Winter 2020 Epidemiology Practicum Abstracts

S.B.

Public Health Agency of Canada - Centre for Immunization and Respiratory Infectious Diseases

I completed my practicum in the Centre for Immunization and Respiratory Infectious Diseases at the Public Health Agency of Canada. My main project was to produce influenza vaccine effectiveness estimates (VE) using an existing secondary dataset provided by the Serious Outcomes Surveillance (SOS) Network of the Canadian Immunization Research Network (CIRN). The CIRN-SOS team collects surveillance data on laboratory-confirmed influenza-related hospitalization admissions and analyzes the data to generate VE estimates independently. My project aimed to analyze their data from the 2018/19 influenza season to estimate the effectiveness of the 2018/19 influenza vaccine against influenza-related hospitalizations, facilitating a comparison of results.

I constructed several multivariable logistic regression models in SAS to generate estimates of VE against all influenza, as well as estimates by influenza type/subtype and age strata. In my analysis, it was estimated that the 2018/19 influenza vaccine reduced the risk of all influenza-related hospitalization in Canada by 47%. Vaccine effectiveness was significantly higher against influenza A(H1N1) than influenza A(H3N2), as the 2018/19 influenza vaccine did not display a significant protective effect against the latter subtype. Vaccine effectiveness against all influenza was higher amongst adults aged <65 years than those aged ≥65 years but demonstrated a significant protective effect in both age strata. Broadly, the overall findings of significant vs non-significant protective effects by influenza type and subtype were consistent with CIRN's (and several other influenza surveillance networks), but point estimates differed considerably. Differences in point estimates were likely caused by differences in model building processes and were investigated through sensitivity analyses but were not fully explicated.

C.C.

Women's College Hospital (Women's College Research Institute, Center for Integrated Diabetes Care)

As a practicum student working for Women's College Hospital, I created a draft manuscript which is ongoing, for the research group for integrated diabetes care. The group includes clinicians, research analysts, and epidemiologists who aim to improve the state of integrated diabetes care within the hospital setting, and diabetes management throughout Ontario.

The creation of the manuscript involved an acclimation to the existing clinical areas of interest in diabetes care, and the research gaps that exist in related health systems. The nursing home setting was identified as an area with plenty of room for the improvement of health outcomes, and I conducted a literature review of the challenges involving glycemic management for older nursing home residents. A descriptive overview of assessment instruments, health

indicators, and measures was constructed to examine the feasibility and validity of the linkages with ICES which could be used for our research project. This was informed by confirmation of data codes and evaluation of our assessment's completeness within our nursing home population. Subsequent consultations with a research team culminated in a preliminary research plan, after which a draft manuscript and supporting documents were constructed to represent the different research objectives of our study. The proposed analysis and results aim to inform research on the prevalence of optimal glycemic management within the older population, and patient and provider characteristics which may predict appropriate changes in treating diabetic residents. Lastly a summary document is to be constructed detailing the experiences with different health systems encountered within the WCRI during my practicum experience.

S.D.

Canadian Centre for Policy Alternatives

The Canadian Centre for Police Alternatives (CCPA) has previously published a series of reports on the 'Colour-coded Labour Market' – an analysis of differential labour market outcomes for racialized populations in Canada. Racialized workers in Ontario experience higher unemployment rates, lower earnings, and a higher likelihood to be in low-paying occupations compared to non-racialized workers. The racialization of the labour market is further compounded by gender and immigration status: racialized women – particularly racialized immigrant women – face greater barriers than racialized men, non-racialized men, and non-racialized women. These barriers have serious material impacts on workers' health (e.g. access to health benefits, paid sick leave, income for food, etc.). Prior to the pandemic, the initial aim of this practicum was to do a detailed investigation of the labour market outcomes of the four largest racialized groups in Ontario (South Asian, Chinese, Black, Filipino) using the 2016 long-form Census. However, given the that the CCPA is a policy research institute that releases data dependent on a changing political context, I spent a significant portion of my practicum doing rapid response policy research instead. However, the literature review and preliminary data analysis on the above project still informed my analysis and understanding in subsequent work.

A mixture of data sources were used in my rapid response analyses: the 2016 Statistics Canada Census, the 2019 and 2020 Labour Force Survey (LFS), and the 2016 Survey of Employment, Payrolls and Hours (SEPH). This data was not only accessed through the CANSIM tables accessible through the Statistics Canada website, but also through Beyond 20/20 (for the census) and Public Use Microdata Files (PUMF) on SPSS. The methodology primarily consisted of descriptive analysis, such as cross-tabs and graphs of wage differentials. Quantitative research was supplemented with investigative qualitative work such as digging through news reports (eg. long-term care deaths due to COVID-19) or parsing through government or private sector financial reports. The final articles were published on the CCPA's 'Behind the Numbers' website, and some were occasionally reported on by mainstream media outlets. The content of the rapid response research articles included: labour market experiences of nurses, the labour market outcomes of frontline workers (eg. warehouse workers, grocery store clerks, etc.), and the importance of care workers in the long-term care and home care sectors.

M.E.

Ministry of Children, Community, and Social Services; ICES

I completed my practicum placement at the Ministry of Children, Community and Social Services. I worked under the Policy Research and Analysis Branch, where I was a part of the Social Assistance Analytics Unit. I had the opportunity to work with ICES data linked with Social Assistance data to examine the health profiles of youth (ages 18-29) who received Social Assistance in 2009-10. The objectives of my project included exploring the health profiles of Ontario Works and the Ontario Disability Support Program (ODSP) youth recipients such as health service utilization, prescription drug use, healthcare costs, and mental health and addictions. The mental health status of individuals from the population was defined by past mental healthcare use. For the analyses, descriptives and multivariate regressions were performed, in which the health profiles of Social Assistance recipients were compared to those of low-income individuals and the general population. The association between Social Assistance and mental healthcare service use among low-income individuals with mental illness was investigated. Additionally, the association between Social Assistance and severe vs. non-severe healthcare service use among those who accessed healthcare services was also tested. Findings and its impact on policy and program development were then evaluated and translated to the Ministry and ICES.

A.G.

The Hospital for Sick Children

TITLE – PREVALENCE OF CHRONIC AND TRANSIENT IRON DEFICIENCY IN EARLY CHILDHOOD
AUTHORS – Argie Gingoyon[1,2], Cornelia M. Borkhoff[2,3,4], Charles D.G. Keown-Stoneman [1,5], Catherine S. Birken[2,3,4,6], Jonathon L. Maguire[3,4,5,6], Patricia C. Parkin [2,3,4,6]

AFFILITATIONS –
1. Epidemiology Division, Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada
2. Division of Paediatric Medicine and the Pediatric Outcomes Research Team (PORT), Hospital for Sick Children, Toronto, Ontario, Canada
3. Institute of Health Policy, Management and Evaluation, University of Toronto, Toronto, Ontario, Canada
4. Child Health Evaluative Sciences, SickKids Research Institute, Toronto, Ontario Canada
5. Applied Health Research Centre, Li Ka Shing Knowledge Institute, St. Michael's Hospital, Toronto, Ontario, Canada
6. Department of Paediatrics, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada

Background: Worldwide, iron deficiency (ID) is one of the most common nutrient deficiencies. Iron deficiency peaks in prevalence (12% or higher) in children aged 1 to 3 years, which is a

sensitive time for brain development. The deleterious effects or ID may depend upon the duration of exposure. Traditionally, ID is categorized as iron deficiency anemia (IDA) and non-anemic iron deficiency (NAID). However, this approach may not adequately address duration of ID. Our objective was to assess the prevalence of chronic ID and transient ID in young children.

Methods: Young children, 1 to 3 years of age, were recruited during a scheduled health supervision visit at a primary care practice participating in the TARGet Kids! research network. Participating children had blood work obtained at one or more visits, including hemoglobin, serum ferritin (SF) and C-reactive protein (CRP). We excluded children with CRP >5, gestational age < 35 weeks, birthweight less than 2,500g, and those taking iron supplementation. Chronic ID was defined as IDA at one or more visits (hemoglobin <110 g/L and SF <12 ug/L) or NAID at two or more visits (hemoglobin >110 g/L and SF <12 ug/L). Transient ID was defined as NAID at only one visit with iron sufficiency at one or more visits.

Results: A total of 384 children were identified with n=147 having blood samples at 2 or more visits. n=19 subjects and n=44 subjects were considered chronically iron-deficient using a <12 ug/L and <18 ug/L serum ferritin cut-off, respectively. We will report the prevalence of chronic and transient ID in children 1 to 3 years of age. Analysis is ongoing.

Conclusions: Few early child cohorts exist that have blood samples on young children. Next steps will be to determine the association between both transient ID and chronic ID and later developmental outcomes.

Y.K.

Public Health Agency of Canada

My role during this placement was a Student Epidemiologist at the Public Health Agency of Canada (PHAC). I was working within the Behaviours, Environment, and Lifespan Division (BELD) and I was specifically within the Injury Surveillance Team of this division. My main projects involved drafting two manuscripts that describe the prevalence of, and complications related to, senior falls in Canada. One of these manuscripts would use administrative data (DAD, NACRS, and Vital Statistics Death data) and the other would use data from the Canadian Community Health Survey (CCHS). At the time of writing this abstract significant progress was only made on the paper using administrative data. This project involved extracted multiple years' data from the three sources and importing them into SAS. Following some data cleaning (such as stacking datasets, defining new variables, and re-categorizing existing variables), the analyses were performed. The analyses included a variety of descriptive statistics including calculating frequencies and proportions. Trends over time were explored using Joinpoint Software. In addition, crude and age-standardized rates of fall-related hospitalizations, emergency department visits, and death, were calculated in SAS. The paper aims to inform Canadians on updated figures for the prevalence of falls among the Canadian Senior Population and is planned to be submitted to Health Promotion and Chronic Disease Prevention in Canada: Research, Policy and Practice (HPCDP) Journal for publication.

E.K.

Public Health Ontario

My objectives include enhancing my knowledge in opioid-related morbidity and mortality, and opioid agonist treatment through analysis and knowledge translation.
Activities
I completed a CIHR report and manuscript writing on the evaluation of the gap in delivery of opioid agonist therapy (OAT) among individuals receiving medical care for opioid-related health problems in Ontario. I used epidemiological skills to interpret findings and translate them in the conference (TOPHC) poster, a CIHR report, and in my student presentation at PHO. I also contributed to PHO's opioid-mortality surveillance report, where I critically appraised literature from British Columbia and Alberta.

Methods
In collaboration with the epidemiologist and analyst at ICES, I took part in the analysis planning and interpretation of findings. I participated in meetings regarding my main project, including preparing meeting agendas and minutes, and obtained feedback from the team and relayed this feedback into the report and manuscript writing. The TOPHC poster that I had completed was done using the background, methods, results and discussion of the in-progress manuscript, along with the grant proposal that was completed prior to my arrival.
Outcomes
Completed report will be circulated to the large project team for feedback, and will then be submitted to CIHR as an end-of-grant report. The TOPHC poster will be used at future conferences (post-COVID-19). Manuscripts that are still in progress will be submitted later this year.

S.L.

Women's College Research Institute
A Portrait of Aging Women and Men in Ontario, Canada

Importance: Older adults are the fastest growing segment of the population in Canada. Further understanding of this population as a whole is needed to better service their healthcare service needs.

Objective: To provide a detailed sociodemographic, health, and health service usage profile for older adults residing in Ontario with careful consideration for care settings, sex-differences, and diversity between age groups.

Design: Population-based cross-sectional study using linked health administrative data.

Setting: Ontario – Canada's largest province.

Participants: All individuals aged 65 and older who were alive and residing in Ontario within the community, with and without home care, as well as those living in long-term care homes on April 1, 2019 were identified. A detailed portrait description was provided for this population-based sample on this date.

Main Outcomes and Measures: Sociodemographic characteristics extracted included age, sex, income status, rural residency status, and setting of care. Frequencies of prescription drugs dispensed and chronic health conditions were also measured. Lastly, health service use within the previous year was characterised using acute care hospital admissions, emergency department visits, and the total number of physician visits.

Results: A total of 2,260,412 individuals (1,237,949 [54.8%] women and 1,022,463 [45.2%] men) aged 65 and above were included in the study. The mean age for women was 75.9 ± 7.8 while that of men was 74.8 ± 7.0 (SD = 0.15). Notably, 90.4% of people resided in the community independently while only 6.4% of people resided in the community with home care and 3.3% were living in long-term care homes. Women and men differed substantially in terms of low-income rates, number of prescription drugs dispensed, chronic health conditions diagnosed, and health service usage. Similarly, these factors varied across different age groups of older adults.

Conclusions and Relevance: The population of older adults in Ontario is growing rapidly as people remain healthier, longer. The vast majority of older adults live in the community independently, and key differences exist between sexes and age groups which should be carefully considered. Understanding the sociodemographic and health profile of older adults is important to identify factors associated with healthy aging and inform strategies to improve delivery of health services.

C.L.

Population Health Analytics Lab

I completed my second practicum in Dr. Laura Rosella's Population Health Analytics Lab at DLSPH. My main deliverable was preliminary analysis findings for the evaluation of the Integrated Care program at the UHN, which has been offered to thoracic surgery patients since June of 2019. The evaluation examines patient and caregiver experiences with the program, its impacts on health care providers' work lives, and health outcomes such as readmission rates and cost-effectiveness. Our evaluation is comprised of both qualitative and quantitative components, that latter of which was my main responsibility. Tasks included cohort selection, making data requests, defining outcome metrics, and analyzing health administrative data.
I also contributed to the development of qualitative methods for the evaluation. I mapped evaluation questions to survey and interview materials, and adapted health assessment questions from existing sources into the evaluations. I actively participated in a monthly working group comprised of clinicians and patient partners, allowing me to view the evaluation from a holistic lens considering aspects of the patient experience as well as identifying outcome metrics of interest. Last month, I gave a presentation to the working group on the baseline characteristics

of patients in the IC program. Since then, I have analyzed more of the data which I am receiving on a rolling basis.

In addition, I reviewed articles and extracting data for a systematic review on the effect of depression on patients with low back pain; I have been involved in this project as of my first placement here at the lab. Dr. Rosella also gave me the opportunity to work on a systematic review on mortality indicators used in public health research and surveillance. I have updated the grey literature search by perusing thousands of online sources and compiled new indicators.

Throughout the practicum, I enjoyed collaborating with others in the research lab, actively engaged in different aspects of the evaluation, and practiced multitasking on other projects while data access was pending.

D.M.

Public Health Agency of Canada

How to manage a new respiratory pathogen occurring in Canada: development of an epidemiology standard operating protocol.

Introduction
Although new respiratory pathogens occur regularly, if infrequently, across the globe, each new event could be serious and could cause panic, so public health emergency preparedness is vital. A standard operating protocol (SOP) is a tool for preparedness, offering methods and procedures to help epidemiologists with less experience to develop their roles. The current pandemic of the SARS-CoV-2 virus was an opportunity to witness an emergency first hand.

Method
An observational study was conducted to determine how a new event was managed over January to March 2020. The researcher was placed into the Emerging Respiratory Pathogens team in the Public Health Agency of Canada. Data collection included taking part in the emergency response in the Emergency Operations Centre. Expert interviews were conducted with those who worked on the emergency. Other SOPs and related documents were analysed. A report was drafted and shared with the epidemiology team for their input on pitfalls, nuances and clarifications.

Results
The SOP includes earlier work on emergency responses as emergencies can be handled in similar ways when respiratory diseases occur in humans. It offers a standardised way to understand first steps which is a good way to reassure people working on an emergency. Peer review was essential to ascertain whether the lived experience was reflected, and this is now incorporated in the document. The result was an agreed and activated emergency document.

Discussion
This study was greatly facilitated by the arrival of the abhorrent SARS-CoV-2. Emergency preparedness cannot be conducted in a vacuum, and observing an unfolding emergency was an opportunistic way to understand how epidemiology is conducted in real time.   This document

will be a useful tool when future emerging respiratory pathogens arrive. Public health emergency preparedness is an ongoing, evolving field that is ever-present in Canada to protect people from infectious diseases.

A.M.

Public Health Ontario

The primary purpose of this practicum was to describe trends in fully and partially alcohol attributable hospitalizations and emergency department visits in Ontario between 2008 and 2017 overall and by sex and age group using an online, open-sourced alcohol harms estimating tool. The tool, entitled the International Model of Alcohol Harms and Policy (InterMAHP), was developed by a team of leading alcohol researchers at the University of Victoria to serve as an internationally comparable method to assess population-level alcohol morbidity and mortality.

The practicum was supervised by Drs. Brendan Smith and Erin Hobin at Public Health Ontario (PHO). Drs. Smith and Hobin are scientists in the department of Health Promotion, Chronic Disease, and Injury Prevention and they have specialized in examining health inequalities, population-level nutrition, and alcohol harms and policy impacts.

The work I did at PHO consisted of requesting, cleaning, aggregating, and analyzing large health administrative datasets in SAS and R to be used in the InterMAHP tool. The datasets comprised hospitalizations and emergency department visits for conditions that could be partially – such as cancer – or fully – such as alcohol dependence – attributable to alcohol between 2008 and 2017. InterMAHP was used to calculate alcohol-attributable fractions to determine the proportion of hospitalizations and emergency department visits caused by alcohol in Ontario. Figures displaying trends in the rate of alcohol attributable hospitalizations and emergency department visits were generated in R and the findings were written up in an academic manuscript. Preliminary results were also presented at PHO in Motion, a webinar showcasing student projects at PHO.

A.M.

Public Health Ontario: Health Promotion, Chronic Disease and Injury Prevention

My Winter 2020 practicum was with the Health Promotion, Chronic Disease and Injury Prevention division of Public Health Ontario. Specifically, I worked in the applied public health sciences unit with the injury prevention lead. My primary task was to create two evidence briefs to summarize the existing evidence on concussion prevention interventions and concussions risk factors. I developed a literature search strategy with a research librarian; these articles were then screened for relevance based on predetermined inclusion criteria. I then conducted a quality appraisal and synthesized the data from the articles that were rated high enough on methodological quality. Finally, the main findings were included in the evidence brief which will then be published on the Public Health Ontario website for use by injury prevention practitioners.

I also contributed to the development of a workshop for the Ontario Public Health Convention. While this was cancelled due to COVID-19, the experience of developing a

presentation component and relevant activities for a 90-minute workshop was an exciting new experience. I hope to be able to develop and lead a similar workshop in the future.

My time at Public Health Ontario was incredibly valuable and the experience I acquired will be instrumental in my future career in public health.

F.N.

University of Toronto Scarborough

Title: Prenatal care adequacy among women with disabilities in Ontario: A population-based cohort study

Authors: Fareha Nishat, Yona Lunsky, Lesley Tarasoff, Hilary Brown

Objective: To examine prenatal care adequacy among women with physical, sensory, and intellectual/developmental disabilities, compared to women without disabilities.

Design: Population-based cohort study using linked health administrative data, 2003-2017.

Setting: Ontario, Canada.

Population: Singleton obstetrical deliveries to women with physical (n=83,840), sensory (n=25,644), intellectual/developmental (n=1,225), and multiple disabilities (n=4,987), and without disabilities (n=953,692).

Methods: Women with disabilities were identified using algorithms applied to health care encounters before conception. Multivariable nominal logistic regression was used to compute adjusted odds ratios (aOR) and 95% confidence intervals (CI) comparing each disability group to women without disabilities.

Main outcome measures: Prenatal care adequacy, using the Revised-Graduated Prenatal Care Utilization Index.

Results: Women with physical (aOR 1.22, 95% CI 1.19-1.24), sensory (aOR 1.11, 95% CI 1.08-1.14), and multiple disabilities (aOR 1.41, 95% CI 1.32-1.51), compared to those without disabilities, had increased odds of intensive vs. adequate prenatal care. Women with sensory (aOR 1.06, 95% CI 1.02-1.09), intellectual/developmental (aOR 1.20, 95% CI 1.08-1.44), and multiple disabilities (aOR 1.14, 95% CI 1.05-1.22), had increased odds of inadequate care. Women with sensory (aOR 1.24, 95% CI 1.14-1.35) and intellectual/developmental disabilities (aOR 1.64, 95% CI 1.16-2.33) had increased odds of no care, while women with physical disabilities had decreased odds (aOR 0.94, 95% CI 0.89-0.99).

Conclusion: Disparities in prenatal care adequacy among women with disabilities, particularly in those with intellectual/developmental disabilities, demonstrate the need to address barriers to timely and sustained prenatal care among women with disabilities.

G.O.

Centre for Addiction and Mental Health (CAMH) - Institute for Mental Health Policy Research

The objectives of this study were to estimate the prevalence of alcohol use during pregnancy and to examine whether there was an association between alcohol use during pregnancy and either adverse neonatal outcome or pregnancy complications.

Methods
This study utilized linked obstetrical and neonatal records contained within the Perinatal Services British Columbia's Perinatal Data Registry, for deliveries that were discharged between January 1, 2015 and March 31, 2018. Estimates for the period and fiscal year prevalence estimates were calculated. Chi-square tests were used to compare adverse neonatal outcomes and pregnancy complications by alcohol use during pregnancy. Logistic regression was used to examine the association between alcohol use during pregnancy and adverse neonatal outcomes or pregnancy complications, after adjusting for identified risk factors.

Results
The period prevalence of alcohol use during pregnancy was 1.1% and yearly prevalence was XX, similar to previous prevalence estimates. Women who reported alcohol use during pregnancy were younger, had a lesser number of antenatal visits and a greater proportion were nulliparous, reported a history of any mental illness and reported substance use and current smoking status. There were no differences in pregnancy complications when comparing women who consumed alcohol during pregnancy and those who did not. After adjustment, neonates born to mothers who reported alcohol use during pregnancy had greater odds of being diagnosed with slow fetal growth (OR = 1.44; 95% CI: 1.07, 1.89), low birth weight (OR = 1.57; 95% CI: 1.28, 1.91), other respiration distress of newborn (OR = 2.84; 95% CI: 1.70, 4.45), neonatal difficulty feeding at breast (OR = 2.31; 95% CI: 1.50, 3.39) and unspecified feeding problems (OR = 2.53; 95% CI: 1.63, 3.74), compared to non alcohol-exposed neonates.

Conclusion
Alcohol use during pregnancy was associated with notable differences in maternal and neonatal characteristics and certain adverse neonatal outcomes.

S.P.

Public Health Agency of Canada: Maternal, Child and Youth Health Division

My second practicum was conducted at the Public Health Agency of Canada (PHAC). I worked as part of the Developmental Disorders Surveillance Unit within the Maternal, Child, and Youth Health Division in the Centre for Surveillance and Applied Research. Throughout my practicum, I worked to support national surveillance of developmental disorders. During my time at PHAC, I was involved in two projects: a peer-reviewed paper on factors associated with employment status among Canadians adults with developmental disorders, and an analytic plan to profile children and youth with select developmental disorders.

The first project involved the development of a peer-reviewed paper utilizing data from the 2017 Canadian Survey of Disability (CSD) with the goal of exploring the association of a variety of sociodemographic and health factors with employment status in Canadians aged 20-64 with developmental disorders. To support this project, I conducted background research, developed the analytical plan and SAS code, and performed descriptive and multinomial multivariate logistic regression analyses. I presented these results in the form of tables and text and completed an initial draft of the peer-reviewed paper, including introduction, methods, results, and discussion.

The second project within my practicum involved the development of an analytical plan using pilot data from the 2019 Canadian Health Survey on Children and Youth (CHSCY). As part of this task I became familiar with the survey methodology and content, and using this knowledge, created an analysis plan to contribute to the development of a surveillance knowledge product on children and youth with select developmental disorders in Canada. This plan will be implemented upon the full release of the CHSCY data.

The skills, experience, and connections that I have gained through both of my practicums with PHAC will be valuable as I graduate and continue my career as an epidemiologist.

Y.Q.
Li Ka Shing Knowledge Institute - Center for Global Health Research

The adverse effects of air pollution on mortality and morbidity has been well documented across the world. Increases in Particulate Matter (PM) 2.5 concentration in the air has been associated with increased risk of pulmonary and circulatory mortality and morbidity, and increased risk of all-cause mortality. Modelling the short-term effects of mortality and air pollution has often employ time-series analysis or case-cross over techniques. These methods, particularly time-series studies, have been consistent and reliable in reporting small, positive associations between air pollution and hospitalization or mortality in different adult groups including the elderly population (80 years or older), people with pre-existing diseases including COPD and diabetes. While the method is commonly accepted, short-term air pollution and daily mortality at the country level may not provide enough data to be reliably modelled using time-series analysis, even with a Poisson distribution. Using mortality and morbidity data from Health Canada and air pollution monitoring data from Environment Canada, a common Poisson Time-Series Analysis with linear and non-linear PM2.5 exposure was replicated and then compared with a Bayesian Poisson Model with Random Walk-2 on PM2.5 as part of a larger comparison

with Bayesian case-cross over model to identify models that can improve air pollution and mortality/morbidity predictions. Data wrangling and analysis were conducted using R. It is theorized that a Bayesian case-cross over approach would provide the best predictions for the association between air pollution and mortality. The Bayesian case-cross over model posterior predications can be useful in an air pollution warning system that evaluates daily air pollution readings and identifies increased mortality and morbidity risks.

S.R.

International Care Ministries Philippines

International Care Ministries (ICM) is a Philippines-based non-governmental organization with a mission to reduce the burden of "ultrapoverty" in the Philippines. Between February 2018 and January 2019, ICM conducted the first randomized controlled trial (RCT) to investigate whether providing food and transportation costs increases the rate of attendance to the rural health unit (RHU) for tuberculosis (TB) testing. Study participants were assigned to one of four RCT groups based on incentives or subsidies that they were given: A) no incentives or subsidies (i.e., control group); B) food; C) transportation costs to the RHU; and D) food and transportation costs to the RHU. Between February 2019 and January 2020, ICM conducted the second RCT with three RCT groups: A) food and transportation costs to the RHU (i.e., control group); B) food, transportation costs to the RHU, and subsidies for chest x-ray; and C) food, transportation costs to the RHU, subsidies for chest x-ray, and accompaniment of a counsellor (i.e., a trusted community member) to the RHU. To elucidate the effect of incentives and subsidies in increasing the rate of RHU attendance for TB testing, a logistic regression model was developed using RHU attendance for TB testing as the outcome, and RCT group, age, and sex as the predictors. In summary, the first RCT has shown that providing both food and transportation costs was associated with the highest odds of attending the RHU for TB testing (Odds Ratio (OR) = 7.06, 95% Confidence Interval (CI) [4.79, 10.38], $p < 0.05$), compared to providing no incentives or subsidies. Males had significantly lower odds of attending the RHU for TB testing (OR = 0.63, 95% CI [0.47, 0.83], $p < 0.05$), compared to females. In the second RCT, chest x-ray subsidies and counsellor accompaniment did not significantly increase the odds of attending the RHU for TB testing ($p > 0.05$).

R.S.

ICES

My second practicum took place at ICES, an independent research institution that specializes in population-wide initiatives using linked data of the Ontario population. Under the supervision of Drs. Natasha Saunders and David Gomez, I conceptualized and planned a study investigating the epidemiology of recurrent violent injuries in Ontario (i.e. the rates of occurrence, associated sociodemographic risk factors, as well as outcomes such time to recurrent injuries and mortality). To do this, we derived a cohort with an index injury related to violence (2005- November 2016) using emergency department and hospitalization diagnosis codes

through linked administrative databases. Individuals were followed until December 2016 to capture subsequent violence-related injuries. The analysis included numerous key risk factors as fixed covariates (i.e. at the time of index injury) as well as two that were updated annually as time varying-covariates (incarceration status and 2-year look back of active mental illness). A recurrent events regression analysis will be undertaken once remote access to the data has been approved (due to COVID-19). While public health measures have been in place during the present pandemic, I continued with a scoping review looking at evidence of recurrent violent injuries (due to interrupted data access). This experience allowed me to advance my statistical knowledge (including hands on experience of running a complex survival analysis), SAS software skills, preparation of a manuscript, and staying engaged during periods of working from home.

J.V.

Public Health Agency of Canada (PHAC)

The opioid crisis in Canada is an ongoing challenge despite promising changes in policies and programming. Recent statistics from the Public Health Agency of Canada report that there have been over 13, 900 apparent opioid-related deaths over a 3.5-year period between January 2016 and June 2019. In addition, there have been 17, 050 opioid-related poisoning hospitalizations between January 2016 and March 2019. In recent years, the contamination of illicit supplies of opioid substances, namely synthetic fentanyl and carfentanil products, has been attributed to a high proportion of recent opioid poisonings and opioid-related fatalities across the country.

National, provincial and territorial surveillance reports for opioid-related harms have almost exclusively focused on opioid poisonings and apparent opioid-related deaths, but there are other harms beyond opioid poisonings that have not been adequately reported on based on recent data. Therefore, this practicum project would provide an update to previously reported trends on opioid-related harms (beyond poisonings) to broaden the understanding of the national opioid crisis to guide evidence-based policies and interventions. Specific objectives for this project are to:
a.   examine recent national trends of hospitalizations for opioid use disorders, adverse drug reactions from opioids and neonatal withdrawal symptoms using the Discharge Abstract Database for the fiscal year from April 1, 2018 to March 31, 2019
b.   identify shared and unique determinants for each type of opioid-related harm (such as discharge disposition and total length of stay)

Y.M.

Public Health Agency of Canada

My Winter 2020 practicum was held at the Public Health Agency of Canada (PHAC) located in Ottawa. Within PHAC, I worked specifically for the Office of Border and Travel Health (OBTH) where I had the opportunity to work alongside the COVID-19 response to protect Canadians and Canadians travelling abroad by using various epidemiological data.

With COVID-19 being a moving target, my tasks varied each day. At the beginning of my practicum, when the virus was still contained in China, I worked on both travel health and epidemiological surveillance. Travel health tasks involved writing media lines due to the shortage of yellow fever vaccine, helped consolidate edits for malaria and yellow fever statements, referenced statements using Ref works, and used different data sources to updates our statements. Surveillance tasks involved consolidating and interpreting data of travellers coming from Wuhan and Hubei to Canada. In addition to surveillance, I helped organize process for quarantine procedures, aided in the creation of a database, summarized flight data, and also had the real-world experience of going to Ottawa airport to promote public health messaging surrounding COVID-19 symptoms.

Overall, the experience was fast paced and interesting. If I could re-live my practicum experience, I would have liked to have more independent and long-term projects balanced with daily tasks. Ultimately, it was great practicum experience getting to work alongside the COVID-19 response with a small team of epidemiologists committed to protecting the health of Canadians.

J.Z.

OCI, Princess Margaret Cancer Centre

This practicum is offered by Geoffrey Liu Lab (COMBIEL) at Princess Margaret Cancer Centre, co-supervised by Dr. Geoffrey Liu and Dr. Wei Xu. This is a continuation of the work from the first practicum, offered by the same organization. During the practicum, my role is to provide epidemiological expertise in study design, data wrangling, database management, and statistical methodologies in multiple on-going projects under the guidance of the practicum supervisors. The practicum allowed me to develop my quantitative skills, (e.g. data visualization, model building (logistic, GEE), data harmonization, and other epidemiological knowledge application), and challenged my task prioritization and time management skills in a fast-moving research environment. Current on-going projects include evaluating clinical and genomic predictors for Cisplatin-induced ototoxicity, describing survival and treatment outcomes of mesothelioma patients, and developing a longitudinal data base for ALK positive lung cancer patients.

Additional to analytic tasks, work involved collaborative work with core lab members – such efforts included developing databases and pipelines for data storage. The ability to clearly communicate epidemiological ideas and statistical results to a non-familiar crowd and to offer

educated opinions in projects meetings were key competencies in this practicum. Overall, I have found this practicum experience to be intellectually stimulating and professionally challenging.

K.Z.

The Hospital for Sick Children

I completed a 12-week practicum with Dr. Teresa To at the Hospital for Sick Children. My main project was to analyze the differences of asthma incidence between twins among 12,600 twin pairs of children in Ontario using ICES data. As the principal investigator of this project, I was responsible for the documentation, literature review, database management, data analysis, and abstract and manuscript preparation. For my data analysis, I gained experience using R for conditional logistic models and generalised estimating equations. Additionally, I was also given the opportunity to participate in other team research activities, including completing REB forms, completing ICES PIA, PAW, and DCP forms, poster presentations, presentations at departmental research rounds, reports, organization of current and future projects, and development of Excel VBA macros to streamline workflow. Overall, Dr. To and SickKids offered an outstanding practicum experience in an excellent collaborative work setting where I was continually challenged in a variety of aspects and was given ample opportunity to apply my epidemiological and biostatistical skills while gaining new knowledge and skills in the field of respiratory epidemiology.