

Summer 2025 - MPH Epidemiology Practicum Abstracts

L.B.N

Public Health Ontario - Healthy Populations and Prevention

During my practicum at Public Health Ontario (PHO), I worked with Dr. Erin Hobin, an expert in alcohol labelling and policy, on alcohol-related research. This role gave me experience with both qualitative and quantitative methods and strengthened my understanding of alcohol harms at the provincial and national levels. My first project was creating an overview page for PHO's new Alcohol Harms and Availability Interactive Map, developed in response to the expansion of take-away alcohol sales to convenience stores in Ontario. The map showed the link between alcohol availability and alcohol-attributable harms (emergency department and hospitalization rates) and included marginalization data revealing that the new outlets were disproportionately located in the lowest socioeconomic neighbourhoods. As part of this work, I consulted with stakeholders to learn their priorities and identify the messages that mattered most to them.

In the second project, I conducted an independent analysis using CCHS data, building on recent U.S. research examining sex-based differences in heavy episodic drinking (HED) before and after the COVID-19 pandemic. I developed an analysis plan, cleaned and compiled data from multiple survey years, fit the data to a statistical model, and presented the findings using R packages. The results revealed an unprecedented trend in Canada, in which females aged 18-25 now surpass males of the same age in HED. This shift mirrors U.S. patterns and suggests that the sharper decline in HED among young males paired with increases in females after the pandemic has reversed the traditional risk profile. These findings carry important implications for clinical guidelines and intervention strategies, which have typically focused on males as the primary high-risk group. Altogether, this practicum was an excellent opportunity to expand my knowledge of alcohol policy and harms in Ontario and Canada, while building skills in communication, data analysis, policy evaluation, and knowledge translation.

S.B
Ontario Health

This practicum was completed as a Research Associate under the Population Health team at Ontario Health, with a focus on supporting the development of Ontario's Diabetes Measurement Framework (DMF) and informing improvements to Diabetes Education Programs (DEPs). The primary goal was to identify meaningful indicators and reporting strategies to guide future monitoring of diabetes-related initiatives and demonstrate progress across the province. Through jurisdictional scans and indicator analysis, the practicum aimed to reveal strong models from other regions and generate recommendations for how Ontario should report on diabetes indicators, particularly within DEPs and broader strategic initiatives. An initial DMF jurisdictional scan was conducted in Winter/Spring 2023, reviewing frameworks from Canadian provinces and territories, the United States, Australia, and Scotland. In Summer 2025, the scan was expanded to include additional jurisdictions such as Qatar, Wales, Croatia, Spain, New Zealand, and England. Indicators were categorized by domain and jurisdiction to support comparative analysis and framework development, with emphasis on disease burden, comorbidity burden, prevention, access to care, and clinical management. A targeted scan of diabetes programs was also conducted in Summer 2025, focusing on Canada, the United States, the United Kingdom, and Australia. This work informed an indicator inventory for Ontario's DEPs, highlighting metrics related to disease burden, comorbidity burden, access to care, clinical management, patient-reported experience measures (PREMs), and standards and quality improvement. To complement the scan findings, five key indicators from the DMF inventory—diabetes prevalence and incidence, HbA1c (glycated hemoglobin) testing, foot assessments, and diabetic retinopathy treatment—were selected for detailed analysis across fiscal years 2014/15 to 2023/24 using health administrative data. These included the Ontario Diabetes Cohort (ODC), Registered Persons Database (RPDB), Ontario Health Insurance Plan (OHIP) claims database, Ontario Marginalization Index (ON-Marg), and Postal Code Conversion File Plus (PCCF+ v8). Analyses were conducted using SAS software and validated through literature review and comparison with data from fiscal years 2014/15 to 2022/23. Overall, this practicum provided a valuable opportunity to apply epidemiological and analytical skills in a government setting, contribute to the development of population health tools, and support evidence-informed improvements in diabetes care and performance measurement across Ontario.

B.R.B
Global Implementations Science Lab

During my practicum at the Global Implementations Science Lab, under the tutelage of Dr. Thorpe and Dr. Wei I was responsible for the statistical methodology and analysis of two large scale cluster randomized control trials (cRCT) to evaluate effectiveness of different public health interventions in low-resource settings.

The first project evaluated a digital health intervention (DHI) in Pakistan to improve blood pressure management among hypertensive patients. The primary and other continuous outcomes were analyzed using a linear mixed effects model to estimate the interventions impact on systolic blood pressure at 12 months. Binary secondary outcomes such as proportion of participants with controlled blood pressure, implemented generalized estimating equations to estimate the odds of their respective outcomes. These models account for clustering and baseline imbalances. I also conducted sensitivity and subgroup analysis to investigate potential effect modification by sex and socioeconomic status (SES).

The second cRCT analysis was conducted to explore the effectiveness of a multi-component behavioral intervention designed to improve vaccine confidence against measles and polio in the Philippines. Given the nature of the study design, the same models were used to estimate treatment effects for primary and secondary outcomes of interest.

Across both projects, I was tasked with refining datasets, model fitting and diagnostics, variable computation, complete case analysis, and inverse probability weighting. I also created data visualizations and composed analysis summaries and manuscript development for the methodological and results components for publication.

This practicum uniquely positioned me to bolster my skills in advanced statistical modelling, implementation research, data management, cluster RCT analysis, and overall R software proficiencies. I gained unparalleled experience working with global interdisciplinary research teams and the opportunity to apply key epidemiological and statistical competencies to evaluate real world interventions with the potential for positive public health impact.

M.H

**Centre for Addiction and Mental Health (CAMH) – Azrieli Adult
Neurodevelopmental Centre**

During my MPH Epidemiology practicum, I worked on two projects that combined quantitative and qualitative methods with knowledge translation.

The first project analyzed data from the 2023 Ontario Student Drug Use and Health Survey (OSDUHS) to examine how autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD), and mental health conditions individually and in combination were linked to outcomes such as suicidality, self-rated mental health, absenteeism, social status, and discrimination among Ontario high school students. Focusing on Grades 9-12 who completed the outcomes assessed (unweighted $n = 6,648$; weighted $N \approx 442,200$), I created composite diagnostic groups and applied survey-weighted descriptive analyses and regression models adjusted for demographic and socioeconomic factors. Findings revealed exceptionally high risks among students with multiple diagnoses, underscoring the need for neuroaffirming, school-based supports.

The second project, Brain Health IDD, evaluated a virtual education program for family caregivers of adults with intellectual and developmental disabilities. I merged data from three course cycles, conducted quantitative analyses in SPSS and Excel on caregiver well-being, self-efficacy, and satisfaction, and applied Bonferroni-adjusted comparisons. I also coded open-text feedback in NVivo to identify themes of impact, accessibility, and community. To support knowledge translation, I prepared tables and figures, contributed slides for the annual Brain Health Summit, and co-authored an ePoster presented at the Alzheimer's Association International Conference (AAIC).

Through these projects, I strengthened my skills in applied epidemiology, mixed-methods analysis, and translating research findings for academic, professional, and community audiences.

S.H

Toronto Public Health

My practicum experience at Toronto Public Health (TPH) provided an opportunity to strengthen my quantitative analysis skills and gain exposure to various areas of applied epidemiology. I joined the Epidemiology and Data Analytics Unit (EDAU) on the Health Status and Behaviour (HSB) team, where I worked alongside a group of professionals specializing in different domains of epidemiology. This practicum supported my goal of exploring real-world epidemiological work, while building my confidence in data analysis.

My first project involved contributing to the injury indicator refresh of the Population Health Status Indicators dashboard. I began by creating an analysis plan, which served as a guide throughout the process. I then extracted data from IntelliHEALTH, Ontario's administrative health database. After that, I conducted descriptive analyses to examine trends by demographic and geographic characteristics. Finally, I created key highlights based on my findings and entered all results into a data entry template. This template will be sent to the Data Visualization Expert, who will use it to update the dashboard.

My second project involved an exploratory analysis of micromobility-related falls in Toronto. I began by reviewing reports and journal articles to gain background knowledge on this topic. Then, I developed an analysis plan and extracted the data from IntelliHEALTH. After completing the analysis, I translated the findings by presenting a summary to the HSB team and producing a report for management to review before distributing it internally.

In addition to project work, I participated in professional development sessions with members of the EDAU. These sessions provided valuable insight into the diverse roles within epidemiology. I also connected with other teams across TPH to explore the scope and impact of their initiatives. Through this practicum, I gained a well-rounded perspective on the application of epidemiological methods in public health and the importance of cross-team collaboration.

M. V. M. H

Canadian Partnership for Tomorrow's Health (CanPath)

The Canadian Partnership for Tomorrow's Health (CanPath) is Canada's largest population health study. They are focused on partnering with researchers to produce tangible outcomes regarding the causes of chronic disease and cancer. In my role with CanPath, I conducted research on breast cancer screening using administrative health data from ICES as part of a PHAC grant examining racial and ethnic disparities in breast cancer screening and outcomes.

The main objectives of this practicum were to 1) formulate a research project based on objectives from the PHAC grant, 2) gain data cleaning and analysis skills and 3) draft an academic manuscript. I developed a research question investigating adherence to the Ontario Breast Cancer Screening Program (OBSP) in Ontario women aged 51-74 diagnosed with breast cancer between 2001 and 2023 by different quintiles of the racialized and newcomer dimension of the Ontario Marginalization Index. I also investigated breast cancer screening behaviours (whether women ever had a screening mammogram prior to their breast cancer diagnosis) in Ontario women under age 50 by the same exposure variable. As part of the data cleaning process, I created variables to classify OBSP eligible women as adherent, non-adherent, or never screeners based on OBSP guidelines, and whether women under 50 received screening mammograms. Additionally, I completed logistic regression analyses for each study cohort. From these analyses, I determined women living in more marginalized quintiles had higher odds of never screening or being non-adherent to OBSP guidelines, compared to the least marginalized quintile. However, racialized and newcomer quintile did not influence the odds of whether women under 50 had received screening mammograms. These and additional findings were drafted into a manuscript which is planned for peer-reviewed publication.

Overall, this practicum was a valuable opportunity to gain epidemiological research experience and expand my knowledge of women's health research.

D. E. I

Public Health Ontario - Immunization and Vaccine Preventable Diseases

For my practicum placement I worked at Public Health Ontario within the Immunization and Vaccine Preventable Diseases (IVPD) team. As part of my practicum, I supported an evaluation of immunization coverage and catch-up strategies implemented by Ontario's 29 public health units (PHUs) following the pandemic. I led the analysis of a survey which captured both quantitative and qualitative data on ISPA (Immunization of School Pupils Act) enforcement, catch-up clinics, communication methods, and engagement with primary care. I cleaned the data, conducted descriptive analyses, and linked the data to preliminary measles coverage estimates. I also compared the responses between the lowest and highest coverage quartiles.

The survey found that all PHUs reported conducting ISPA enforcement activities, such as sending Notice of Assessment Letters and issuing suspension orders, but only 50% targeted all age cohorts. Nearly all PHUs held vaccine catch-up clinics for routine childhood vaccines (97%) and school-based vaccines (93%). Over three-quarters (77%) implemented at least one strategy aimed at increasing coverage of measles-containing vaccines. PHUs with higher measles coverage were more likely to target all cohorts in their ISPA enforcement activities and to be targeted the same cohorts before and after the pandemic. However, there were no statistically significant differences in the implementation of measles-specific interventions.

In addition to this analysis, I developed posters and presentations for internal meetings, drafted a manuscript for submission to the Canadian Journal of Public Health, and created a database for internal use. This practicum improved my analysis skills and deepened my understanding of immunization policies, enforcement, and delivery in Ontario.

H. I.

St. Michael's Hospital, Unity Health Toronto - Knowledge Translation Program, Li Ka Shing Knowledge Institute

During my practicum with the Knowledge Translation Team at St. Michael's hospital, I contributed to multiple research projects that strengthened my skills in manuscript writing, data analysis, and knowledge translation. For the Research Integrity Project, I assisted in the drafting of the protocol specifically the background, portions of the methods section of the manuscript, and summary of the pilot. The pilot involved selecting 10 sample units from a dataset of approximately 30,000 authors to evaluate the feasibility of data collection and analysis procedures. Using R, I conducted descriptive analyses to summarize demographic and bibliometric characteristics of the pilot sample. As part of the Strategy for Patient-Oriented Research Evidence Alliance (SPOR-EA) initiative, I developed plain language summaries in response to queries from patient-partners. SPOR-EA is a pan-Canadian partnership uniting researchers, patients, healthcare providers, policymakers, and other decision-makers to promote patient-oriented research. These summaries aimed to translate complex research findings into accessible, reader-friendly language to facilitate knowledge update and informed decision-making. I also ran a meta-analysis exploring the effect of eHealth literacy and related digital skills among older adults. This involved performing data extraction from the included studies and running a statistical analysis using R, with ongoing involvement in running the analyses. This practicum provided hands-on experience in multiple stages of the research process from manuscript preparation to data analysis and knowledge translation thereby enhancing both my technical and communication skills in research.

A. L.

St. Michael's Hospital - Unity Health Toronto

Abstract 1: Micromobility and Built Environment Factors

Objective

Micromobility vehicles, including bicycles, e-bikes, and e-scooters, are increasingly used for commuting, deliveries, and leisure travel in Toronto. However, collisions and injuries are rising, and little is known about how built environment factors shape collision risk. This study examined the demographic, spatial, and temporal patterns of micromobility collisions in Toronto (2021-2024), with a comparative analysis against New York City (NYC).

Methods and Analysis

We conducted a retrospective cross-sectional study using Toronto Police Service and NYC Police Department collision records. Micromobility collisions were linked to infrastructure datasets, including traffic signals, schools, subway lines, and cycling facilities, using geospatial analysis in R. Spatial clustering was assessed using DBSCAN and Moran's I. Vehicle type (bicycle, e-bike/scooter, scooter/skateboard) was compared across demographic and infrastructure variables using chi-square, Kruskal-Wallis, and Dunn's post-hoc tests.

Results

A total of 2,684 collisions were analyzed in Toronto: bicycles (74%), e-bikes/scooters (22%), and scooters/skateboards (4%). Bicycle riders were older (median 39.5 yrs) than e-bike/scooter and skateboard users (median 29.5 yrs). Male riders were overrepresented in e-bike/scooter (RRR = 3.59, $p = 0.004$) and skateboard/scooter collisions (RRR = 2.62, $p = 0.002$). Temporal trends showed bicycles dominated morning/evening rush-hour collisions, while e-bikes/scooters peaked in evening/night hours. Over half of all collisions occurred within 3 km of riders' homes, with e-bike/scooter users travelling farther on average. E-bike/scooter collisions occurred significantly farther from TTC subway lines than bicycles ($p = 0.003$). Approximately two-thirds of Toronto collisions, compared to 90% in NYC, occurred within 30 m of a traffic signal. About 41% of bicycle and e-bike collisions occurred on bike lanes, while scooters/skateboards were more often injured near pedestrian crossovers and traffic beacons. Spatial analysis revealed dense clusters in downtown and arterial corridors (Moran's I = 0.588, $p < 0.001$), with moderate inequality in collision distribution (Gini = 0.275).

Conclusion

Micromobility collisions cluster near intersections and transit hubs, with distinct demographic and spatial patterns by mode. Comparative findings with NYC

underscore the need for city-specific safety strategies, including protected intersection redesign, expansion of cycling infrastructure beyond downtown Toronto, and targeted helmet promotion for higher-risk groups.

Abstract 2: Socioeconomic Deprivation and Micromobility-Related Collisions

Objective

Socioeconomic deprivation shapes transport behaviours and injury risk, yet its role in micromobility collisions, specifically e-bikes and e-scooters, remains underexplored. This study examined deprivation patterns across bicycle, e-bike/e-scooter, and scooter/skateboard collisions in Toronto (2021-2024).

Methods

Police-reported collisions ($n = 2,684$) were geocoded to dissemination areas (DAs) and linked to Ontario Marginalization Index (ON-Marg) domains. Quintile distributions, Kruskal-Wallis, and Dunn's post-hoc tests compared patterns by vehicle type, collision density, sex, and age. Area-level socioeconomic indicators (e.g., renters, apartments, transit use, housing unaffordability, low income) were also assessed.

Results

High-collision areas were concentrated in the most deprived quintiles for residential instability and racialized/recent immigrant concentration, but in the least deprived quintiles for age/labour force dependency. Material deprivation followed a U-shaped pattern, with collisions clustering in both the least and most deprived neighbourhoods.

By vehicle type, e-bike/e-scooter and scooter/skateboard collisions disproportionately occurred in renter-dense, apartment-heavy, transit-reliant, and housing-unstable areas. Bicycle collisions were more evenly distributed but relatively more associated with low-income DAs. Sex-stratified analyses showed female scooter/skateboard collisions concentrated in the most deprived areas, while males clustered in less deprived contexts. Age-stratified results indicated that older e-bike users and younger scooter/skateboard users experienced the highest deprivation exposures.

Kruskal-Wallis tests confirmed significant differences across vehicle types for renter households, apartments, unaffordable housing, transit use, low income, and recent immigrant concentration (all FDR-adjusted $p < 0.05$).

Conclusion

Micromobility collisions in Toronto cluster in socioeconomically vulnerable neighbourhoods, with distinct gradients by mode, sex, and age. Findings highlight the need for equity-focused infrastructure planning and deprivation-informed injury surveillance.

H. T. L.

CAMH - Institute for Mental Health Policy Research

Purpose: This study aimed to investigate the risk factors associated with problem gaming among youth in Ontario.

Methods: Data was taken from the 2023 Ontario Student Drug Use and Health Survey (OSDUHS), a repeated cross-sectional survey based on a stratified two-stage cluster design, selecting from a random selection of school classes, stratified by region and school type. Problem video game playing (PVP) was measured using the PVP scale where a score of 5 and above was considered as problem gaming. Descriptive and univariate analyses were conducted for all PVP possible predictors. Bivariate analysis explored any possible interaction effects. Multivariate logistic regression was used to investigate PVP determinants.

Results: Youth who played more frequently in the past 12 months were more likely to be problem gamers. Those who game for more than 1 hour daily had an odds ratio (OR)=2.48 [95% CI: 1.66, 3.70] of being a problem gamer. Age was positively associated with problem gaming (OR=1.11 [95% CI: 1.01, 1.22]). Immigrant youth had higher odds of being a problem gamer (OR=1.41 [95% CI: 1.01, 1.99]). Youth who drank alcohol had an OR=0.643 [95% CI: 0.422, 0.982] for problem gaming. Youth with serious psychological distress and sleep for 10 or more hours had an OR=22.16 [95% CI: 3.20, 153.5] for problem gaming. Those who gambled in video games and online were more likely to be problem gamers (OR=1.88 [95% CI: 1.32, 2.66], and OR=2.13 [95% CI: 1.28, 3.55], respectively).

Conclusion: Increased gaming frequency, immigrant youth, and youth who have gambled in video games or online are all risk factors that can increase the odds of developing a gaming addiction.

J. L.

Novo Nordisk Network for Healthy Populations

During my practicum with the Population Health Analytics Lab, I conducted a research project in partnership with the Novo Nordisk Healthy Population Network, focusing on premature mortality among Canadians with Type 2 diabetes. Using the Premature Mortality Population Risk Tool (PreMPoRT) and data from the Canadian Community Health Survey (CCHS), I applied epidemiologic and biostatistical methods to estimate five-year risk of premature mortality in Peel Region, stratified by health equity factors such as income, education, sex, and immigrant status.

This work involved extensive literature reviews, statistical modeling, and the application of survey weighting techniques to ensure population-representative estimates. I also explored intervention scenarios, such as the impact of smoking cessation and increased physical activity, to evaluate potential reductions in mortality risk. Beyond technical analysis, the practicum emphasized knowledge translation. I synthesized findings into a draft manuscript and delivered presentations to academic and non-academic stakeholders, including at the NHP Summer Research Day. These opportunities strengthened my ability to communicate complex epidemiologic results in accessible, policy-relevant ways.

Through this experience, I developed competencies in epidemiologic methods, predictive modeling, and critical appraisal of population health data, while deepening my understanding of health equity and the social determinants of health. Working within a multidisciplinary team provided insight into how evidence can inform policy and practice, and how epidemiologic research contributes to addressing health inequities. Overall, the practicum bridged classroom learning with real-world application, preparing me to contribute to evidence-based public health research and decision-making.

S. K. M.

Ontario HIV Treatment Network

During my practicum with the Ontario HIV Treatment Network (OHTN), I contributed to a project examining disparities in access to health and social services among people living with HIV (PLWH) in Ontario. Using questionnaire data from the OHTN Cohort Study (OCS), I conducted a cross-sectional analysis of service usage patterns in 2024, exploring how access varied by key demographic and socioeconomic factors.

After reviewing the literature and developing a research proposal, I presented it to internal staff and policy makers to gather feedback and align the analysis with their priorities. I prepared the dataset for analysis by performing data handling, including variable recoding and handling missing data based on questionnaire logic. Descriptive analysis were conducted, stratifying by relevant correlates of usage, and the findings were presented in publication-ready tables and figures for an academic manuscript, currently in preparation. In addition to the analytic work, I shared preliminary findings with interest holders (i.e., policy makers, AIDS Service Organizations, co-investigators) and contributed recommendations for refining future iterations of the OCS questionnaire.

Beyond my research project, this practicum provided valuable insight into the OHTN's role in supporting data-driven, community-informed HIV research across Ontario. I gained a deeper understanding of the complexities of managing a longitudinal cohort study, particularly in the context of data governance and the need for meaningful engagement with PLWH and populations affected by HIV. Overall, this experience strengthened my abilities in managing and analyzing complex datasets, communicating findings to varied audiences, and conducting equity-focused public health research. I look forward to applying these insights as I continue to work with the OHTN, finalizing my manuscript and contributing to generating evidence that supports understanding disparities in service access among PLWH.

R. M.

Public Health Ontario - HPCDIP

I completed my practicum at Public Health Ontario for a research-based project focused on polysubstance use among students from grades 7 to 12 in Ontario. The project was inspired by trends of increasing polysubstance use among youth in Canada, with a particular interest in the increased use of vaping products within the past decade. I was tasked with conducting literature reviews to gain an understanding of the current state of research on the topic within the population, as well as how prior studies have gone about conducting their analysis. For my project, I was responsible for developing and running a statistical model that would enable us to examine unique substance use subgroups that exist among youth in Ontario, in terms of their substance use patterns and relevant characteristics associated with substance use. For the analysis, we utilized existing health surveillance data from a provincially representative survey, which allowed for inferences to be made about population characteristics. The goal of the project was to provide evidence-based recommendations for future public health action in the form of improvements to substance use programming that is adequately tailored to the Ontario youth population. Throughout the project, I had the opportunity to draft a research proposal, complete data analysis, deliver presentations on analysis findings, and draft a manuscript for publication.

E. I. B. N.

OCI, The Princess Margaret Cancer Centre (UHN) – Division of Medical Oncology and Hematology

Overview of Work: Dr. Geoffrey Liu's laboratory at the Princess Margaret Cancer Centre is focused on using real-world data from a large, multi-centre, prospective cohort study to investigate how trends in pattern of treatment, disease outcome, and other predictors relate to survival in non-small cell and small cell lung cancer patients. My practicum work was focused on cleaning and harmonizing new patient data from affiliated research sites to the lab's internal database; communicating with research teams from those sites to help refine their study proposals, provide preliminary analyses, and assist with statistical analysis plan generation; and conducting descriptive and time-to-event analyses to produce tables and figures for manuscript preparation. One project that I was particularly involved in was a review of the treatment approaches and clinical outcomes of older patients with limited disease small cell lung cancer.

Project Mini Abstract: The aims of this project were to 1) characterize differences in received treatment between younger (n=754) and older (n=568) patients, and 2) characterize differences in survival and toxicity for older patients receiving curative-intention treatment. Chi-square test was used to compare treatment patterns between younger and older patients, and Fisher's exact test was used to compare rates of treatment toxicity in patients who received curative treatment. Kaplan-Meier curves with log-rank test were used to check for differences in overall survival among patients receiving curative-intention treatment. Among all patients, a significantly larger proportion of older patients received palliative-intent treatment (31% vs. 14%, $p<0.001$). In patients receiving curative-intention treatment, a significantly larger proportion of older patients discontinued treatment due to toxicity (8.5% vs. 5.0%, $p=0.041$) and did not have a significant difference in median survival compared to younger patients (23.46 [20.67-28.91] vs. 26.45 [24.34-29.57] months, $p=0.251$). Since the study is still ongoing, these results are only preliminary.

E. N.
BlueDot Inc

This summer, I was an Epidemiology Intern in the Surveillance and Analytics team. My work focused on developing epidemiological reports on influenza-like illnesses (ILIs), such as seasonal influenza, COVID-19 and RSV. Some reports involved pulling data from BlueDot's internal API, analyzing case trends, and extracting key insights. Other reports required using statistical models to detect early signs of peaks in seasonal ILI trends. Overall, these reports worked to contextualize disease trends and provide intelligence to support client decision-making.

I also contributed to BlueDot's surveillance systems, which is a mix of indicator-based surveillance (IBS) and event-based surveillance. I primarily worked with the IBS system. I reviewed official epidemiological reports from governmental and global health sources to track the activities of numerous diseases globally.

Being at BlueDot developed my communication skills. I was practicing how to report disease trends and draw conclusions that were technically accurate and in anticipation to my audience needs. I deepened my understanding of technology. I explored opportunities to integrate AI technologies into my workflow to automate repetitive tasks and increase efficiency. I enjoyed opportunities to work cross-functionally with individuals across the organisation. It was motivating to see how everyone is working hard towards the overall goal of growing BlueDot's global presence and positioning as a credible leader in infectious disease intelligence. In addition to gaining epidemiological and data analysis competencies, I had opportunities exposing me to stakeholder communications, sales, and project management tools.

R. R.
Toronto Metropolitan University

Introduction

Pedestrian and bicyclist injuries are frequently underreported in traffic surveillance systems that rely on police records, particularly for non-collision events such as falls or single-vehicle crashes which are often not recorded in police records or collision centres. This underestimation limits our understanding of the true burden of injury from active transportation.

Objective

To assess underreporting of pedestrian and cyclist injuries in Ontario by comparing self-reported survey data and administrative health records with collision reported data.

Methods

We compared injury records from the Ministry of Collision Records (MCR) and Hospital Records. Collision records include all police-reported motor vehicle collisions involving pedestrians or bicyclists with injuries classified as minimal, minor, major, or fatal. Hospital records include emergency department visits and hospital admissions identified through ICD-10-CA external cause codes for pedestrian and cycling injuries. For both sources, injuries were stratified by age group, sex, and year to facilitate direct comparison and to assess patterns of underreporting.

Results

Collision records substantially underreported pedestrian and bicyclist injuries compared to healthcare data. Both minor and major injuries were often missing from police reports, and many collision-related injuries appeared only in administrative health datasets, exposing substantial gaps in police-based surveillance for public health monitoring.

Conclusion

The integration of health administrative data enhances injury surveillance by capturing cases missed by police reports. The findings highlight the need for standardized injury definitions and data integration, to implement evidence-based prevention strategies and public health policies for vulnerable road users.

I completed my first MPH practicum at the Institute for Mental Health Policy Research (IMHPR) at the Centre for Addiction and Mental Health (CAMH) under the supervision of Dr. Shannon Lange. My project examined the relationship of alcohol use and suicide mortality across the United States, with a specific focus on the impact of state-level binge drinking prevalence on the individual odds of an alcohol-attributable suicide. Using individual-level data from the National Violent Death Reporting System (NVDRS) from 2005-2022, I conducted extensive data cleaning and descriptive analysis in R Studio. To test the association of interest, I constructed and ran generalized linear mixed models with logistic regression, while also conducting model diagnostics to ensure robustness. In addition to quantitative analysis, I carried out a literature review to identify existing gaps in research on alcohol-attributable suicide. Weekly meetings with my supervisor and team facilitated continuous feedback, while collaborating with U.S.-based researchers provided additional expertise and helped resolve challenges such as data inconsistencies. This project will culminate in a peer-reviewed publication currently in preparation. The goal of this project is to inform policy by highlighting the harmful role of alcohol in suicide mortality. This practicum provided me with the opportunity to refine core epidemiological skills, including statistical modelling, data interpretation, and academic writing, which I look forward to applying in my future public health career.

A. A. R.

Centre for Addiction and Mental Health – Institute of Mental Health Policy Research

This summer, I completed my practicum at the Centre for Addiction and Mental Health (CAMH) with the Institute for Mental Health Policy Research under the supervision of Dr. Shannon Lange. We were given the option of several potential research questions, and I was able to choose one to investigate. The objective of my research project was to explore how alcohol use modified the relationship between state-level firearm laws and suicide mortality rate. To explore this research question, we were able to use and learn about several different databases, including the National Violent Death Reporting System, the Centers for Disease Control WONDER database, and firearm law databases. I was able to use these data to create and manipulate datasets in R and explore the use of several different types of models. Results from our models allowed us to determine that alcohol use did modify the relationship between state-level firearm laws and firearm-involved suicide mortality rate. I then acted as the primary author in the creation of a manuscript to be submitted for publication with the support of other members of the research team. Throughout the 16 weeks, we were able to collaborate with other international researchers, allowing for the improvement of presentation, communication, and cooperation skills. Overall, the practicum was a very valuable and rewarding learning experience. I was able to develop my knowledge on various practices and hone my epidemiological skills in a real-world context.

B. Y. T. S.

Centre for Addiction and Mental Health

In a world where the digital realm is readily accessible for all, children are exposed to the world of gaming and gambling constantly. This exposure has caused an increase in youth gaming and gambling problems in Canada. The Ontario Student Drug Use and Health Survey is a survey conducted biennially to collect student data on over 200 variables related to legal and illegal drug usage, physical and mental health, gaming and gambling behaviours, academic performance, and more. Using the latest dataset from 2023, three multivariate logistic regression models were used to assess predictors of three gambling behaviours among youth in Canada, which include betting money on any game (including online sports and casinos), betting money in any video game, and betting money in any other way. Despite each logistic model producing slightly different results, the main takeaways from each of the three logistic models were similar. The analysis found that males have statistically significantly higher odds of engaging in any form of gambling, and those who consume legal or illegal drugs have statistically significantly higher odds of engaging in any gambling behaviour. The logistic model results suggest that future gambling prevention policies should be targeted at these specific sub-groups to mitigate the detrimental effects of gambling on Canadian youth.

L. T.

Network for Healthy Populations – Prevent Diabetes Save Lives Lab

As part of my placement, I contributed to the evaluation of a community-based diabetes screening initiative in Peel Region, where certain areas have nearly twice the prevalence of diabetes relative to Ontario. The goal of this initiative was to provide timely diabetes screening to community members of the Brampton and Mississauga area in local, accessible, community settings.

My role focused on developing and implementing a survey based on the PRISM (Practical, Robust Implementation and Sustainability Model) RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) framework, to evaluate participants' experience taking part in a community-based diabetes screening initiative (CBDSI). This began with a literature review using Web of Science, Scopus, and MedLine to identify pre-existing CBDSI which have been evaluated using an implementation science frameworks. Based on the 3 of 360 articles which satisfied the criteria, they informed the design of my survey which attempted to evaluate participants motivation to take part in the screening, the accessibility of the CBDSI, knowledge gained through the intervention, and feedback for future scaling of the CBDSI.

Based on participants' responses, I co-led a focus group gathering further details regarding the CBDSI. Participant testimonies were analyzed to identify motivations for taking part in the diabetes screening, their overall experience with the intervention, and feedback for future implementation of the CBDSI.

Through my practicum, I gained valuable skills in mixed-methods evaluation, survey design, and qualitative thematic analysis. Moreover, I developed an understanding of how implementation science frameworks such as PRISM (RE-AIM) can be applied to real-world community-based health. The evaluation highlighted the importance of culturally responsive outreach and working with community members to develop sustainable and equitable health programs. These findings will be shared through a manuscript and contribute to implementation science literature informing the design of future community-based diabetes screening interventions.

J. U.
Dalla Lana School of Public Health

Introduction: A simulation study offers a controlled setting with known ground truth to systematically examine complex, high-dimensional data. Postmenopausal women are at particularly high risk of prevalent geriatric health outcomes, including functional impairment, falls, and fractures. Machine learning-based prediction models have gained empirical support for their robustness and flexibility in handling complex, high-dimensional data. The objective of this study was to conduct a simulation study to develop an interactive prediction model for three geriatric health outcomes: functional impairment, falls, and fractures.

Methods: A simulation dataset ($n = 20,000$) emulating baseline characteristics of the Women's Health Initiative (WHI) study population was created, with a maximum follow-up of 25 years and complex between-feature associations introduced. We trained three machine learning models: random survival forest, XGBoost, and Lasso-Cox. Models were compared across multiple domain-specific feature sets and the most comprehensive full models comprising all demographic, socioeconomic, behavioral, functional, and health-related features in the dataset, using time-dependent ROC-AUC, calibration, and Brier score. SHapley Additive exPlanations (SHAP) guided feature selection in the full models to develop reduced models, which were then deployed in an interactive prediction application.

Results: Simulation dataset had a mean age of 63.2 years (SD: 7.25), 82.4% non-Hispanic White. The random survival forest outperformed other models across different feature sets and outcomes. Reduced models incorporating 30 features demonstrated comparable performance relative to the full model with 57 features, while improving computational efficiency. These reduced models demonstrated strong discrimination and predictive accuracy across most time points (time-dependent ROC-AUC >0.80 and Brier scores <0.10) and were deployed to develop the interactive application.

Conclusions: This simulation study demonstrated the potential applicability of machine learning-based prediction to guide individualized interventions by capturing the complex, heterogeneous nature of geriatric health outcomes. Deploying such advanced models into an interactive, user-friendly application may support data-driven decision-making in clinical practice.

M. K. W

Public Health Ontario - Antimicrobial Stewardship and Prevention

Amoxicillin-clavulanate is commonly prescribed for amoxicillin-susceptible infections, despite posing a higher risk than amoxicillin for *Clostridioides difficile* infections (CDI). We examined whether increased amoxicillin-clavulanate susceptibility reporting was associated with prescribing patterns and community-associated CDI (CA-CDI). We conducted an ecological controlled longitudinal study of Ontario residents from January 2017 to June 2024 assessing the association between increased monthly amoxicillin-clavulanate susceptibility reporting and changes in amoxicillin-clavulanate prescribing and CA-CDI incidence. The primary exposure was monthly amoxicillin-clavulanate reporting among amoxicillin-susceptible Enterobacterales isolates. Outcomes included amoxicillin-clavulanate prescribing rates and CA-CDI incidence, while amoxicillin, nitrofurantoin, trimethoprim-sulfamethoxazole, and ciprofloxacin served as negative tracers. Analyses used negative binomial regression stratified by age-sex strata and adjusted for seasonality using respiratory virus activity. All scenario modelling estimated changes in prescribing rates and CA-CDI using marginal standardization. Following a 59.8% increase in susceptibility reporting from Jan 2017 - Nov 2021 to Dec 2021 - Jun 2024, amoxicillin-clavulanate prescribing increased (Incidence Rate Ratio (IRR): 1.29, 95%CI: 1.17-1.43), while negative tracer antibiotic rates declined. The increase was greatest among older adults. Amoxicillin-clavulanate susceptibility reporting was associated with increased prescribing in amoxicillin-clavulanate compared to amoxicillin (IRR: 1.34, 95%CI: 1.21-1.49). The change in reporting was associated with a 17% increase (95%CI: 1.12-1.23) in CA-CDI incidence, with an estimated 2430 additional cases of CA-CDI from Dec 2021-Jun 2024. Reporting amoxicillin-clavulanate susceptibility among amoxicillin-susceptible Enterobacterales is associated with increased amoxicillin-clavulanate prescribing and higher CA-CDI rates. These findings highlight the importance of thoughtful cascading antibiotic susceptibility reporting by microbiology laboratories to impact patient outcomes.

Y. Y.

Injury Prevention Research Office

I completed my first MPH practicum with the Department of Neurosurgery at St. Michael's Hospital. The project I worked on was a validation study of a disease-specific, health-related quality of life (HRQoL) questionnaire. My assigned research tasks included reviewing research ethics board documents, managing ongoing study recruitment, cleaning data, conducting statistical analyses, delivering oral presentations, and writing reports.

In addition to these research activities, I reviewed clinical information on common neurological conditions and anatomical structures of the central nervous system and had the opportunity to shadow Dr. Cusimano, the primary investigator, in his outpatient neurosurgery clinic. Observing Dr. Cusimano's work in both the outpatient clinic and inpatient settings enriched my learning by contextualizing the research project I worked on. For example, hearing concerns from patients with meningioma deepened my appreciation for the importance of developing a meningioma-specific HRQoL questionnaire.

Regarding quantitative data management, I accessed survey responses in REDCap, cleaned and recoded data, and examined data distribution and missingness in RStudio.

With little prior background in psychometrics, I learned various statistical techniques related to instrument validation. A key topic I self-studied was exploratory factor analysis, a method used to identify latent factors in a dataset based on correlation matrices. This technique has broad applications, not only in instrument validation but also in projects focused on understanding variable relationships. Thanks to the hands-on experience during this practicum, my confidence in quantitative data cleaning and analysis using RStudio has significantly improved.

F. Z.
CanPath

Purpose

Racial differences in breast cancer (BC) outcomes are beginning to be investigated in the Canadian context. However, there is a lack of literature exploring how BC risk factors vary across different racial/ethnic groups. The Ontario Health Study (OHS) survey collects self-reported ethnicity and various exposures. Study objectives were to determine differences in BC risk factors, screening and cancer outcomes by race/ethnicity.

Methods

We used data of OHS participants that link to an incident cancer case in the Ontario cancer registry (OCR) to identify 1,194 women, mean age 49 years (IQR 45-54), diagnosed with BC between 2009 and 2017. Hormone therapy (HRT) as a BC risk factor was assessed in these women, including HRT ever use (N = 1,178), duration of HRT use (N = 1,194), and start age of HRT (N = 227). A multivariable Cox proportional hazards model was used to estimate hazard ratios (HRs) for BC incidence, examining the association between HRT use and BC risk.

Results

Among women with breast cancer, those with HRT ever use (reference level as never use) had a higher rate of BC incidence (hazard ratio [HR] 1.11, 95% confidence interval [CI] 0.91, 1.35). Women with HRT use duration >2 years had an increase in BC incidence rate (HR 2.46, 95% 0.83, 7.33) compared to those with <2 years of use. Compared to starting HRT at age of 50+ years, women who began HRT between 45-49 years experienced a greater rate of BC incidence (HR 1.47, 95% CI 0.49, 4.38).

Conclusions

This study suggests the HRT use, duration and start age are notable BC risk factors increasing the rate of BC incidence. If HRT use varies significantly across racial/ethnic strata, it may represent a modifiable target for reducing disparities in BC risk.

S.A

SickKids - Clinical Pharmacology & Toxicology

Background

Overprescription is a major driver of the opioid crisis.¹ Enhanced caution is needed when prescribing opioids to pediatric patients as this population is uniquely vulnerable to several opioid-related harms, including prescription errors, adverse events, accidental ingestion, and potential misuse or later-in-life substance use disorders. While efforts to reduce opioid overprescription in children have increased in recent years, few studies have examined the impacts of these efforts on prescribing practices - particularly in the Canadian setting.²⁻⁵

Objective

The objective of this observational, retrospective study was to characterize trends in pediatric postoperative opioid prescribing practices at SickKids from 2018 to 2025.

Methods

Using the electronic health record system at our site (Epic), we identified all patients under 18 years old who had undergone any surgery between June 2, 2018 and April 15, 2025, who were discharged within seven days post-operation, and who received an outpatient opioid prescription at discharge. We then extracted data on variables of interest including patient and surgical characteristics, and characteristics of associated opioid prescriptions. Statistical analyses were conducted using SAS.

Results

There were 20523 postoperative opioid prescriptions during the study period. The rate of opioid prescriptions (per 100 surgeries) did not change over time. Morphine was the most commonly prescribed opioid (90.4%), followed by hydromorphone (8.7%). Most opioids were prescribed for orthopedics surgeries (40%). Median opioid volume prescribed decreased over time among all age groups, but less significantly for toddlers. Median volume was higher for females compared to males in 2018 and 2019, but was similar thereafter.

Conclusion

While rates of postoperative opioid prescribing did not change, median volume per prescription decreased across all age groups and surgical specialties (most significantly prior to 2020). Reductions in total volume dispensed were greater for older children compared to infants and toddlers, suggesting opioid-sparing initiatives may disproportionately target older age groups.

References:

1. Makary MA, Overton HN, Wang P. Overprescribing is major contributor to opioid crisis. *BMJ*.2017;359:j4792. doi:10.1136/bmj.j4792
2. Colquhoun M, Orrbine E, Sheppard I, Stromquist L, Koczmara C, Cheng R, Greenall J, Salsman B, Sabovitch S. National collaborative: Top five drugs reported as causing harm through medication error in pediatrics. *Dynamics*. 2009 Dec 1;20(4).
3. Burns D, Lal R, Mc Donnell C. Paediatric harmful adverse drug events (PHADE). *Paediatr Child Health*. 2023;28(5):299-304. Published 2023 Mar 31. doi:10.1093/pch/pxac132
4. Caldeira-Kulbakas M, Stratton C, Roy R, Bordman W, Mc Donnell C. A prospective observational study of pediatric opioid prescribing at postoperative discharge: how much is actually used?. *Can J Anaesth*. 2020;67(7):866-876. doi:10.1007/s12630-020-01616-5
5. Ahrari M, Ali S, Hartling L, et al. Nonmedical Opioid Use After Short-term Therapeutic Exposure in Children: A Systematic Review. *Pediatrics*. 2021;148(6):e2021051927. doi:10.1542/peds.2021-051927