T.T.

St. Michael's Hospital, The MAP-Centre for Urban Health Solution

Socioeconomic inequalities in the awareness, integration and compliance with provincial nutrition guidelines among elementary schools in Alberta, Canada

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School nutrition policies are important mechanisms to create healthful food environments that promote healthy eating in children. It is unknown whether the awareness, alignment and compliance of school nutrition guidelines varies across socioeconomic settings. Provincially-representative survey data were collected between 2008-2021 in elementary schools from: (1) Real Kids Alberta (Raising healthy Eating and Active Living Kids in Alberta) population-based survey and (2) APPLE Schools (A Project Promoting healthy Living for Everyone in Schools) health promoting intervention targeting active and healthy living among students attending schools in disadvantaged settings. School principals reported on their awareness and actions (integration, compliance) related to the Alberta Nutrition Guidelines for Children and Youth (ANGCY) released in 2007. School-level socioeconomic characteristics included neighbourhood's material deprivation index and rural/small vs. large population centres. Provincially, awareness of ANGCY did not vary by material deprivation. More schools located in deprived neighbourhoods integrated ANGCY into school nutrition policies, compared to less deprived schools (2008: 25% vs. 16%; 2014: 67% vs. 59%). Fewer deprived schools used ANGCY to determine most food choices (2008: 14% vs. 20%; 2014: 51% vs. 58%). Among APPLE schools located in deprived neighbourhoods, the use of ANGCY determine most food choices improved from 28% at baseline to 67% after 6+ years. Provincially, fewer schools in rural/small vs. large population centres integrated ANGCY into school nutrition policies (2008: 21% vs. 29%; 2014: 61% vs. 87%). More schools in rural/small vs. large population centres used ANGCY to determine most food choices in 2008 (34% vs. 15%) but this reversed in 2014 (64% vs. 69%). Among APPLE schools located in rural/small population centres, ANGCY were integrated into school nutrition policies in 60% after 6+ years vs. 33% at baseline. ANGCY were used to determine most food choices in 82% after 6+ years vs. 44% at baseline. Schools located in deprived neighbourhoods and rural/small population centres may need support to improve their uptake of provincial nutrition guidelines. Implementation of intensified health promotion programs such as APPLE Schools is imperative to promoting healthy eating in disadvantaged schools and reducing health inequities. Financial Support: Joannah & Brian Lawson Centre for Child Nutrition.

A.Y.

Northwestern Public Health Unit & Canadian Public Health Service

My second practicum took place with the Northwestern Health Unit, located in Northern Ontario. My primary task was to construct a report on child and youth mental health outcomes. This report was comprised of key population health indicators among children and youth aged 10-24 in the catchment area of Ontario monitored by the Northwestern Health Unit. Statistics included in this report describe

outcomes for hospitalization and emergency room visits for intentional self-harm, mental and behavioural disorders and substance-related mental and behavioural disorders. Data was collected from 2012 to 2021. Statistical significance of incidence rates were assessed using Poisson and negative binomial regression.

Key findings were:

- Female children and youth tended to experience significantly higher emergency room visits and hospitalizations due to intentional self-harm compared to male children and youth
- Male children and youth tended to experience significantly higher emergency room visits due to substance-related mental and behavioural disorders compared to female children and youth
- Across all indicators, Sioux Lookout was the Health Hub experiencing the greatest burden of child and youth mental illness
- Findings of this report will be shared with community partners and will be used to further establish a knowledge base of child and youth mental health outcomes within this region of Ontario.

H.S.

Peel Public Health

During the COVID-19 pandemic, the social determinants of health were identified as risk factors for COVID-19 illness. In June 2020, the Ontario government mandated the collection of data on race, income, language, and household size for those who test positive for COVID-19. Despite efforts to increase sociodemographic data (SDD), completeness of SDD remained low, limiting public health unit's ability to utilize this data. The objective of this project was to document the experiences of public health units in the collection of SDD in order to identify a set of recommendations based on identified enablers and barriers, that public health units can reference as they scale SDD collection beyond COVID-19 specific activities. A survey was sent to the 34 public health units to collect background information from each public health unit focused on what happened during the pandemic. Focus groups were completed to collect information on enablers and barriers to data completeness, training methods, tool development/use, and lessons learned from SDD collection during COVID-19 case management and vaccination. Descriptive analysis was completed from the survey data and inductive content analysis was completed on the focus groups. During case management 91% of health units collected sociodemographic data and 53% collected SDD during vaccination. Common barriers to SDD collection during case management and vaccination included SDD collection not being a priority and lack of capacity due to case volume. Common enablers to SDD collection during case management and vaccination were staff and client comfort, and public understanding of the importance of SDD. Overall, public health units will be able to utilize these findings to inform recommendations and learning exchange activities that support SDD collection going forward.

C.X.Y.Z.

Public Health Agency of Canada

Introduction: Children are placed in foster care when there is abuse, neglect, or other risks to the child's well-being in their home. Foster care offers protection to vulnerable children, an important part of a

country's child welfare system. However, it can also have unintended consequences, such as separation from family and community.

Methods: We used a cross-sectional study design to examine the incidence rate of children placed in foster care by province and territory in Canada. We used census data from 2011-2021 and used SAS Enterprise Guide 7.1 to calculate the incidence rates of children in foster care and 95% confidence intervals, per 100,000 children.

Results: This study found Manitoba to have the highest rate of children placed in foster care, while Ontario and Prince Edward Island has the lowest rates. Ontario's lower rate of children in foster homes may be attributed to more comprehensive child welfare policies, however, more research is needed to understand the between-province variations.

Discussion: The results are broadly consistent with previous research, with Manitoba reported to have the highest rate of children in care. The results underscore the need for ongoing surveillance, targeted interventions, and program evaluation to reduce the rate and improve the outcomes of children in care.

G.M.C.

Institute for Work and Health

Background: Physical activity (PA) plays an important role in the prevention of many chronic diseases, however, most Canadian adults, particularly workers, do not achieve PA recommendations. Active transportation (AT) can be integrated into routines, helping working be physically active. Occupational characteristics are potential determinants of AT use, but their relationship with AT has not been extensively studied.

Methods: We analyzed data from the Canadian Census (2006-2016) to examine the association of occupational group and working hours with AT use among adults. We used multinomial logistic regression to estimate odds ratios and 99% confidence intervals for cycling, walking, and public transit use, adjusting for demographic and environmental factors. We also examined trends over time and sex-differences.

Results: Among Canadian workers, commuting by private motorized vehicle and bicycle were more common among males than females while walking and using public transit were more common among females. After adjusting for covariates, arts, culture, recreation, and sport occupations followed by applied sciences were associated with the greatest odds of AT use while workers in trades, transportation, natural resources, manufacturing, and utilities had the lowest odds of AT. Sex differences in the association between occupation and AT were also observed. Working in sales and service and education, law, social, community and government services was associated with greater odds of AT among males than females. Time trends demonstrate that since 2006, the proportion of workers commuting by private motorized vehicle has declined, however, AT use has remained relatively stable with only public transit use increasing substantially.

Conclusion: Our study highlights the importance of considering occupational status in understanding and promoting AT use.

R.K.

Public Health Agency of Canada Lifespan Chronic Disease and Conditions (LCDC) Division

Development and expansion of a Canadian surveillance population health tool for children and youth with cancer

Background and Aims: Capturing cancer trends in children and youth is vital to understanding cancer burden. The Cancer in Young People in Canada (CYP-C) maintains an interactive tool that presents data on cancer incidence, survival and relapse risk. It is the only pan-Canadian surveillance tool dedicated to childhood cancer. New developments include data on prevalence, mortality and potential years of life lost (PYLL). This abstract describes the statistics newly available in the CYP-C data tool.

Methods: Data was collected from the CYP-C program (2001-2020) and Canadian Cancer Registry linked to the Canadian Vital Statistics-Death Database (1992-2017). Prevalence estimates include children diagnosed before 15 years old and alive 5, 18, or 25 years after diagnosis. Mortality and PYLL rates include children who died before 18 years old. PYLL was estimated using life expectancies in the general population. Crude and age-standardized rates (ASRs) are included and stratified by sex, age, year, cancer diagnosis, region, and period.

Results: At the start of 2018, there were almost 15,000 individuals in Canada (excluding Quebec) diagnosed with childhood cancer in the previous 25 years. Of these individuals, 25% were diagnosed in the previous 5 years. Over 20 years, the age-standardized 5-year prevalence increased (419.0 per million in 1997; 531.7 per million in 2017). Leukemias were the most prevalent. All-cause mortality among individuals < 18 years old was consistently 20.5 per million over the fifteen-year analysis period. Almost 11,000 potential years of life were lost yearly, most in males. CNS tumors accounted for one of the highest rates of PYLL (ASR 410.5 per million).

Conclusions: The CYP-C data tool aims to make childhood cancer epidemiology accessible. The expansion to include prevalence, mortality and PYLL allows users to explore more trends by several stratifiers. Future developments will include other childhood cancer indicators for continued surveillance of this population.

R.O.A.

Durham Region Health Department

I did my second practicum at the Durham Region Health Department with the Health Analytics and Research Team otherwise known as HART. For this practicum, I had the opportunity of conducting population health assessments using data from the Canadian Community Health Survey (CCHS) data. I identified indicators pertaining to healthy eating, active living, and injury prevention to assess the health of Durham region residents. I ran survey analysis with bootstrap weights from the CCHS data using the household bootstrap data file or the individual bootstrap data where appropriate. All analyses were performed using Stata version 16.1. I prepared report documents to explain the findings of the analysis in plain language. I had the opportunity to learn about other data sources such as the Birth Outcomes Registry Network, Rapid Response Factor Surveillance System (RRFSS), and the integrated Public Health Information System (iPHIS). I attended a workshop on Power BI organized by the IT department which introduced me to creating basic dashboards. I also worked on preparing a document that will be used in

updating the Durham region cancer infographic to highlight relevant information about overall, age-and-gender-specific cancer incidence and mortality. I had the opportunity to support programs in areas such as the Nutritious Food Basket, Mental Health Support, and access to a primary care provider in the Durham region. I had the best experience working with a strong team of Epidemiologists who provided unwavering support to ensure that I succeeded and obtained the best experience possible. The team welcomed me onboard and provided a healthy work environment that helped me thrive.

S.K.

Public Health Agency of Canada, Food-borne Disease and Antimicrobial Resistance Surveillance Division

Objectives: Salmonella enterica infections are a leading cause of acute gastrointestinal illness, which is most commonly contracted and transmitted through the consumption of contaminated food of animal origin, particularly raw poultry products. Identifying the sources of salmonellosis infections at the point of exposure is critical to understanding the dynamics of the disease and the development of control measures aimed at preventing infections and reducing the burden of enteric illness. The current project aimed to contribute to the enteric disease source attribution evidence base through the following objectives: i) to estimate the impact of the 2019 CFIA frozen breaded chicken products (FBCP) policy on human salmonellosis; ii) to investigate the relationship between FBCP Salmonella contamination levels in retail samples; iii) to estimate the portion of salmonellosis cases attributable to FBCP contamination exposure.

Methods: The study used data from FoodNet Canada and the National Enteric Surveillance Program. The pre-post with the difference-in-differences, as well as the interrupted time series analyses were used to estimate the change in the weekly human salmonellosis incidence after the policy implementation. The multivariate autoregressive integrated moving average with exogenous variables (ARIMAX) time series regression analysis was used to estimate the association between Salmonella contamination in frozen breaded chicken products and human salmonellosis infections. Source attribution analysis was used to estimate the portion of the change in salmonellosis infections due to the reduction of Salmonella contamination in FBCP from the policy intervention.

Results: There was a reduction of 4.33 (2.11-6.55) and 4.84 (3.87-5.81) weekly cases of salmonellosis per 100,000 population, annualized, in the three FoodNet Canada sentinel sites, and in Canada overall, respectively. There was a 23% (19.66-27.25) reduction in the Salmonella contamination prevalence in the retail frozen breaded chicken product samples due to the CFIA policy. A significant association was observed in the relationship between human salmonellosis infections and the FBCP contamination (0.66 (0.09-1.22; p=0.023). The source attribution analysis demonstrated that 12% (1.70-22.45) of the reduction in salmonellosis was due to the reduction in Salmonella contamination in the FBCP after the policy implementation.

Conclusions: There was a significant reduction in the salmonellosis incidence after the CFIA food policy intervention, and a significant association was observed between Salmonella contamination levels in retail samples of frozen breaded chicken products demonstrating the causal link between the reduction of FBCP contamination as a result of the policy and salmonellosis outcome. These findings support the conclusion that the targeted public health intervention was effective at reducing the rate of salmonellosis infections on the population level.

S.F.

Public Health Ontario, Department of Health Promotion, Chronic Disease and Injury Prevention

Introduction: Alcohol use continues to have severe health impacts, yet some jurisdictions are increasing alcohol availability by deregulating sales. The impact of increased alcohol outlet availability on alcohol-related harms has been investigated, but how this association is impacted by differing socioeconomic status (SES) would assist in better understanding the complexities of this association. Therefore, this study aims to estimate the association between the density of off-premise alcohol outlets and alcohol-attributable emergency department (ED) visits at the area-level in Ontario and how it's modified by SES.

Methods: A retrospective cross-sectional study of Ontario dissemination areas (DAs; n=19,740) was conducted using the Canadian Census (2016), Ontario Marginalization Index (ON-MARG; 2016), National Ambulatory Care Reporting System (NACRS; 2017-2019), and Ontario Alcohol Availability (2018) datasets. The primary outcome was the age-standardized rate of alcohol-attributable ED visits per DA. Sex-stratified negative binomial regression estimated risk ratios (RRs) of the primary association for three models, including the interaction between off-premise outlets and material deprivation quintiles, the indicator selected to evaluate SES. Model 2 was adjusted for DA covariates (rural, population density, and percent of immigrants).

Results: In adjusted analyses, each additional off-premise outlet was associated with increased alcohol-attributable ED visits in males (RR=1.05 [95% CI: 1.02-1.08]) and females (1.05 [1.01-1.08]). Similarly, each increasing material deprivation quintile was associated with increased ED visits in both sexes. A mild dose-response is observed in both sexes in the interaction model, although not all values are statistically significant.

Conclusions: As Ontario considers further deregulation of alcohol sales, the impact of increased off-premise alcohol availability on differing SES and ED visits is integral to acknowledge.

S.P.

Public Health Agency of Canada

Objectives: The main objective of this practicum was to strengthen core epidemiology competencies through a late effects project. This late effects project looked specifically at late mortality of survivors of childhood cancer using the Canadian Cancer Registry-death linked database (CCR-CVSD).

Activities: A variety of tasks over the four-month period were conducted to complete the initial planning phases and preliminary analyses for this project. These included identification of late mortality studies associated among survivors of childhood cancer, exploring, and summarizing CCR-CVSD data, and exploring/proposing methodology to analyze late mortality data in epidemiological studies.

Methods: The literature search was conducted using online data libraries: Pubmed, Medline and Embase to collect relevant articles. From this search, a standard definition of 'late mortality' was identified, key measures of mortality such as standardized mortality ratios, absolute excess risk and mortality rates were noted. Comparison groups were identified to be the general population, as relevant to our study and key risk factors for the exposed group. Once this was completed, the CCR-CVSD data was summarized using frequency tables and creating a cohort of eligible individuals. Lastly a proposed methodology based on relevant papers was presented to my supervisor.

Outcomes: Using the proposed methodology, an abstract for two international conferences was submitted using the preliminary data analyses (SMR by cancer type and time to follow-up). Later analyses expanded to Kaplan Meier curves for survival probability by cancer type, age at diagnosis and sex. Additionally, SMRs per cause of death were identified. All results and interpretations were presented to internal and external stakeholders.

M.S.L.

Ontario Health - Indigenous Cancer Care Unit

Objectives: The aims of my practicum at Ontario Health (OH) within the Indigenous Cancer Care Unit (ICCU) was to: (1) Develop statistical experience working with quantitative population-level datasets; (2) Gain experience collaborating directly with Indigenous populations; (3) Research cancer trends within Indigenous communities; (4) Strengthen collaboration skills with supervisor and colleagues while taking the initiative to ask for support when needed; (5) Further knowledge about the agency and career opportunities available beyond this practicum.

Activities: To achieve these objectives, my activities included manipulating and analyzing quantitative data at the Statistics Canada research data center to use population-level datasets on kidney cancer trends among First Nation populations. I collaborated weekly in ICCU meetings and student touchpoint meetings to share progress updates. I also attended informative conferences by OH and the Chiefs of Ontario which highlighted the positive impact of Indigenous health research. Additional activities included completing the Indigenous Relationships and Cultural Awareness (IRCA) courses and assisting with updating these modules.

Methods: Prior to the practicum, I established clear objectives and deliverables with my supervisor. Our midterm and final evaluations offered insight on my strengths and areas of improvement. During meetings and conferences, I took detailed notes that prompted questions to ask my supervisor and colleagues to learn more about relevant Indigenous health projects. I initiated conversations with individuals at the agency to gain experience networking. In completing my literature review and manuscript, I gathered information from librarians to guide me through a search strategy.

Outcomes: The final deliverables included completion of four IRCA modules and presenting my work to the Indigenous Advisory Committee and ICCU team. My major work involved drafting a literature review on kidney cancer trends among Indigenous populations. Using Canadian literature, I drafted a manuscript and completed an analysis for the kidney cancer census project.

F.E.

Occupational Cancer Research Centre, Ontario Health

Abstract- Understanding the relationship between work and female reproductive cancers in a large Ontario cohort

Introduction: The etiology of female reproductive cancers varies considerably, and the role of occupation/industry in the development of these cancers is not well understood. This study aims to evaluate the association between employment in an occupation/industry and female reproductive cancers, such as cervical, uterine, and ovarian among a large cohort of Ontario workers.

Methods: In the Occupational Disease Surveillance System (ODSS), a total of 837,551 females workers were identified between 1983-2019. Workers were linked to the Ontario Cancer Registry (OCR) to identify female reproductive cancer cases. Cox proportional hazard models were used to calculate age-adjusted hazard ratios and 95% confidence intervals (CIs) to estimate the risk of reproductive cancer by occupation/industry group. Standardized incidence ratios (SIRs) and 95% CIs were also calculated, adjusted for age and time-period, to compare cancer rates in the ODSS to the Ontario general population.

Results: The total number of malignant cervical, uterine and ovarian cancer cases were 1411, 4666 and 2517 in the ODSS, respectively. Elevated risk was identified for cervical cancer in product fabricating (HR=1.20, 95%CI=1.02-1.42) and construction (HR=1.82, 95% CI = 1.09-3.03). Risks were higher for uterine cancer in management/administration (HR=1.39, 95% CI=1.17-1.64) and teaching (HR=1.38, 95% CI=1.24-1.54), and for ovarian cancer for management/administration (HR=1.22, 95% CI=0.95-1.56) and materials handling occupations (HR=1.25, 95% CI=1.05-1.48). The SIRs for all female reproductive cancers were significantly reduced when comparing the ODSS cohort to the general Ontario population.

Conclusion: This study provides evidence of risk of reproductive cancers among a large cohort of female workers. Findings show increased risks across various occupations and industries, warranting further research in potential exposures involved. Findings may help to advance understanding of the etiology of these cancers and ultimately lead to improvements in cancer prevention.

A.K.

BlueDot - Epidemic Intelligence Team

I completed my Winter 2023 practicum placement as an Intern Epidemiologist with BlueDot's Epidemic Intelligence team. BlueDot is a Toronto-based, private company offering a data as a service platform that combines public health expertise with data analytics to track infectious disease risks worldwide.

During my practicum, I was responsible for creating epidemiological reports providing meaningful, data-driven insights on select infectious diseases for diverse clients. The first report I created was an in-depth, 26-page investigation of viruses in the Orthopoxvirus genus for a pharmaceutical client. The second report, which is currently in progress, investigates chikungunya and will be delivered to multiple clients. The creation of both reports required the use of data pulled from BlueDot's unique Application Programming Interface, such as Human Disease Cases and Deaths, to analyze the existing burden and future risk of diseases. I experimented with different methods of statistically computing and visualizing the data in R and ArcGIS. I also comprehensively reviewed and critically appraised grey and peer-reviewed literature, including case reports, news media, phylogenetic analyses, and regulatory documentation, in order to describe the diseases, comment on data quality, and contextualize data findings.

Throughout the process of creating the reports, I was guided by and worked collaboratively with BlueDot's team of expert epidemiologists, data scientists, and clinicians. I gained invaluable skills in knowledge translation, in addition to enhancing my ability to analyze and visualize data and synthesize literature. I was also exposed to the tools necessary for cross-sectoral collaboration to mitigate and respond to public health threats, as we met with our pharmaceutical client multiple times regarding the Orthopoxviruses report.

R.P.

Public Health Agency of Canada, Substance Related Harms Division

Background: I completed my practicum as a Junior Epidemiologist at the Public Health Agency of Canada (PHAC) in the Substance Related Harm Division (SRHD) on the Integrated Data and Enhanced Analytics (IDEA) team. PHAC is mandated to improve health and respond to public health emergencies, and one focus of the SRHD is the ongoing opioid overdose crisis in Canada. Twice a year, the IDEA team releases a model of opioid-related deaths in Canada. This model incorporates the effect of public health measures into its projections of opioid mortality.

Aim: A current goal of the IDEA team is to gather evidence to inform and strengthen these estimates, as well as to understand the impact of individual public health measures (e.g., supervised consumption sites, naloxone, drug checking services) implemented since 2016. To assist with this goal, my practicum project is to conduct a systematic review of the impact of supervised consumption sites (SCS) on opioid-related and overdose deaths between 2016 and 2023.

Description: This has involved conducting scans of existing reviews, writing a systematic review protocol, developing search strategies, screening articles, extracting relevant data, appraising the quality of the literature, presenting preliminary findings, and drafting the review for publication. I also calculated the estimated proportion of deaths averted due to SCS across included studies. Throughout this process, I have collaborated with team members, incorporated their feedback, and participated in multiple team meetings each week. I have also had the opportunity to attend numerous training sessions and webinars on a variety of interesting topics and was able to participate in quality assessment for a release of data on opioid and stimulant-related harms in Canada.

J.S.L.

Toronto Metropolitan University

Background: Cycling is associated with a number of health and environmental benefits. Despite these benefits, cycling is associated with substantial risk in the form of cyclist-motor vehicle collisions. Cycling infrastructure interventions - such as cycle tracks and bike lanes - are one way of altering the built environment to make cycling a safer and more comfortable experience.

Methods: Panel fixed effects methods, an extension of the interrupted time series design, were used to measure the association between cyclist-motor vehicle collisions and the implementation of cycling infrastructure along a given street. This association was investigated in tandem with the measurement of weekly cyclist volume along select streets.

Results: Cycling volumes increased more dramatically along treated streets relative to untreated streets. The implementation of bike lanes was associated with an imprecise 74% increase in the rate of CMVCs (IRR = 1.74,; 95% CI: 0.61 to, 4.97), whereas the implementation of cycle tracks was associated with an imprecise 17% decrease (IRR = 0.83,; 95% CI: 0.29 to, 2.38). The installation of new cycling infrastructure was associated with an imprecise 44% increase in the rate of CMVCs (IRR = 1.44,; 95% CI: 0.52 to, 3.98), whereas the upgrade of existing cycling infrastructure was associated with an imprecise 19% decrease (IRR = 0.81,; 95% CI: 0.29 to, 2.29).

Conclusion: When contextualized by the increased volume of cyclists along the observed streets, cycle tracks and upgrades to existing infrastructure may offer greater protective benefits.

S.A.C.

Dalla Lana School of Public Health, Population Health Analytics Lab

Measuring the Equitable Impacts of Climate Change Interventions on Premature Deaths in Cities: Simulating Air Pollution Policy Scenarios using the Premature Mortality Population Risk Tool (PreMPoRT) and Urban Environmental Data

Sabrina Chiodo, Lief Pagalan, Helen Stylianou, Mackenzie Hurst, Meghan O'Neill, Stacey Fisher, Lori M. Diemert, Hong Chen, Jeffrey Brook, Andy Hong, Laura C. Rosella

Background: Premature deaths (before age 75) are preventable through public health and policy interventions and are an important indicator to compare health status between populations. Canada has large variations in premature mortality across sex, socioeconomic status (SES), and geography. This disparity is exacerbated by the unequal distribution of environmental vulnerability. Using the Premature Mortality Population Risk Tool (PreMPoRT), which predicts the 5-year incidence of premature mortality in adults 18-74, we aim to estimate the health co-benefits of air pollution reduction.

Methods: Sex-specific Weibull survival models were developed by linking the 2000-12 Canadian Community Health Survey (CCHS) cycles to the Canadian Vital Statistics Death Database. Model predictors include sociodemographics, health behaviours, health-related variables (e.g., chronic conditions), air pollutants (i.e., PM2.5, NO2), greenspace, temperature, and neighbourhood-level socioeconomic and walkability indices. To investigate the impact of implementing pollution reduction strategies on the incidence of premature mortality, we utilized the 2016-2017 cycles of the CCHS as our prediction and simulation cohort. This cohort was stratified by all CMAs and exclusively Toronto/Peel. We tested four hypothetical intervention scenarios on both cohorts, targeting both PM2.5 and NO2 pollutants separately and combined.

Results: The analytic sample included 126,000 females and 108,000 males, with 1.3% and 1.9% premature mortality, respectively. The risk prediction models achieved excellent discrimination (C-indices: 0.83-0.87) and calibration (integrated Brier scores: <0.01) in the hold-out validation sets, indicating strong performance. The simulation results demonstrated that the implementation of air pollution reduction strategies led to a decrease in the predicted number of deaths; this finding was similar across prediction cohorts and between males and females. As we increased the aggressiveness of the pollution intervention, the number of predicted deaths decreased correspondingly.

Conclusion: Our study provides valuable insights for informing climate adaptation and mitigation strategies in urban areas of Canada, highlighting the specific risks of air pollution and empowering policymakers and planners to develop effective solutions that enhance resilience to climate change.