticable for moderate sample sizes.

Objectives: Our main objective is to find a faster alternative to estimate the parameters of a GP and perform predictions at new locations while correctly providing uncertainty quantification when the outcome follows a Gaussian distribution.

Methods: Variational inference (VI) proposes to approximate the posterior distribution through optimization instead of sampling. We explored the use of Semi-Implicit Variational Inference (SIVI) as an alternative to MCMC. We compared SIVI with four VI algorithms (mean-field, ADVI, INFVI, and Pathfinder) and Hamiltonian Monte Carlo based on the inference of the parameters, prediction performances, and run time through a simulation study in a geostatistical context.

Results: Outside of Pathfinder, all considered methods provided similar point estimates and predictions. While the VI methods were much faster than the HMC method, they provided smaller credible intervals. Of the four VI algorithms, INFVI offered the best uncertainty quantifications. Preliminary results of SIVI showed promise in its ability to appropriately approximate posterior distributions, but no results are currently available for GPs.

Conclusion: While MCMC methods remain the gold standard of Bayesian inference for spatial models, some VI methods can provide valid approximations of posterior distributions faster.

Speaker

Sébastien Garneau

PhD student | mcgill university

[D3.4] Disease mapping of Covid-19 incidence using digital mobility data in Toronto

11:15 AM – 11:30 AM

Background: Understanding spatial mobility patterns is crucial for identifying neighbourhoods at elevated risk of communicable diseases. However, to our knowledge, there is a lack of Canadian studies integrating small-area (neighbourhood-level) mobility data for improved areal disease risk estimation. This study aims to evaluate the association between geospatial mobility and COVID-19 incidence in Toronto across five pandemic waves from March 2020 to February 2022.

Methods: We analysed anonymized commercial Global Positioning System (GPS) data, which recorded monthly origin-destination travel patterns across 94 forward sortation areas in Toronto. We modeled the area-level relative risk of COVID-19 incidence ascertained through Polymerase Chain Reaction (PCR) testing by Public Health Ontario. A Poisson likelihood model was applied, incorporating unit-standardized and mean-cantered mobility counts in addition to known census variable predictors of COVID-19 incidence (e.g., median income). We used the Besag-York-Mollié (BYM) hierarchical Bayesian spatial model to account for two spatial structures: (1) a traditional contiguity-based binary weighting structure; (2) a mobility-based binary weighting structure.

Results: Mobility was strongly associated with COVID-19 incidence across all waves in the mobility-adjusted spatial structures. For instance, during the first wave, estimates based on the mobility-based binary weighting structure indicated that a unit increase in mobility intensity is associated with a 73% (95% Credible Interval: 41%–112%) increase in relative risk (RR) for COVID-19 incidence. This association was stronger than that of traditional area-level census predictors of COVID-19.

Conclusions: Small-area mobility data is a strong predictor of area-level COVID-19 risk. This study advances geospatial modeling of communicable disease incidence and provides valuable insights for geospatial surveillance and targeted public health interventions.

Speaker

Chi Zhang

[D3.5] Bayesian meta-analysis and meta-regression for proportion studies: The example of neurocysticercosis among people with epileptic seizures

11:30 AM – 11:45 AM

Background: Neurocysticercosis (NCC) is caused by the infection of the central nervous system with the zoonotic tapeworm Taenia solium. In 2010, a meta-analysis of studies conducted between 1990 and 2008 estimated that nearly one-third of people with epileptic seizures (PWES) living in endemic countries had NCC lesions upon brain imaging.

Objectives: The objective of this meta-analysis was to update the global proportion estimate of NCC among PWES between 1990 and 2023 and to assess if this proportion varied with time and region.

Methods: Twenty international databases were searched for articles published between January 1990 and May 2023. A systematic review, registered with PROSPERO, was conducted in three phases: 1) title and abstract screening, 2) full article evaluation and 3) data extraction. All phases were completed by two independent reviewers. The pooled proportion of NCC among PWES was estimated using a Bayesian hierarchical logistic model. Similar model was used for sub-group analyses and meta-regressions to identify factors contributing to the heterogeneity of the estimates. Information from the 2010 meta-analysis and uniform distributions were used as priors for the proportion of NCC among PWES.

Results: The pooled median proportion of NCC among PWES was 22% (95% Bayesian credible interval [BCI]: 17;28%) with large heterogeneity ($\tau = 1.12$). The reporting of clear definitions for NCC and epileptic-seizures resulted in a higher estimate compared to studies without provided definitions (Odds-Ratio [OR]=2.5; 95%BCI: 1.3;5.0). A higher estimate was also observed for studies conducted in South-East Asia compared to the African regions (OR=2.1; 95%BCI: 1.1;4.1). The proportion of NCC among PWES was lower in studies conducted after June 2008 (OR=0.51; 95% BCI: 0.30;0.90).

Conclusion: The proportion of NCC among PWES was lower in studies published after mid-2008 and showed regional differences. Misclassification error could bias estimates when clear definitions for NCC and epileptic-seizures are not applied.

Speaker

Mohammad Shah Jalal

PhD candidate | Université de Montréal

Breakout D4: Cancer Epidemiology

10:30 AM – 11:45 AM | Location: Drummond West Room (3rd floor)

Moderators

Vikki Ho

University of Montreal

Canisius Fantodji

Postdoctoral researcher | Centre de recherche du CHUM (CRCHUM)

[D4.1] Examining How Chronic Inflammation Impacts Colorectal Cancer Incidence in Atlantic Canada

10:30 AM – 10:45 AM

Background: Colorectal cancer (CRC) is the third most common cancer in Canada. Incidence of CRC is highest in Atlantic Canada, which may be due to increased exposure to risk factors and common genetic susceptibilities in the region. Chronic inflammation is a risk factor for cancer and Atlantic Canadians are regularly exposed to pro-inflammatory environmental factors (e.g. smoking and alcohol). Moreover, given that the region is more ethnically homogenous than other parts of Canada, increased prevalence of genetic variants in inflammatory pathways, which also have roles in tumour development, may be contributing to regional differences in CRC risk

Objectives: Identify genetic variants of inflammatory genes in the form of single nucleotide polymorphisms (SNPs) that are unique to, or more prevalent in, Atlantic Canada that may help explain the significantly higher CRC incidence rates observed within the region. Methods: A case-control study was conducted using data from 2,500 participants from the Atlantic PATH and BC Generations Project cohorts of CanPath. Multivariable logistic regression was used to calculate odds ratios and assess CRC risk among nearly 1,200 SNPs from four gene groups (PTGS, TNF, NFKB and IL6). The Benjamini-Hochberg procedure was applied to correct for multiple testing. Results: A total of 87 SNPs were found to be significantly associated with CRC, of which 4 remained significant after adjusting for the false discovery rate, including 3 from TNF-associated genes. Additionally, three of the four SNPs displayed significant distributional

differences by region.

Discussion: These findings suggest that SNPs associated with inflammatory pathways may contribute to the elevated CRC incidence in Atlantic Canada. Additionally, regional differences in allele distribution support the role of genetic factors in shaping disease risk. Understanding these associations could help identify populations with increased CRC risk and inform targeted prevention efforts in Atlantic Canada.

Speaker

Avery Cook

Biology Teaching Assistant | St. Francis Xavier University

[D4.2] Risk of developing a subsequent primary lung cancer among adult non-lung cancer survivors

10:45 AM – 11:00 AM

Background: An estimated 1.5 million Canadians are living with and beyond cancer and may carry elevated risks of developing subsequent primary cancers at different sites, including cancers of the lung.

Objectives: To characterize the risk of developing a subsequent primary lung cancer (SPLC) among survivors of different-site first primary cancers (FPC) and examine if subgroups may benefit from lung cancer screening.

Methods: Data for this study came from the Alberta Cancer Registry. We included all adults diagnosed with cancer between 2000 and 2021 who survived at least six months. Survivors were followed from their FPC diagnosis until diagnosis of a SPLC, death, or censoring. We estimated incidence rates and standardized incidence ratios (SIR) for SPLC development compared to those without a personal cancer history.

Results: There were 180,325 FPC survivors with 1.2 million person-years of follow-up who developed 2,865 SPLC. Cancer survivors had a higher risk of developing SPLC compared to those without a cancer history (SIR=1.76, 95% CI: 1.69-1.82). Fifteen out of twenty-one (71%) FPC sites had significant increases in SPLC risk with SIRs ranging from 1.3 to 5.6. Head and neck FPC (tobacco-associated) carried the highest risk of SPLC (SIR=5.56). Risk was also higher for non-tobacco associated FPC combined (SIR=1.59). Cancer survivors were twice as likely to be diagnosed with an advanced (stage III/IV) lung cancer than those without a cancer history. When standardized to the age and sex distribution of a major lung cancer screening trial (NLST), five FPC had significantly higher lung cancer incidence rates than the trial control arm (esophagus, Hodgkin lymphoma, larynx, oral, other head and neck).

Conclusion: Survivors of some FPC sites have considerable risk for SPLC and may benefit from early lung cancer detection initiatives. The specific location of a prior cancer is important to consider for accurate lung cancer risk stratification.

Speaker

Matt Warkentin

Postdoctoral Fellow | University of Calgary

[D4.3] Intra-provincial Geographic Relocation and Breast Cancer Screening in Ontario: A Population-Based Recurrent Event Analysis

11:00 AM – 11:15 AM

Background and Objectives: Breast cancer is Canada's most common female cancer and second leading cause of female cancer death. A Pan-Canadian study found regular screening reduced breast cancer mortality by 40%. Despite biannual screening availability for eligible residents, uptake varies, particularly among socioeconomically disadvantaged groups or those without primary care. Relocation may disrupt care continuity, and this study aimed to assess whether intra-provincial relocation in the past year was linked to reduced screening rate.

Methods: We conducted a population-based cohort study using linked administrative healthcare data at ICES. Females were eligible if they were aged 50–74 between Jan 1, 2009 and Dec 31, 2021 with ≥3 years of OHIP coverage The exposures were a previous year intra-provincial relocation identified by postal code changes as yes/no, and relocation distance categorized as no move, nearby (0km), <25km, 25–100km, >100km, updated annually. The outcome was screening mammography defined using physician billing, analyzed as recurrent events via Andersen-Gill models. Covariates included age, neighborhood income, and primary care visits.

Results: Our cohort included 3,020,148 females with a median of 9 years of follow-up. Females with a previous year relocation had lower screening rates (aRR (Adjusted Rate Ratio): 0.88, 95% CI: 0.875-0.885) than those who had not relocated. We observed significantly lower screening rates compared to non-movers with increasing magnitude of effect with increasing move distance: individuals who moved nearby (0.93, 0.87-0.98), those who moved within 25km (0.89, 0.88-0.89), those who moved 25-100km (0.87, 0.85-0.88), and those who moved over 100km (0.87, 0.85-0.88).

Conclusion: Breast cancer screening is crucial for lowering mortality, yet our findings show that intra-provincial relocation reduces mammography rates among females in Ontario. Proactive outreach after an address change can keep relocated individuals engaged in preventive care. Future research should explore strategies to ensure these populations remain connected to care.

Speaker

Luke Bai

Roche

[D4.4] Increasing cervical cancer rates among younger women in Canada: Age-specific cervical cancer incidence trends in Canada, 1992-2022

11:15 AM – 11:30 AM

BACKGROUND: Cervical cancer is largely preventable via human papillomavirus (HPV) vaccination and screening with cytology or HPV DNA testing. After decades of progress in reducing cervical cancer incidence and mortality, recent reports suggest a plateau or modest increase in incidence rates in Western populations. Further investigation is needed to evaluate these emerging trends in Canada.

OBJECTIVE: To examine the trends in age-specific cervical cancer incidence rates in Canada from 1992 to 2022.

METHODS: Data sources for this study included the Canadian Cancer Registry database, maintained by Statistics Canada, and the Centre for Demography Population. Data obtained included cervical cancer cases, population counts, and incidence rates of cervical cancer by age and province from 1992 to 2022. Quebec and Nova Scotia were excluded from this study because they have not reported cancer data up to 2022. Joinpoint regression was performed to estimate the annual percentage changes (APC) in cervical cancer incidence rates and the corresponding 95% confidence intervals (95% CI).

RESULTS: Cervical cancer incidence rates in Canada have decreased among females 25 to 34 and those 65 years and older since 1992. Incidence rates among females aged 35 to 44 and 45 to 54 have increased by 1.1% (95% CI: 0.5, 2.5) and 1.6% (95% CI: -0.1, 8.6) per year since 2001 and 2012, respectively. In 2022, the highest incidence rate of cervical cancer was among females aged 35 to 44 years (18.1 per 100,000 females) and rates in this age group are at levels comparable to those in 1992.

CONCLUSION: Cervical cancer incidence rates have been increasing in recent years among females aged 35 to 54 years. Younger cohorts may be falling into a cancer prevention gap. Targeted public health interventions are warranted to address the rising incidence of cervical cancer among younger Canadian females.

Speaker

Ioana Nicolau

Postdoctoral fellow | University of Calgary

[D4.5] Indications for regular use of analgesic medications and the risk of ovarian cancer.

11:30 AM – 11:45 AM

Background: Increasing evidence suggests that analgesic use, particularly aspirin, reduces ovarian cancer risk. Analgesics are used for diverse indications, some of which may be associated with ovarian cancer, and could potentially introduce confounding by indication.

Objectives: We examined indications for aspirin, other nonsteroidal anti-inflammatory drugs (NSAIDs), and acetaminophen in relation to ovarian cancer risk.

Methods: In a population-based case-control study conducted in Montreal between 2011 and 2016 (498 cases, 908 controls), lifetime history of analgesic use was self-reported, along with the specific reason for use. Regular use was defined as taking at least one tablet per week for 6 continuous months. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for regular analgesics use, by type and indication, in relation to ovarian cancer were estimated using unconditional logistic regression.

Results: Adjusted ORs (95% CIs) of ovarian cancer with regular use of aspirin, NSAIDs, and acetaminophen were 0.86 (0.63-1.18), 0.76 (0.56-1.03), and 0.88 (0.65-1.20), respectively, when compared to occasional/no use. The most frequent indication for aspirin was heart disease prevention (75%), while other NSAIDs were most commonly taken for general pain (44%), arthritis (34%), and headaches (25%). Similarly, acetaminophen was typically used for headaches (40%), general pain (31%), and arthritis (29%). When examining ovarian cancer risk by analgesic type and indication, the OR (95% CI) for aspirin taken for heart disease prevention was 0.87 (0.60-1.25), similar in magnitude to that seen for overall use. ORs (95% CIs) for NSAID use were similarly inverse for different indications, and strongest for general pain (0.63 (0.41-0.98)). For acetaminophen, ORs (95% CIs) differed from that observed for overall use when taken for menstrual pain (1.70 (0.80-3.61)) and for arthritis (0.63 (0.26-1.09)).

Conclusion: Indications for regular analgesic use vary and should be explored further to assess possible confounding in studies of ovarian cancer risk.

Speaker

Claudia Waddingham

SMRC

Breakout D5: Épidémiologie et biostatistique (en français) - English captions will be available

10:30 AM – 11:45 AM | Location: Salon 8 (4th floor)

English language captions will be available on screen for this session.

Moderators

Miceline Mesidor

Assistant Professor | Institut national de la recherche scientifique

Créscence Joëlle Mefou Tasong

Université Laval

[D5.1] Relation entre les trajectoires de fréquence de consommation de cannabis et la santé mentale positive chez les jeunes adultes

10:30 AM – 10:45 AM

Contexte : A ce jour, peu d'étude ont décrit l'évolution de la fréquence de consommation de cannabis chez les jeunes adultes et aucune n'a examiné sa relation avec la santé mentale positive, qui se concentre sur le bien-être et la résilience.

Objectifs : identifier les trajectoires de fréquence de consommation de cannabis chez les adultes de 20 à 36 ans, décrire les caractéristiques sociodémographiques de chaque trajectoire, et estimer l'association entre ces trajectoires et la santé mentale positive à 36 ans.

Méthodes : Des données étaient disponibles pour 711 participants de l'étude Nicotine Dependence in Teens. La modélisation des trajectoires basée sur le groupement a été utilisée pour identifier les trajectoires d'utilisation de cannabis. L'association entre ces trajectoires et la santé mentale positive a été analysée par régression linéaire, avec ajustement pour le sexe, l'éducation maternelle et des participants, ainsi que la consommation de tabac et d'alcool.

Résultats : Quatre trajectoires ont été identifiées : les consommateurs occasionnels et les non-consommateurs (67.0%), les participants qui ont diminué (9.4%) ou augmenté (9.7%) leur fréquence de consommation de cannabis au fil du temps, et les consommateurs chroniques lourds (13.9%). La proportion d'hommes, de personnes vivant seules et sans diplôme secondaire était plus élevée chez les consommateurs chroniques lourds que chez les utilisateurs occasionnels et les non-consommateurs. Les consommateurs chroniques lourds (β^ = -3.89, IC à 95% = [-7.11, -0.67]), en augmentation (-1.40, [-5.61, 2.81]) et en diminution (-2.47, [-2.07, 1.12]) présentaient des scores de santé mentale positive plus faibles que ceux des occasionnels et des non-consommateurs.

Conclusion : Nos résultats appuient une association inverse potentielle entre la consommation de cannabis et la santé mentale positive, et suggèrent que les consommateurs chroniques pourraient bénéficier de stratégies de promotion de la santé mentale.

Speaker

Roua Chihi

[D5.2] Association entre l'hypertrophie des adipocytes mammaires, les facteurs pronostiques et la survie des patientes atteintes de cancer du sein.

10:45 AM – 11:00 AM

Contexte: L'obésité est associée à un pronostic défavorable chez les patientes atteintes de cancer du sein (CS). L'indice de masse corporelle (IMC), bien que couramment utilisé, présente des limites dans l'évaluation précise de l'adiposité. L'hypertrophie des adipocytes mammaires (marqueur de dysfonctionnement du tissu adipeux) pourrait constituer un biomarqueur alternatif plus pertinent pour évaluer l'impact de l'adiposité sur la progression du CS.

Objectif: Examiner l'association entre la taille des adipocytes mammaires, les facteurs pronostiques du CS et la survie des patientes.

Méthodes : Une cohorte de 2 219 femmes traitées pour un CS invasif entre 2000 et 2012 a été analysée. Le diamètre moyen des adipocytes mammaires (µm) a été mesuré sur des lames histologiques colorées à l'hématoxyline-éosine par ImageJ. L'association avec les facteurs pronostiques a été évaluée par des modèles linéaires ajustés pour l'âge et le statut ménopausique, lorsqu'applicable.

Résultats : Le diamètre adipocytaire était significativement associé à l'IMC (β=0,78), mais aussi à plusieurs facteurs pronostiques défavorables : un grade tumoral élevé (β=1,13), un stade avancé (β=0,98) et une tumeur de grande taille (β=0,06)(p<0,001 pour toutes ces associations). L'hypertrophie des adipocytes était aussi liée au statut ménopausique (β=4,72; p<0,001) mais pas à l'âge (β=0,01; p=0,661). Un statut positif des récepteurs aux œstrogènes était associé à un plus petit diamètre adipocytaire (β=-1,07; p=0,034), alors que les récepteurs de la progestérone n'étaient pas significativement associés (β=-0,43; p=0,299).

Les résultats de l'analyse multivariée de Cox, en cours, évaluant l'association entre le diamètre adipocytaire et la survie, seront présentés au congrès.

Conclusions : L'hypertrophie des adipocytes mammaires est associée à une plus grande agressivité tumorale et pourrait constituer un biomarqueur pronostique du CS.

Speaker

Ouafa Badre

Faculté de médecine, Université Laval Centre de recherche du CHU de Québec – Université Laval Centre de recherche sur le c…

[D5.3] Analyse de médiation et comportements de santé publique : une approche avancée en contexte de pandémie.

11:00 AM – 11:15 AM

Contexte : L'adhésion aux mesures de santé publique durant la pandémie de COVID-19 a été déterminante pour limiter la transmission du virus. Cette étude examine comment la préférence pour certaines sources d'information influence l'intention future de se conformer à ces mesures, avec l'objectif d'orienter les stratégies de communication en santé publique.

Méthodes : Nous avons réalisé une analyse secondaire sur les données de 116 743 participants issus de 11 pays, recueillies via la plateforme RIWI (Real-Time Interactive World-Wide Intelligence). Une approche de médiation multiniveau a été utilisée pour évaluer l'effet des sources d'information (fiables, modérées, faibles) sur l'intention de suivre des directives sanitaires futures, avec l'adhésion passée comme médiateur. Deux modèles de régression logistique multiniveau ont été ajustés, et les effets de médiation ont été estimés à l'aide du bootstrap et de la méthode delta.

Résultats : Les analyses suggèrent une médiation significative de l'effet des sources d'information par l'adhésion passée. L'effet total est estimé à 1,52 (IC95% [1,17–2,22]), l'effet direct à 1,12 (IC95% [0,95–1,27]) et l'effet indirect à 1,36 (IC95% [1,02–1,77]). Une variabilité inter-pays marquée est observée, suggérant un rôle contextuel important. La méthode delta génère des intervalles de confiance plus précis que le bootstrap.

Conclusion : Ces résultats soulignent l'importance de stratégies de communication adaptées aux sources d'information utilisées. L'étude met aussi en valeur la contribution de la méthode delta pour estimer l'incertitude des effets de groupe dans les analyses de médiation multiniveau.

Speaker

Rado Ramasy

Tuteur académique - Épidémiologie | Faculté de médecine de l'Université de Montréal

[D5.4] Vaccination par le Bacille Calmette-Guérin (BCG) et mortalité au Québec

11:15 AM – 11:30 AM

Contexte : Le vaccin au bacille Calmette-Guérin (BCG), utilisé contre la tuberculose, pourrait protéger contre d'autres maladies. Des études suggèrent un effet protecteur de ce vaccin sur la mortalité infantile dans les pays émergents, mais peu de données existent sur son association avec la mortalité au-delà de l'enfance et dans les pays industrialisés.

Objectifs : Ce projet vise à estimer l'association entre la vaccination BCG et la mortalité de causes naturelles afin de mieux comprendre ses effets non spécifiques sur la survie à long terme.

Méthodes : La cohorte CO·MMUNITY inclut 400611 personnes nées au Québec entre 1970 et 1974. Les analyses ont porté sur 387 935 (96,8 %) personnes, après exclusions (statut vaccinal indéterminé, décès de malformation congénitale ou anomalie chromosomique). Les données de vaccination et de décès proviennent de registres. Les décès ont été documentés de 1970 à 2014. Des modèles de Cox ajustés pour les facteurs de confusion ont permis d'estimer l'association entre vaccination et mortalité de cause naturelle sur l'ensemble du suivi et par tranche d'âge (0-17, 18-25, 26-44 ans).

Résultats : Quarante-six pourcent de la population était vaccinée au BCG. Les décès de cause naturelle et non naturelle représentaient respectivement 0,7% et 1,2%, ne différant pas selon le statut vaccinal. Une suggestion d'association inverse entre la vaccination BCG et la mortalité naturelle a été observée (HR=0,94; IC 95%: 0,87-1,02). Cette tendance était légèrement plus marquée pour la période 0-17 ans (HR=0,72; IC 95%: 0,49-1,07) que pour 18-25 ans (HR=0,94; IC 95%: 0,78-1,15) ou 26-44 ans (HR=0,96; IC 95%: 0,87-1.05). Aucune différence selon le sexe n'a été observée.

Conclusion : Ce projet apporte de nouvelles connaissances sur les effets non spécifiques du BCG, suggérant un effet potentiel de faible magnitude sur la mortalité de causes naturelles en jeune âge, s'estompant au cours du temps.

Speaker

Jérémy Lelièvre

INRS

[D5.5] Construction de multiples recommandations epsilon-équivalentes dans le cadre des stratégies dynamiques de traitement

11:30 AM – 11:45 AM

La médecine de précision place les caractéristiques individuelles du patient au cœur des stratégies de recommandation de traitement. Cette approche repose sur le cadre formel des "Dynamic Treatment Regimes" ou stratégies dynamiques de traitements, qui exploitent des méthodes statistiques, bayésiennes ou d'apprentissage automatique pour élaborer des règles de décision personnalisées. Cependant, ces méthodes fournissent généralement une seule recommandation de traitement à chaque point de décision, aboutissant ainsi à une seule séquence de décisions optimales. Nous proposons une approche innovante basée sur le Q-learning, capable de générer des stratégies de traitement proches en équivalences. Cette flexibilité permet aux experts médicaux d'intégrer leur expertise clinique ainsi que leur jugement dans le processus de prise de décision.

Speaker

Sophia Yazzourh

Mcgill

Breakout D6: COVID-19

10:30 AM – 11:45 AM | Location: Salon 6 (3rd floor)

Moderators

Sheila O'Brien

Associate Director, Epidemiology and Surveillance | Canadian Blood Services

Tristan Watson

PhD Candidate | University of Toronto

[D6.1] Retrospective analysis of age-specific non-pharmaceutical interventions on wild-type SARS-CoV-2 in Canada

10:30 AM – 10:45 AM

Background: The magnitude, severity, and duration of novel infectious disease events like SARS-CoV-2 are influenced by factors like contact patterns and the application and effectiveness of public health control measures. Across Canada, non-pharmaceutical interventions (NPIs) were implemented to target these heterogeneous drivers and modifiers of wild-type (wt) SARS-CoV-2 transmission; however, it is difficult to determine and understand their individual and joint effectiveness on different populations.

Objectives: We aimed to delineate the impacts and effectiveness of age-specific NPIs on wt-SARS-CoV-2 transmission in three urban regions in Alberta, Ontario, and British Columbia prior to widespread vaccination (Mar 2020-Feb 2021).

Methods: We developed an age-structured Susceptible-Exposed-Infectious-Recovered (SEIR) deterministic model and stratified our population into two age groups: adults (20+), and children and youth (0-19). The model incorporated contact mixing rates, age-specific susceptibility, and NPI strength. Using maximum likelihood estimation, we determined regional baseline transmission probabilities in the absence of widespread NPIs and estimated the subsequent time-dependent and age-specific NPI effectiveness on transmission reduction. Finally, we considered alternative NPI scenarios and compared the simulated regional age-specific epidemic trajectories with reported case data.

Results: The age-specific and time-dependent NPI strength for wt-SARS-CoV-2 transmission reduction was estimated for each region. We observed that adult-specific contacts strongly impact transmission, and moderately increasing the strength of adult-specific NPIs led to a greater effect on transmission reduction across all regions when compared with a drastic strengthening of control measures in children and youth (i.e., closing schools). These results held when varying the temporal application of alternative singular and joint alternative NPI scenarios.

Conclusion: By considering population heterogeneity, our retrospective study provides insight into age-specific NPI effectiveness on curbing wt-SARS-CoV-2 transmission. These findings can inform decision-making related to targeted control strategies and aid in resource planning and preparedness for future emerging outbreaks.

Speaker

Tanya Philippsen

PhD candidate | University of Victoria

[D6.2] Public health funding, vulnerable groups, and COVID-19 hospitalizations and deaths: a time-to-event analysis in Ontario, Canada

10:45 AM – 11:00 AM

Background: The COVID-19 pandemic disproportionately impacted health across sociodemographic groups. Areas with higher pre-pandemic public health funding may have better protected population and vulnerable group health.

Objectives: To estimate the association between public health unit (PHU) funding and COVID-19 hospitalization or death, and whether associations differ among vulnerable groups in Ontario, Canada.

Methods: A population-based cohort study was conducted using linked health administrative data from all residents covered by the Ontario Health Insurance Plan (OHIP) (March 1, 2020-December 31, 2022). PHU funding per capita in 2019, a measure of pre-pandemic preparedness, was linked from the Ontario Public Health Information Database (OPHID). The association between PHU funding per capita and COVID-19 hospitalization or death was estimated using Fine and Gray subdistribution hazard models, with non-COVID-19 death as a competing risk. Interactions between PHU funding per capita and neighborhood socioeconomic status (SES) quintile, neighborhood racialized population quintile, and individual immigrant status on COVID-19 hospitalization or death were estimated. Quintile 1 (Q1) was the referent and represented the highest SES/lowest racialized population neighborhoods. Models were adjusted for individual- and area-level covariates and included robust sandwich co-estimators by PHU.

Results: Each additional $10 of PHU funding per capita was associated with a 5% decreased risk of COVID-19 hospitalization or death (HR=0.95, 95%CI:0.90-0.99). The protective effect of increased PHU funding on COVID-19 hospitalization or death was stronger in neighborhoods with lower SES (Q5 vs. Q1: HR=0.94, 95%CI:0.90-0.99) and higher racialized populations (Q4 vs. Q1: HR=0.92, 95%CI:0.87-0.97), and among immigrants (recent immigrant [≤5 years] vs. Canadian born resident: HR=0.92, 95%CI:0.84-1.01).

Conclusion: PHU funding was associated with decreased population and vulnerable group risk of COVID-19 hospitalization and death in Ontario. Findings highlight the importance of public health funding in mitigating harm and reducing health inequities during health crises.

Speaker

Stephen Hunter

Postdoctoral Fellow | University of Alberta

[D6.3] Explaining low COVID-19 incidence and mortality rates in Haiti: Insights for low- and middle-income countries

11:00 AM – 11:15 AM

Background: Haiti reported lower than expected COVID-19 incidence and mortality rates, raising concerns about the completeness and accuracy of national surveillance data.

Objectives: This study aimed to explore the factors that may have led to the underreporting of COVID-19 cases and deaths in Haiti, focusing on geographic and socio-economic disparities in screening and care facilities, and individual-level risk factors.

Methods: We analyzed national COVID-19 surveillance data from March 2020 to December 2021. Using cluster detection, time series analysis, and cartographic mapping, we assessed the distribution of the epidemic. Multivariate Quasi-Poisson regression models were applied to evaluate socioeconomic factors associated with incidence and mortality, while mixed-effect logistic regression was used to identify individual risk factors linked to COVID-19 infection.

Results: Out of Haiti's 140 communes, 57 (40.7%) had COVID-19 screening centers, and the incidence was six times higher in these communes. Only 22 (15.7%) communes had COVID-19 care centers, and mortality was five times higher in communes with care centers. Wealthier communes had significantly better access to both screening and care, while poorer communes were largely underserved. Additionally, factors such as male gender, older age, and having only Haitian nationality (a proxy for low socioeconomic conditions in Haiti) were associated with an increased risk of infection.

Conclusions: The study highlights significant geographical and socio-economic disparities in Haiti's COVID-19 response, particularly the limited availability of screening and care centers in poorer communes. These disparities likely contributed to the underreporting of COVID-19 cases and deaths, underscoring the need for more equitable healthcare infrastructure in low- and middle-income countries to effectively address public health crises.

Speaker

Marcmy Presume

Doctoral Researcher | University of Bordeaux

[D6.4] Implications of healthcare-associated SARS-CoV-2 infections in Ontario, Canada

11:15 AM – 11:30 AM

Background: The COVID-19 pandemic had a significant impact on the healthcare system in Ontario, disproportionately affecting individuals with poorer baseline health. Healthcare-associated infections put both patients and healthcare workers at risk, often leading to more severe outcomes due to patient age and comorbidities. Although many efforts have been made to minimize transmission risk, continued investigation into the consequences of healthcare-associated infections can improve patient and community safety in future outbreaks.

Objectives: 1) Assess whether healthcare-associated cases had higher odds of death than hospitalized community-acquired cases, and 2) Determine the directionality of COVID-19 transmission between community and hospital outbreaks.

Methods: We obtained COVID-19 surveillance data from the Ontario Case Contact and Management System and the COVAX vaccine information system from March 17, 2020, to September 4, 2022. The odds of death during hospitalization based on the interval from admission to positive PCR test were analyzed using binomial logistic regression. To examine directionality between hospital outbreak-associated and community cases, we used a modified Granger causality approach. Lagged variables for hospital outbreak and community case counts (2 weeks before reported cases/outbreaks) were created for each public health unit. Wald tests assessed whether including the lagged variable significantly improved model fit, indicating potential forecasting ability.

Results: Odds of death in patients hospitalized with COVID-19 were elevated in healthcare-associated vs. community-acquired infections (positive test 3-7 days post-admission: OR=1.29 [95% CI: 1.11-1.46], 8-14 days: OR=1.50 [95% CI: 1.31-1.72], 15+ days: OR=1.29 [95% CI: 1.16-1.44]). Community cases with a 2-week lag did not improve forecasting of hospital outbreak-associated cases (p=0.5749), however, hospital outbreak-associated cases improved forecasting of community cases (p=8.681e-07).

Conclusion: Healthcare-associated COVID-19 infections have severe consequences in both patients and the greater community. Reducing hospital outbreaks may help reduce community transmission of SARS-CoV-2, highlighting the need for further efforts to reduce healthcare transmission of high-consequence pathogens.

Speaker

Natalie Wilson

Graduate Student | University of Toronto

[D6.5] Changes in trust in health professionals during COVID-19 pandemic: National data from CoVaRR-Net's Trust Dynamic and Public Health and Equity project

11:30 AM – 11:45 AM

Background: Erosion of trust in public health authorities, medical-care providers, and health-scientists has emerged as a major societal issue. A comprehensive, national analysis of how trust has changed-in whom, where and how-is necessary to inform strategies for trust restoration.

Objective: We examined changes in trust in public health authorities, medical-care providers, and health scientists during COVID-19 compared to before, and identified factors associated with these changes.

Methods: Nationally representative cross-sectional survey of 5,607 individuals were recruited in May-2024. Changes in trust were defined as: increased, decreased, or unchanged. Sociodemographic variables, location of residence, and vaccination-related attitudes and behaviours were analyzed using weighted data, and multinomial logistic regression models were built.

Results: Overall, 14.7% reported increased trust, during compared to before COVID-19, in public health authorities; 13.8% in health scientists, and 4.3% in medical care providers. Men were more likely to report decreased trust in public health authorities (RRR = 1.23) and in health scientists (RRR = 1.51) than women. Older adults (≥55 years) were less likely to report increased trust in medical care providers (RRR = 0.28). Ethnic minority groups were less likely to have decreased trust in public health authorities (RRR = 0.80) but those who preferred not to disclose ethnicity were more likely to have decreased trust in health scientists (RRR = 4.84). Quebec residents were less likely to report increased trust in health scientists (RRR = 0.76). Vaccine-trusting individuals were more likely to report increased trust in public health authorities (RRR = 2.61), health scientists (RRR = 4.17), and medical care providers (RRR = 2.37).

Conclusion: The COVID-19 pandemic significantly impacted public trust in health institutions, with disparities across sociodemographic groups and regions. Trust levels were closely tied to vaccination-attitudes, underscoring the need for transparent, science-based communication and targeted interventions to rebuild trust, particularly among vaccine-hesitant populations.

Speaker

Jafar Rizvi

University of Saskatchewan

Lunch

11:45 AM – 1:00 PM | Location: Ballroom (4th Floor)

Breakout E1: "Applications of Small-Area Analysis in Epidemiological Studies"

1:00 PM – 2:15 PM | Location: Drummond East Room (3rd floor)

Administrative and survey data sets typically available to researchers are designed to produce reliable statistical estimates of population-level measures, such as means or quantiles, over relatively large areas. In comparison, the goal of small area estimation is to produce estimates over smaller geographies or sub-populations which tend to be more homogenous than larger areas. As such, there has been growing interest in its epidemiological applications. These include examining inequities in risk factor prevalence or disease outcomes, which can be particularly useful for detecting local clusters that would otherwise not be detectable when working with larger geographies. It is also well suited to the application of locally relevant and equitable interventions, and to support community advocacy.

The interest in small-area estimation is part of a trend towards using large data sets and complex statistical models to investigate relationships between variables aggregated at more granular spatial resolutions than before. This poses new computational and statistical challenges. For example, when applying small-area analysis, researchers need to account for the spatial dependence between small areas and must address numerical issues that arise from the smaller sample sizes associated with these areas. There are many approaches to accounting for these concerns, such as using spatial and/or spatio-temporal smoothing or by incorporating additional information to a model by adding covariates (such as demographic or economic variables) that are available at the small area level.

While these challenges may be seen as a barrier to the wider adoption of small area estimation, software packages that provide convenient access to modern methods are available. This mini-symposia will discuss the application of small-area estimation within the context of epidemiological studies and will provide an overview of some available software packages. It will also include presentations from projects that use small-area estimation methods to address specific research problems.

Speakers

Daniel Rainham

Full Professor | Dalhousie University

N

Nathalie Saint-Jacques

Sr Epidemiologist | NSH Cancer Care Program

Sarah Mah

Assistant Professor | University of Vermont

K

Kamal Rai

Graduate Teaching Assistant | University of Toronto

V

Victoire Michal

Breakout E2: "Innovations in Bayesian Clinical Trial Design: Elicited Priors, Clustered Data, and Adaptive Enrichment"

1:00 PM – 2:15 PM | Location: Drummond Centre Room (3rd floor)

Bayesian methods are reshaping clinical trial methodology by improving efficiency, optimizing patient allocation, and enabling greater

flexibility in the face of uncertainty. This mini symposium brings together recent advances in Bayesian trial design across a range of challenges, including eliciting expert knowledge, managing clustered data, identifying treatment-sensitive subgroups, and supporting treatment de-intensification. Dr. Derek Ouyang introduces a novel prior elicitation framework that emphasizes prior-posterior coherence—the alignment between an expert's mathematical prior and their intuitive posterior beliefs under hypothetical outcome scenarios. By reversing the elicitation process and inferring the prior from expert judgments about prospective posteriors, this approach promotes more accurate and meaningful incorporation of expert knowledge into Bayesian analyses. Dr. Luke Hagar presents an efficient method for evaluating operating characteristics in Bayesian clinical trials with clustered data. Rather than relying on extensive Monte Carlo simulations across many design configurations, his approach uses posterior probability functions derived from just two sample sizes to approximate performance across a range of scenarios, dramatically reducing computational burden while retaining accuracy. Dr. Shirin Golchi describes a Bayesian adaptive enrichment design that uses flexible splines and Bayesian model averaging to dynamically identify treatment-sensitive biomarker subgroups. Motivated by a rheumatoid arthritis trial, this design enables early stopping and adaptive subgroup targeting, even when relationships between biomarkers and outcomes are complex and nonlinear. Dr. Steffen Ventz introduces a Bayesian basket design aimed at evaluating treatment de-intensification strategies across multiple subgroups. Together, these presentations illustrate methodological innovations that enhance the practicality, interpretability, and precision of Bayesian trial designs. A moderated panel discussion will follow to explore real-world applications and future directions.

Speakers

Lara Maleyeff

Yongdong Ouyang

Roswell Park Comprehensive Cancer Center

Luke Hagar

Shirin Golchi

Associate Professor | McGill University

Breakout E3: Prediction and Machine Learning

1:00 PM – 2:15 PM | Location: Drummond West Room (3rd floor)

Moderators

Amadou Barry

Assistant Professor at Institut national de la recherche scientifique (INRS) | Institut national de la recherche scientifique

Ijeoma Itanyi

Doctoral Reseacher | University of Toronto

[E3.1] Forecasting onset of severe maternal morbidity and mortality by combining pre-pregnancy chronic conditions using conditional inference regression tree analysis

1:00 PM – 1:15 PM

Background: Maternal morbidity and mortality (SMM-M) is somewhat preventable. Pre-pregnancy maternal chronic health conditions may exacerbate the risk of SMM-M, but how that risk varies by sub-types of co-occurring conditions is unknown.

Objectives: To evaluate which pre-pregnancy maternal chronic conditions cluster together prior to the onset of SMM-M.

Methods: This population-based cohort study was completed in Ontario, Canada, where there is universal healthcare and linked databases. Included were 374,553 women with 1+ pre-existing chronic condition and a subsequent hospital birth between 2012-2021. SMM-M was a composite of either death, or 1 of 40 diagnoses or procedures indicative of life-threatening complications, occurring in pregnancy or up to 42 days postpartum. Using conditional inference regression tree analysis (CTREE), a set of mutually exclusive "terminal nodes" was created, which form an exhaustive set of population subgroups according to their chronic conditions. Prespecified stopping criteria were based on a $p<0.05$, and a minimum node size of 100.

Results: The most common chronic conditions within 2 years before conception were obesity (45.3%), mood and anxiety disorders (38.1%), migraine headaches (9.6%), asthma (9.3%), and osteoarthritis (7.3%). About 20% of women had 2+ conditions, and 5.6% had 3+ conditions. CTREE resulted in nine terminal nodes, representing the distribution of SMM-M with different combinations of chronic conditions. SMM-M was most likely in women with the combination of diabetes mellitus, mood and anxiety disorders, and osteoarthritis (15.6%), chronic hypertension and chronic kidney disease (14.6%), and diabetes mellitus and migraine (10.4%). In contrast, the risk of SMM-M was lowest in those without diabetes mellitus or chronic hypertension (2.7%).

Conclusion: Specific combinations of pre-pregnancy chronic conditions can aid in identifying women at highest risk of SMM-M. These findings might enhance person-centered preconception and obstetric care initiatives, in terms of optimizing maternal monitoring and tailored evidence-based preventive strategies.

Speaker

Hilary Brown

Associate Professor | University of Toronto

[E3.2] Enhancing Risk Prediction base on Health Administrative Data Using High-Dimensional Prediction Model

1:15 PM – 1:30 PM

Background: Health administrative datasets often do not contain important clinical variables for predicting the risk of medical outcomes. However, the linked databases often contain a wide range of healthcare variables that can be used for developing high-dimensional prediction model (hdPM) that could compensate for the lack of clinical predictors.

Objectives: To supplement unobserved important clinical predictors but enhance prediction accuracy, we compared the predictive performance of an hdPM with a conventional model that relies only on expert-identified clinical predictors.

Methods: We used health administrative data from a retrospective cohort of immigrants diagnosed with tuberculosis disease in British Columbia, Canada, 1985-2019. We designed a Plasmode simulation to generate a survival outcome by keeping complex correlations between the predictors observed in the case study. Two scenarios were considered: a strong or a weak clinical predictor was unavailable in the development sample. Conventional and hdPMs were fitted without and with LASSO shrinkage and were compared in terms of internally-validated time-dependent c-statistic and calibration.

Results: The hdPMs had a better time-dependent c-statistic in predicting tuberculosis mortality, and also outperformed the conventional model in terms of time-dependent c-statistic in our simulations. Compared to a c-statistic of 0.78 for the conventional model with a strong unobserved clinical predictor, LASSO-based hdPMs had a c-statistic of 0.90. While non-penalized hdPMs exhibited overfitting, LASSO-based hdPMs demonstrated superior cross-validated discrimination and calibration. Results were consistent in sensitivity analyses with varying event rates, numbers of additional healthcare variables, different machine learning algorithms to prioritize variables, predicting time-to-development of cardiovascular disease, and predicting a binary outcome.

Conclusion: Health administrative data can compensate for the lack of known and important clinical variables with many healthcare variables from the linked databases, especially in hdPMs with LASSO-regularization, substantially enhancing predictive accuracy and offering a robust approach for risk stratification and assessment in epidemiological research.

Speaker

Belal Hossain

Statistician | St. Paul's Hospital, Vancouver

[E3.3] Risk stratification algorithms to predict dementia: A systematic review of development and evaluation studies.

1:30 PM – 1:45 PM

Background: As the global incidence and burden of dementia increases with aging populations, identifying high-risk individuals is crucial for preventative interventions. Previous systematic reviews focused on older populations or individuals beginning to experience cognitive decline, with less emphasis on studies assessing external validation and algorithm utility of risk stratification for preventive interventions.

Objectives. The current systematic review aims to synthesize literature on current dementia risk algorithms and their practical utility.

Methods. Following PRISMA guidelines, a comprehensive search of Medline, Embase, PsycINFO and Web of Science databases identified studies published until November 16, 2024, restricted to human adults. Search terms included variations related to dementia, risk stratification/model evaluation, and longitudinal studies. Eligibility criteria for included studies were: longitudinal dataset; development and internal validation of a risk stratification algorithm, or evaluation of such an algorithm's utility; and main outcome dementia, with participant follow-up beginning before dementia onset. Two reviewers independently conducted screening and Prediction model study Risk Of Bias Assessment Tool assessments.

Results. Of 11,273 records, 135 studies met inclusion criteria, with studies including genetic (n=18), biomarker (n=7), lifestyle/clinical (n=56), or a combination (n=53) of risk factors. Dementia scale values (n=33) or diagnosis (n=63) were the most common outcome measures. Predictive accuracy ranged from poor (n=18), to good (n=90) and excellent (n=27), with the area under curve (n=79) being the most common assessment. Most studies were from high-income countries (n=119) with few from low- and middle-income countries (n=16). Validation methodology varied, with only 31 studies conducting external validation of their developed algorithms, and 20 studies only conducting external validation of previously developed risk algorithms.

Conclusion. Dementia risk stratification algorithms ranged from focusing on single risk factor groups to incorporating multiple types, with variation in model validation. In turn, difficulties increase in applications in clinical practice and across different at-risk populations.

Speaker

Patricia Nistor

[E3.4] Characterizing multidimensional social exposure through unsupervised machine learning

1:45 PM – 2:00 PM

Background: The social determinants of health are interconnected, however most research examines each determinant individually.

Objective: Through unsupervised machine learning we aim to identify multidimensional social exposure profiles at the population level.

Methods: Ontario residents aged 25 to 64 who participated in the Canadian Community Health Survey (CCHS) between 2000 and 2012 (62,368 females, 53,523 males) were linked to the Canadian Census (2001, 2006, 2011) using postal code at CCHS interview. Individual-level social determinants were captured through the CCHS, while area-level indicators came from the census. Continuous measures were scaled prior to dimension reduction (Principal Component Analysis, 90% variance). Unsupervised machine learning clustering, through k-prototype, was applied to identify social-exposure profiles. Descriptive analysis was used to assess differences in cluster-membership across social indicators. All analysis was sex stratified.

Results: ML methods identified four distinct clusters (A, B, C, D) with similar patterns across each. Cluster A had the highest proportion of visible minorities, immigrants, and residents of densely populated, racially diverse neighborhoods with high material deprivation. Cluster B had more non-partnered, social assistance-reliant, and food-insecure individuals, living in areas a high proportion of lone parents, and people living alone. Cluster C was characterized by social advantage across education, employment, and income, with area-level-indicators of low unemployment and high material resources. Cluster D had a slightly older average age compared to the sex-specific sample average (respectively: females 47.0 vs 43.7; males 46.5 vs. 43.9) and resided in rural areas with high residential stability. While cluster descriptions were similar across sexes, females experienced higher economic disadvantage across several indicators compared to males.

Conclusions: Distinct profiles of multidimensional social exposure emerged following the application of unsupervised machine learning to a population-based cohort. Future work will examine whether these exposure profiles are associated with differential risk of health outcomes, potentially revealing opportunities for intervention.

Speaker

Ingrid Giesinger
University Of Toronto

[E3.5] Synthetic Health Data in Canada: A Scoping Review of Methods, Applications, and Data Sources

2:00 PM – 2:15 PM

Background: Accessing provincial health-related data for multi-site studies in Canada is challenging because of privacy legislation, restricting individual-level data transfer across borders. Synthetic data (SD), which mimic real data, can facilitate data privacy preservation. However, information on SD use in Canadian research is limited, including types of health data (HD) synthesized, research purposes, and adopted SD methods.

Objectives: To review characteristics, methods, and applications of studies that generated SD from real-world Canadian HD, including administrative, survey, public health, and clinical data sources.

Methods: A scoping review following Arksey and O'Malley's framework, was conducted on literature published until September 2024 that generated SD from provincial or national HD. Eligible studies included English-language peer-reviewed articles or grey literature. We searched PubMed, Scopus, Web of Science, and Google Search, plus reference list screening. A single reviewer assessed eligibility. Extracted data covered synthesized HD types, research purposes, geographic sources, synthesis methods, and quality evaluation approaches. Descriptive methods were used to analyze the data.

Results: Of 232 identified articles, 31 were reviewed and nine met inclusion criteria. Three additional articles were found through references and Google searches, totaling 12— 11 peer-reviewed and one from grey literature. Research topics had a methodological focus on replicability, bias mitigation, and privacy risk assessment. Survey data was the most commonly synthesized. SD were generated for national and provincial datasets, including Canadian Community Health Survey, and administrative and clinical data from Alberta, Manitoba, British Columbia, and Ontario. Synthesis methods included generative, sampling, and predictive models. Data quality evaluations assessed replicability, privacy risk, and predictive performance.

Conclusions: SD offers HD privacy protection but is mainly used in select provinces and for synthesizing national survey data. Standardized best practices are emerging, but broader use in clinical and public HD with improved methodological consistency could strengthen its role in national research and surveillance.

Speaker

Hassan Maleki Golandouz

Breakout E4: Youth Health

1:00 PM – 2:15 PM | Location: Salon 6 (3rd floor)

This concurrent session stream sponsored by the Offord Centre for Child Studies

Speaker

Mark Ferro

Moderator

Weiyi Xie
McMaster University

[E4.1] Mental Health Service Use Among Black Adolescents in Ontario by Sex and Distress Level: A cross-sectional study

1:00 PM – 1:15 PM

Background: Black adolescents in Ontario are more likely to access care in crisis, such as justice system interactions or when intensive care is required, suggesting barriers to early intervention. Despite this, little is known about overall service use patterns for Black Canadians and adolescents specifically.

Objectives: This study examines the mental healthcare service use patterns among Black adolescents in Ontario compared to their White peers. Focusing on whether race, as a social construct reflecting broader systemic forces, impacts mental healthcare use during adolescents.

Methods: Using data from the 2015-2019 Ontario Student Drug Use and Health Surveys, the study assessed mental healthcare access based on student responses about their care usage in the past 12 months. Logistic and Poisson regression models were used to analyze differences in service utilization, with interaction terms for sex and mental distress (measured using the Kessler Psychological Distress Scale).

Results: Black males with low distress were nearly twice as likely as White males to initiate care (OR:1.50, 95% CI:1.09-2.06). However, when their distress worsened to moderate levels, Black males became less than half as likely to access care compared to their White peers (OR:0.41, 95% CI:0.20-0.84). Black females faced disparities at all distress levels, with the gap widening as distress increased (moderate distress OR:0.78, 95% CI:0.46-1.34, serious distress OR:0.60, 95% CI:0.40-0.89). Even after initiating care, Black females mostly had lower odds of access frequency compared to White females (low distress OR:0.78, 95% CI:0.66-0.92, moderate distress OR:1.00, 95% CI:0.84-1.19, serious distress OR:0.60, 95% CI:0.42-0.85).

Conclusion: Black students with psychological distress are less likely to use mental health services than their White peers, with Black girls being the least likely to access care. The study highlights the need for policy and practice changes to address systemic racism and the lack of culturally relevant care for Black adolescents.

Speaker

Mercedes Sobers

Evaluations and Research Coordinator | Centre for Addiction and Mental Health (CAMH)

[E4.2] Childhood maltreatment shapes the trajectory of self-rated mental health in adulthood via personality traits and attachment insecurity: a longitudinal mediation analyses of a population-based cohort

1:15 PM – 1:30 PM

Background: Self-rated mental health (SRMH) captures broader mental health dimensions beyond objective measures of mental illness symptoms. Childhood maltreatment (CM) may have influence on SRMH given its harmful effects on mental health conditions. However, the relationship between CM and SRMH, and the potential mechanism remains unclear.

Objectives: to investigate how CM affects an individual's SRMH over time and to identify the potential mediation roles of personality traits and attachment styles in the relationship between CM and SRMH and its trajectory.

Methods: A total of 1356 participants were enrolled from a multi-wave, 10-year longitudinal cohort. Conditional latent growth curve models were constructed to examine how CM subtypes impact SRMH trajectory over time. Longitudinal mediation analyses were performed to explore the mediating roles of personality traits and attachment insecurity on the relationships between CM and SRMH. Potential sex differences in these relationships were tested.

Results: Our findings revealed that CM not only influences the initial levels of SRMH, but also predicts its trajectory over time, with emotional maltreatment as the strongest predictive factor. Neuroticism and attachment insecurity (especially attachment anxiety) mediated the relationships between all CM subtypes and SRMH, while only the relationships between emotional maltreatment and SRMH were mediated by extroversion and conscientiousness. Moreover, sex differences were observed, with greater mediating effects of personality traits in males, and more persistently mediating effects of attachment insecurity in females.

Conclusions: These findings highlight pathways of CM affecting SRMH over time, indicating neuroticism, extroversion, conscientiousness, and attachment insecurity are predominant intermediate mechanisms linking CM to poor SRMH in adulthood over time, representing potential targets for novel interventions to mitigate the long-term adverse effects of CM. Sex differences should be further considered.

Speaker

Xiangfei Meng

Associate Professor | University of Ottawa

[E4.3] Surveillance of Cardiometabolic Diseases from Early Life to Young Adulthood in Youth with and without Disabilities

1:30 PM – 1:45 PM

Background: The incidence of cardiometabolic disease is rising among youth. Young people with disabilities may be at increased risk for cardiometabolic conditions due to social and healthcare disparities but surveillance in this population is limited.

Objective: To describe the sex-specific incidence of diabetes, obesity and chronic hypertension among youth with and without disabilities.

Methods: A population-based matched cohort study including all births in Ontario (1993–2013) with a physical, vision, hearing, or developmental disability. Youth were age- and sex-matched to up to four youth without a disability from the same population on their index date (date of disability diagnosis). The cohort was followed from index date until diagnosis of each cardiometabolic disease, emigration from Ontario, death, or end of follow-up (2024). Individuals with pre-existing cardiometabolic disease were excluded. Incidence rates were calculated as cardiometabolic disease events per total person-years according to sex.

Results: We identified 212,674 males and 145,588 females with a disability. Over the 30-year surveillance period, higher incidence rates of cardiometabolic diseases were observed among youth with disabilities. Among males with disabilities, incidence rates per 10,000 person-years were 8.36 (95% CI 8.03 – 8.70) for diabetes, 21.6 (21.0 – 22.1) for obesity, and 12.6 (12.2 – 13.0) for chronic hypertension compared to 5.85 (5.70 – 6.00), 16.1 (15.9 – 16.4), and 7.16 (7.00 – 7.33) among males without disabilities. Among females with disabilities, incidence rates were 10.3 (95% CI 9.90 – 10.8) for diabetes, 32.4 (31.6 – 33.2) for obesity and 11.0 (10.6 – 11.5) for chronic hypertension compared to 7.03 (6.84 – 7.23), 23.1 (22.7 – 23.5) and 5.23 (5.08 – 5.42) among females without disabilities.

Conclusion: We demonstrate the incidence of cardiometabolic disease in youth with disabilities, highlighting the importance of continued public health monitoring of chronic disease trends in this population to guide targeted interventions.

Speaker

Fareha Nishat

PhD Candidate | University of Toronto

[E4.4] Perception of Body Image among Youth. Examining whether Interpretations of what body image means vary by sex

1:45 PM – 2:00 PM

Background: Misperceptions of body image, whether it involves overestimating or underestimating, have been linked to low self-esteem, poor mental health, and unhealthy behaviours such as disordered eating. Rapid physiological and psychological changes as this stage, as well as social pressures, media portrayals, and cultural expectations increase youth's vulnerability to this issue.

Objectives: To examine the individual, social, and environmental factors influencing adolescent body image perception and to determine whether these considerations vary by sex.

Methods: Data collected via an online survey of 803 youth aged 13-18 included body image perception and influencing factors, such as social relationships, social media engagement, physical characteristics, and behaviour. Principal component analysis (PCA) identified potential latent factors within the items that participants considered important in rating perception of body image. The robustness of the analysis was assessed by estimating the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity.

Results: Significant sex differences were observed, with 43% of boys rating their body image positively compared to only 23% of girls. Negative body image correlated with poorer self-rated physical and mental health, particularly among girls. PCA revealed three main domains shaping body image perception: social relationships, personal behaviours, and social media. Boys' perceptions were more influenced by personal behaviours such as exercise and fitness, while girls placed greater emphasis on social comparisons, peer comments, and media portrayals. Given that the KMO measures were greater than 0.80 the size of the sample was deemed adequate. Furthermore, the statistical significance of Bartlett's test suggested that the three-common factor solution was sufficient to explain the correlations.

Conclusion: Adolescent body image perceptions are shaped by a complex interplay of social, behavioural, and personal factors, with clear sex differences. Recognizing these influences can guide the development of tailored interventions that promote positive body image and well being of youth.

Speaker

Afshin Vafaei

Assistant Professor | Western University

[E4.5] An Epidemiological Study of Psychosocial and Health Behaviour Outcomes Associated with Early-life Multimorbidity

2:00 PM – 2:15 PM

Background: While previous research has examined psychosocial and health behaviour outcomes in children with chronic conditions, little is known about the effects of multimorbidity (the co-occurrence of physical and mental or neurodevelopmental disorders) on these clinically important outcomes.

Objectives: This study investigated key psychosocial and health behaviour outcomes associated with multimorbidity and compared these outcomes across different morbidities (physical illness only, mental disorder only, neurodevelopmental disorder only).

Methods: Data from the 2019 Canadian Health Survey on Children and Youth, a nationally representative survey of children aged 1 to 17 years, was used for the analyses (N=33,715). The person most knowledgeable (PMK) provided proxy reports for children under 12 years of age, while children 12 years of age and older provided self-reports on outcomes. Regression models were computed to examine associations between morbidity status and academic achievement, life satisfaction, bullying, substance use, and physical activity.

Results: Children with multimorbidity, mental disorder only, and neurodevelopmental disorder only experienced significantly worse psychosocial health and health behaviours across all outcomes compared to those with physical illness only. Notably, children with multimorbidity were less likely to report regular physical activity (OR=0.76 [0.60, 0.95]) and more likely to report frequent bullying (B=1.44 [0.73, 2.15]), school absences (OR=1.46 [1.06, 1.46]), poorer academic achievement (OR=19.80 [14.01, 27.96]), poly-substance use (OR=6.77 [4.48, 10.22]), and experiencing lower life satisfaction (OR=9.03 [5.84, 13.96]).

Conclusion: Findings highlight the widespread and compounded psychosocial and health behaviour challenges faced by children with multimorbidity, underscoring the need for integrated services that address health needs more holistically. Given the high likelihood of substance use and academic difficulties, a coordinated approach that combines educational support with mental health services is essential to improving outcomes for children with multimorbidity.

Speaker

Mark Ferro

Breakout E5: Epidemiological Methods

1:00 PM – 2:15 PM | Location: Salon 8 (4th floor)

Moderators

Paul Demers

Director, Occupational Cancer Research Centre | Ontario Health

Siobhan Carroll

[E5.1] Calibrating weights of major depression classification to account for reference standard misclassification: a Case Study of an Individual Participant Data Meta-Analysis of Studies on the Screening Accuracy of the PHQ-9

1:00 PM – 1:15 PM

Background: Accuracy of the Patient Health Questionnaire-9 (PHQ-9) has been evaluated against several reference standards (semi-structured, fully structured, brief fully structured) that exhibit differential accuracy to classify major depression. Pooling data across reference standards could, thus, bias estimates of PHQ-9 accuracy, but estimating accuracy separately against each reference standard reduces precision.

Objectives: We aimed to evaluate a method for estimating reference standard classification weights where participants receive diagnostic classifications from either a gold standard or alternate misclassifying reference. Then, we used these weights estimate the pooled diagnostic accuracy of the PHQ-9 based on the entire dataset.

Methods: We developed a method for estimating weights for misclassifying reference standards by imputing a gold standard status for all subjects and computing inverse probability of misclassification weights based on differences between assessed and imputed reference standard classifications. We applied this to a PHQ-9 individual participant data meta-analysis database, designating semi-structured interviews as the gold standard. Using two-stage bootstrap sampling, we estimated weights for fully structured and brief fully structured interviews by imputing semi-structured major depression status in each sample at clinically relevant PHQ-9 score ranges. Weights were then applied to derive pooled PHQ-9 diagnostic accuracy estimates via bivariate random-effects models.

Results: Data were obtained for 97 studies (N = 43,677; major depression cases N = 4,488). After weighting, pooled PHQ-9 sensitivity and specificity were maximized at a cutoff of ≥ 9 (sensitivity = 0.84, specificity = 0.81). Weighting had minimal impact on pooled estimates but increased median confidence interval widths for sensitivity and specificity by 238% and 67% respectively. Heterogeneity in PHQ-9 sensitivity at cutoffs of 5-7 increased; otherwise, they remained stable or decreased after weighting.

Conclusions: Our findings demonstrate that variability in screening test accuracy estimates may be underestimated when pooled across multiple different reference standards that are assumed to be interchangeable.

Speaker

Meira Golberg

Lady Davis Institute For Medical Research

[E5.2] Growth charts for grown ups? A novel use of BMI-for-age percentiles to assess cardiometabolic risk among older adults in Canada

1:15 PM – 1:30 PM

Background: The use of a categorical definition of obesity based on a fixed BMI cut point (i.e. BMI >30kg/m2) is inappropriate for older adults given physical and biologic changes that occur as part of the aging process. BMI-for-age percentiles were developed to account for age-related change in BMI and avoid misclassification bias.

Objective: To examine the relationship between obesity and cardiometabolic outcomes among older adults using a novel measure of obesity, BMI-for-age percentiles.

Methods: Data from the Canadian Longitudinal Study on Aging (CLSA) were used (n=18,349). BMI was calculated from measured height and weight at baseline and composite cardiometabolic outcome (heart disease, angina, myocardial infarction, coronary artery bypass surgery, type II diabetes, hypertension, peripheral vascular disease, transient ischemic attack, or cerebrovascular attack) was assessed at follow-up 1. Stratified modified Poisson regression models were used to obtain risk ratios (RR) and 95% confidence intervals, adjusted for age, race-ethnicity, and sex. The association between predicted RR for BMI-for-age percentile and cardiometabolic outcome was modeled flexibly using restricted cubic splines with four knots.

Results: Between ages 45-86, BMI values range in the 85th percentile: 30.9-35.5 (male) and 31.5-37.7 (female) and in the 95th percentile: 33.5-41.1 (male), 34.9-44.1 (female). Among females, RR with a BMI ≥95th percentile was 2.11 (1.86, 2.40) and ≥85th percentile 1.87 (1.69, 2.07). Among males, RR with a BMI ≥95th percentile was 1.88 (1.62, 2.17) and ≥85th percentile 1.87 (1.68, 208). There was a positive dose response relationship between predicted risk of cardiometabolic outcome and BMI percentile with a steeper slope among the highest BMI percentiles.

Conclusion: BMI percentile values were higher in women than men. Risk of cardiometabolic outcome increased with higher BMI percentile values and was higher in females than males. These findings highlight the utility of BMI-for-age percentiles in aging research examining obesity among older adults.

Speaker

C **Claire Cook**

[E5.3] Interaction and effect modification in the association between socioeconomic status and adolescent smoking: A systematic review

1:30 PM – 1:45 PM

Speaker

M **Mounia Naja**

[E5.4] How does attrition in the Canadian Longitudinal Study of Aging impact the association between social support and executive function?

1:45 PM – 2:00 PM

Background. Repeated assessments in longitudinal research are vulnerable to attrition, which can lead to increasingly selective, and possibly biased, samples. As both social support and executive function play a role in attrition, longitudinal studies investigating the association between the two may be particularly vulnerable to selection bias.

Objectives. We investigated: 1) whether baseline social support and executive function were associated with attrition after accounting for potential confounders, and 2) the association between social support and executive function across those participating at one, two, or three timepoints.

Methods. Modified Poisson and logistic regression analyses utilized the first three waves of the Comprehensive cohort of the Canadian Longitudinal Study on Aging (CLSA) (n=29,293). The Medical Outcomes Study-Social Support Survey assessed perceived availability of social support. Executive function was calculated by summing standardized scores across five cognitive tests. Attrition was assessed based on participation at baseline only (T1), both T1 and T2, and at all timepoints (T1, T2, T3). Models were adjusted for sociodemographic, health, and additional social variables.

Results. After accounting for covariates, those with low social support, low executive function, or missing data on any of the tests of executive function were significantly less likely to complete all three waves. The association between low social support and low executive function at baseline was significant for those who participated at baseline only (OR=1.60, 95% CI=1.04-2.46) but not for those who participated at both T1 and T2 (OR=1.15, 95% CI=0.74-1.80) or all three timepoints (OR=1.01, 95% CI=0.81-1.27).

Conclusion. Those with the strongest association between social support and executive function are also those most likely to be lost to follow-up. Attrition in longitudinal studies can lead to underestimating or overestimating the impact of risk factors given the cognitively healthier and more socially engaged participants who remain in the study.

Speaker

Emily Rutter

Graduate Student | University of Waterloo

[E5.5] Identifying Patterns of Participation Among People with Systemic Sclerosis in the Scleroderma Patient-centered Intervention Network Longitudinal Cohort

2:00 PM – 2:15 PM

Background: Attrition is a concern in longitudinal studies; participants who continue across the full duration of a study often differ from those lost to follow-up (LTFU), and some participants may intermittently miss assessments. Such missingness patterns reduce power and increase the possibility of selection bias. No studies have explored complex participation patterns such as those in multicentre chronic disease cohorts where enrollment is ongoing, and participants may disengage and re-engage any number of times.

Objectives: To identify subgroup patterns of participation within a longitudinal systemic sclerosis (SSc) cohort and characterize factors associated with participation profiles.

Methods: We used group-based trajectory modeling with participation status for each assessment as the outcome to identify subgroups with different participation patterns. Multinomial logistic regression was then used to identify predictors of membership in each subgroup.

Results: Data were obtained for 2,883 participants from 54 sites in 7 countries. We identified 5 distinct participation subgroups: ongoing participation (N = 822); immediate (N = 839), mid-term (N = 547) and long-term LTFU (N = 358); and ongoing sporadic participation (N = 317). Older age (10-year Odds Ratios [ORs] range 0.74-0.84 by subgroup) and sites outside the United States (ORs range 0.27-0.86) were associated with statistically significantly lower odds of belonging to subgroups other than ongoing participation. Compared to ongoing participation, male sex (OR = 1.31) and non-white race or ethnicity (OR = 1.64) were associated with statistically significantly higher odds of immediate LTFU. Among SSc disease factors, interstitial lung disease was statistically significantly associated with higher odds of mid-and long-term LTFU (OR = 1.36 for both).

Conclusions: We characterized complex participation patterns from a multicentre, longitudinal cohort and identified site, sociodemographic, and disease characteristics that predicted patterns. Our results may inform strategies to address barriers to ongoing participation.

Speaker

Meira Golberg

Lady Davis Institute For Medical Research

Breakout E6: Public Health and Health Services

1:00 PM – 2:15 PM | Location: Salon 7 (3rd floor)

Moderators

Sarah Harris

University of Manitoba and Pan Am Clinic Foundation

Belinda Nicolau

[E6.1] Trends in the Public Health Nursing Workforce in Canada: A Decade of Demographic and Workforce Change (2013–2023)

1:00 PM – 1:15 PM

Introduction: Public health nurses (PHNs) are the largest professional body of the public health workforce. Understanding the distribution of Canada's PHNs, and trends in this distribution over time, is critical to strategic workforce planning and optimizing resource allocation. The objective of this study was to describe PHN workforce trends in Canada.

Methods: We analyzed 2013-2023 PHN workforce data from the Canadian Institute for Health Information (CIHI) to describe characteristics of the PHN workforce. Descriptive statistics, including counts and percentages, were used to examine trends over time including age, gender, employment type, and years of experience. We conducted an interrupted time series analysis using a negative binomial model to assess the trends in the number of PHNs in Canada before and during the COVID-19 pandemic.

Results: The number of PHNs in Canada increased from 10,117 in 2013 to 13,328 in 2023. The largest year-over-year increase was observed in 2021 (29.7%) and 2022 (26.2%), followed by a sharp decline in 2023 (-13.3%). ITS analysis demonstrated that annual PHN hiring was stable from 2013-2019 (IRR: 0.98, 95% CI: 0.96–1.01; p=0.14) followed by a significant increase during the COVID-19 pandemic compared to pre-pandemic years (IRR:1.16, 95%CI: 1.09–1.24, p<0.001). In 2013, PHNs <35 years old accounted for 17.9% of the workforce, increasing to 25.1% by 2023. Similarly, PHNs with <10 years of experience increased from 24.9% in 2013 to 32.4% in 2023. PHNs with 35+ years of experience declined from 26.8% in 2013 to 19.6% in 2023.

Conclusion: COVID-19 led to a surge in younger, less experienced PHNs, reversing pre-pandemic trends. These workforce changes underscore the shifting demographics of PHNs and evolving workforce to highlight the need for professional development to build a resilient public health workforce.

Speaker

Japteg Singh

[E6.2] Four-way causal mediation to understand the impact of interprofessional primary care teams on health service use that is mediated through quality of care

1:15 PM – 1:30 PM

Background and objective: Interprofessional primary care teams, comprised of family physicians who work with other health professionals, are considered an effective strategy to counteract the expected increased use of health services associated with population aging. The literature has studied the separate effect of interprofessional teams on quality of care and on health service use, yet little is known about their interrelations. This objective of this study is to explore the effect of interprofessional teams on health service use as mediated by quality of care.

Methods: This is a retrospective longitudinal cohort study, using Quebec's health administrative data linked to results from the Canadian Community Health Survey (CCHS). The target population was adults who participated in the CCHS (n≈5500).

Analysis: Causal mediation, utilizing Vanderweele's four-way decomposition, was used to decompose the effect of interprofessional teams (exposure) on the outcome health service utilization (nonurgent emergency department use, total emergency department use, and total hospitalizations), that is mediated by quality of care (access, continuity, and coordination). The weighting-based approach was employed to decompose the effect of interprofessional teams on health service use into four components, the effect due to: mediation, interaction, both mediation and interaction, and neither mediation nor interaction.

Results: The effect due to both mediation and interaction (mediated interaction), when access was the mediator, led to a 7% reduction in nonurgent ED visits and an 8% reduction in total ED visits (ERR= -0.08; 95%CI [-0.18, -0.01] and ERR= -0.07; 95%CI [-0.16, -0.02]). Neither continuity nor coordination mediated the impact of IPCTs on outcomes and no interaction was observed.

Conclusion: Results suggest that the impact of IPCTs on ED visits depends on whether IPCTs improve access to care. To improve the impact of IPCTs on health service use outcomes, strategies to improve access within teams should be emphasized by policy initiatives.

Speaker

Pamela Fernainy

[E6.3] Socioeconomic inequities in alcohol-attributable mortality in Canada: A decomposition analysis

1:30 PM – 1:45 PM

Background: The alcohol harm paradox suggests that individuals with lower socioeconomic position (SEP) experience greater rates of alcohol-attributable harm despite similar or less alcohol alcohol compared to those with higher SEP.

Objective: This study examines how sociodemographic, lifestyle, access to health care, and cumulative risk factors contribute to SEP inequities in alcohol-attributable mortality in Canada.

Methods: A population-representative cohort study was conducted using pooled cross-sectional data from the Canadian Community Health Surveys (2000-2017) linked to mortality data until 2017. SEP was measured using household income and education. Logistic regression estimated associations between SEP and alcohol-attributable mortality, and a threefold Blinder-Oaxaca decomposition analysis quantified the contributions of risk factors to these mortality inequities.

Results: Alcohol-attributable mortality was disproportionately higher among people in the lowest income quartile compared to the highest (OR = 2.90, 95% CI: 2.24, 3.75) and those with less than a high school education compared to a bachelor's degree or above (OR = 3.42, 95% CI: 2.53, 4.64). Compared to people with high SEP, those with low SEP were more likely to have greater exposure to sociodemographic factors (age, marital status), lifestyle risk factors (smoking, physical inactivity), and cumulative risk factors (general health), which explained 52.1% of income inequities and 61.8% of educational inequities in alcohol-attributable mortality. To a smaller extent, the lower vulnerability of those with higher SEP to certain factors, such as heavy episodic drinking, contributed to income inequities. 24.5% of income and 7.5% of education inequities in alcohol-attributable mortality remained unexplained by any of these factors.

Conclusion: Inequities in alcohol-attributable mortality in Canada are mainly driven by higher exposure to lifestyle and cumulative risk factors among individuals with low SEP. A substantial portion of these inequities remains unexplained, highlighting the need for future research on unmeasured structural and systemic factors that could mitigate these health inequities.

Speaker

Alessandra Andreacchi

Real World Evidence Lead | Sun Life

[E6.4] COVID-19 Vaccine Trust and Distrust Among 5607 Adults in Canada: Insights from Trust Dynamics and Equity in Public Health Survey, 2024

1:45 PM – 2:00 PM

Background: Despite high COVID-19 vaccine uptake in Canada, public trust regarding vaccines persists as a major public health issue. Gaps in understanding trust dynamics related to vaccines, and rebuilding this trust, is a top priority.

Objective: To identify key drivers of public trust and distrust in COVID-19 vaccines in Canada.

Methods: Cross-sectional data from 5,607 Canadian adults collected in May 2024 was used. Participants were recruited through a quota sampling, and data were weighted to align with 2021 Canadian Census. The outcome variable was trust in COVID-19 vaccines, rated as: trust, neutral or distrust. The independent variables included sociodemographic factors, trust in public health authorities (PHAs), federal and provincial governments, vaccination behaviors, and media influence. Multivariable multinomial regression was performed.

Results: Overall, 62.9% of participants trusted COVID-19 vaccines; 20% did not trust them. Trust in provincial governments was associated with 66% increase in vaccine trust; paradoxically, distrust in provincial governments was associated with 88% increase in vaccine trust. Trust in federal government was associated with 71% increase in vaccine trust. Distrust in federal government was associated with 36% reduction in vaccine trust. Trusts in PHAs increased likelihood of vaccine trust by nearly threefold, while distrust in PHAs also tripled likelihood of vaccine distrust. Adults aged 35-54 years were 55% less likely to distrust vaccines than those aged 18-24 years. Men were 65% more likely to trust vaccines than women. Household income of $100,000 or more decreased the likelihood of vaccine distrust by 44%. Unvaccinated adults were 3 times more likely to distrust vaccines.

Conclusion: Public trust in vaccines remains a complex topic. Trust in provincial and federal governments and in public health are among the key drivers of COVID-19 vaccine trust. Targeted strategies are needed that address trust disparities, particularly among younger adults, women, and unvaccinated individuals.

Speaker

Sohana Sadique

Project Manager | University of Saskatchewan

[E6.5] Disruption to Sexual Health Service Impacted Chlamydia and Gonorrhea Rates Differently in Ontario and British Columbia: An Interrupted Time Series

2:00 PM – 2:15 PM

Background: The COVID-19 pandemic caused health service disruptions across Canada. We evaluated if the impact of these disruptions on reported chlamydia and gonorrhea cases was less pronounced in British Columbia (BC) where existing online sexually transmitted blood-borne infection's (STBBI) testing service 'GetCheckedOnline' was available compared to Ontario.

Methods: Data on chlamydia and gonorrhea cases among young adults under 25-years of age were obtained from Public Health Ontario and BC Center of Disease Control between 2016–2021. The impact of the pandemic (onset March 2020) was estimated through interrupted time series analysis using linear regression with an autoregressive integrated moving average, to account for seasonality. Analyses were further stratified by sex.

Results: Pre-pandemic (2016-2020) chlamydia and gonorrhea cases increased in both provinces and the onset of COVID-19 led to an immediate reduction in rates. In Ontario chlamydia rates dropped by -40.2 cases/100,000 population (95%CI: -9.2,-5.8) with greater reduction among females of -55.9 (-69.2,-42.2) compared to males -27.5 (-34.1,-21.0). In BC chlamydia rates decreased by -23.1 cases/100,000 population (-27.9,-18.4) similarly, with larger declines among females compared to males of -32.2 (-37.9,-24.4)) and -15.5 (-19.7,-11.3)) respectively. Rates of gonorrhea cases also declined in both provinces, with -3.0 cases/100,000 population (-4.9,-1.7) drop in Ontario; specifically -2.5 (-4.0,-0.9) among females and -4.1 (-6.1,-2.2) among males. BC had a decline of -2.1 cases/100,000 population (-4.1,10.1); with -4.4 (7.0,-1.7) among females and -1.7 (-3.5,0.2) among males. Post-pandemic trends were not significant, indicating rates remained stable following initial declines.

Conclusion: The decline in chlamydia and gonorrhea rates was more pronounced in Ontario than in BC, suggesting that factors such as BC's online testing service may have mitigated some disruptions. While the short-term impact of COVID-19 has passed, long-run post-COVID differences, in STBBI testing and transmission, between provinces merit further investigation.

Speaker

Farhan Khandakar

Transition to Plenary

2:15 PM – 2:30 PM

It's human, it's animal, it's environmental, it's One Health epidemiology!

2:30 PM – 3:45 PM | Location: Ballroom (4th Floor)

This session will be an opportunity for experts working in three major federal agencies to discuss the role that epidemiological methods can play in better understanding risk factors for and control of zoonotic agents across species. The panel will also discuss how federal agencies have been cooperating recent outbreaks of zoonotic agents, and also discuss how epidemiological methods could be used to better study the impact of the environment on health of humans and animals.

Speakers

Nicholas Ogden

Senior Research Scientist | Public Health Agency of Canada

Émilie Bouchard

Maud Carron

Senior Veterinary Science Specialist | Canadian Food Inspection Agency

CSEB Awards and Closing Remarks

3:45 PM – 4:15 PM | Location: Ballroom (4th Floor)