Summer 2014 Practicum Abstracts

MPH Epidemiology students conduct placements at a variety of organizations and on a variety of topics. As a requirement of their first practicum, students work with data, conducting analysis and interpretation of their work. Below you will find a selection of practicum abstracts from summer 2014 practica. Students have provided their consent to share these abstracts, which were submitted to the DLSPH as a part of their final practicum package. The structure of the abstract varies depending on the amount of information that could be shared by the student and the student's preferences in format.

Alyssa Parpia, Natasha S. Crowcroft (Public Health Ontario)

Title: Incidence of Encephalitis in Ontario: A study of administrative hospitalization data

Background: Encephalitis is an acute brain inflammation with high mortality and morbidity, and is caused by over one hundred causative pathogens. In Ontario, with a growing incidence of mosquito and tick-borne infections, it is important to understand what the burden of this neurological disorder is on the population at large.

Methods: Data on hospitalizations were obtained from the Discharge Abstract Database via IntelliHEALTH Ontario, from April 2002 to December 2013. Single ICD codes and combinations of ICD codes for encephalitis-related hospitalizations were used to extract all relevant hospitalizations from this time period in Ontario. Multiple hospitalizations of the same patient within 6 months were considered a single case of encephalitis. A multiple negative binomial regression model was created to identify age, sex, and year-adjusted incidence rate ratio estimates of encephalitis in Ontario. Statistics Canada population data were used for denominators in incidence calculations. Incidence underwent bootstrap resampling to allow for comparison of incidence rates to regions outside of Ontario.

Results: The crude incidence of all-cause encephalitis in Ontario from 2002-2013 is estimated to be 4.28 [95%CI: 4.18-4.38] per 100,000 population per year. Unknown cause (51.04%) and viral (27.67%) encephalitis are the most common etiology categories in Ontario, but among immunocompromised individuals, viral (35.61%), unknown (26.55%), and immune-mediated (21.75%) encephalitis causes dominate. Peaks of encephalitis in Ontario occurred from August-September in 2002 and 2012, where unknown etiology encephalitis and viral encephalitis appear to be the etiology categories that primarily account for this increase. The all-cause incidence rate for females is 15% less than for males, and infants <1 and adults ≥65 have incidence rates 3.86 ($p<0.0001$) and 3.01 ($p<0.0001$) times that of those aged 20-44, respectively, after adjusting for age, sex, and year.

Conclusions: Encephalitis incidence varies significantly by age, yet has no significant time trend aside from peaks. Having a baseline understanding of the epidemiology of encephalitis in Ontario is beneficial in surveillance of emerging infectious diseases, particularly with respect to

the incidence of unknown etiology encephalitis, for which greater elucidation of specific causes is necessary.

Nicolette Baines

The University Health Network (UHN) is a multi-hospital network that includes Toronto General Hospital, Toronto Western Hospital, Princess Margaret Hospital and Toronto Rehabilitation Institute. Throughout my practicum at UHN, I investigated a respiratory syncytial virus (RSV) outbreak that occurred at Princess Margaret Hospital during the summer of 2013. As part of my project, I also investigated the historical trends for RSV throughout UHN and developed infection control recommendations for RSV outbreaks in immunocompromised inpatient populations. We concluded that standard infection control procedures for RSV may not be sufficient to contain outbreaks among immunocompromised populations. Recommendations were created specifically for immunocompromised populations, in order to avoid future occurrences of outbreaks in these populations. Throughout the course of my practicum, I also had the opportunity to work with a community health centre to develop recommendations on infection control and patient safety in outpatient facilities. Lastly, I was involved in a study on Vancomycin-resistant Enterococci (VRE), which involved data validation, chart review, statistical analysis and coordination with multiple other hospitals.

Lauren Della Morra

As a research trainee at the Toronto Western Research Institute, the objective of my practicum was to epidemiologically characterize the low back pain population seeking primary care in Ontario. Low back pain is the leading cause of years lived with disability and it is estimated that up to 70% of adults will experience this condition in their lifetime. Low back pain is traditionally referred to as a homogeneous condition. However, variation in symptoms and etiologies suggests that distinct clinical subgroups may exist. To investigate this hypothesis, I performed a retrospective analysis of demographic and health measure data that had been prospectively collected from primary care patients with low back pain.
Descriptive statistics were computed to describe the total cohort and the cohort stratified into four clinical subgroups: back dominant pain aggravated by flexion or extension, and constant or intermittent leg dominant pain. Multinomial regression models were developed to assess whether certain factors were significant predictors of clinical subgroup. The results supported the hypothesis that low back is a heterogeneous condition with unique clinical subgroups that differ in age, gender, body mass index and comorbidities indicative of metabolic syndrome. Further research to better understand the different presentations of low back pain is warranted as we progress toward preventing low back pain in the population and providing more efficient patient-centered care.

Dov Millstone

My summer practicum was spent at Toronto Western Hospital where I completed a project focusing on adverse events in orthopaedic surgery. The first part of the practicum was spent completing a literature review. After completing the literature review I had a much better sense of this topic area and was able to develop the introduction to my paper. I then spent a large portion of my time cleaning and manipulating data using the statistical software R in order to have the data in an appropriate form for analysis. Once the data was verified I conducted bivariate and multivariate analyses. After going over the results with my supervisors I wrote the first draft of a paper that will eventually be submitted to a scientific journal for publication. In addition to writing a paper, I also presented my findings at summer student research day and have drafted an abstract that will be submitted to conferences where I can present my poster. Overall, my summer practicum provided me an opportunity to work with real data that will be invaluable to my career as an epidemiologist going forward.

Anja Bilandzic

The aim of the Canadian Public Health Service is to build capacity in rural, remote or low resource public health placement sites across Canada. As a Student Public Health Officer at the Northwestern Health Unit in Kenora, Ontario, I worked with the Foundations team on a variety of projects which demonstrated the breadth of activities and programming occurring around the health unit. My main projects included developing health indicator webpages, analyzing and reporting the results of a school-based regional survey and qualitatively analyzing participant discussions from a conference setting. There were also opportunities to engage with specific programs of interest and work with them on ad hoc projects, such as a vaccination cold-chain break analysis I worked on with the infectious disease team. This practicum allowed me to enhance my applied epidemiology skills and to gain a different perspective on public health issues in the province, through the lens of a very unique public health unit setting.

Jasantha Naidoo

Background/Purposes: The Ontario Mental Health Reporting System (OMHRS) is an administrative database used to collect information on mental health hospitalizations within Ontario. The purposes of this investigation were to describe the OMHRS, examine its data for Peel, to compare the OMHRS data with data from the Discharge Abstract Database (DAD), and to recommend aspects of the data that can be used in public health. Methods: The study population included patients occupying or discharged from a designated adult mental health bed in 2013, who have a health card number, and a residential postal code indicating they reside in Peel or Ontario. Rates were calculated using counts of admissions, patient diagnoses, and discharges for mental illnesses. In addition, rate ratios were calculated to compare discharge rates from the OMHRS data with discharge rates using both the OMHRS and DAD data combined. Results: During 2013, the highest diagnosis rate occurred for mood disorders at 85 diagnoses per 100, 000 population among Peel patients and 127 diagnoses per 100,000 population for Ontario patients. Admission rates were highest among Peel patients age 20 to 24

years, with the rate for males being 342 admissions per 100,000 population and 193 admissions per 100,000 population for females. Rate ratios comparing the discharge rates from the OMHRS to rates using both the OMHRS and DAD data were found to be extremely high; suggesting that many mental health hospitalizations are being captured in the DAD instead of the OMHRS. Conclusions: These findings show that rates for admissions, patient diagnoses, and discharges of mental illness are lower in Peel compared to Ontario; that the DAD should be used together with the OMHRS to report on mental health hospitalizations; and lastly, that data on mental health hospitalizations specific to mental illnesses of public health interest can be useful in a public health context.

Kristen Wheeler

A 16-week practicum was undertaken at the Ontario HIV Treatment Network (OHTN), a research-focused not-for-profit agency funded by the Ontario Ministry of Health and Long-Term Care. The practicum involved working with cross-sectional data from the OHTN Cohort Study (OCS) to generate a health profile of heterosexual men living with HIV in Ontario, an understudied group of HIV-positive people who may face particular challenges regarding prompt diagnosis, appropriate services, and stigma. The OCS is a long-running observational cohort of HIV-positive people, and collects data from clinical records, lab tests, and questionnaires. Descriptive statistics were calculated to determine the sociodemographic characteristics and clinical status of self-identified heterosexual men, who were then compared to gay and bisexual men to look for significant differences in the demographic make-up and health of HIV-positive men according to sexual orientation. The relationships and sexual behaviour reported by heterosexual men were also assessed, and the factors associated with recent sexual activity were identified using multiple logistic regression. This research was used to produce an analysis report and presentation, and may serve as the basis of future published work.

Sehar Jamal

Background: Roughly one-third (31.5%) of Canadian children and adolescents aged 5 to 17 years are overweight or obese. The absence of data for children under 3 years of age is a critical gap given that early risk and protective factors can profoundly affect children's development.

Methods: The Better Outcomes Registry & Network (BORN) Ontario data quality framework was used as a guideline. Data coverage, completeness (missing data), and validity (according to WHO Simplified Tables for BMI) were evaluated.

Results: In total, 2,126 18-month WBV records were extracted between September 2013 and June 2014. A subset of 779 records (17-22 months) was used to perform analysis. Over 80% of the records had valid heights and weights. Similarly, the item response was high for the nutrition module: 82% for breastfeeding, 95% for homogenized milk, 92% for avoiding sweetened beverages, and 92% for using no bottles. ON-Marg dimensions were present for 85% of the age

group. Fourteen percent (14%) were at risk of being overweight and 8% were overweight or obese. Patterns of obesity varied by ON-Marg, PHUs, and FHTs.

Discussion: Although the estimates of obesity are not representative, they are consistent with the literature. The results underscore the need to continue the collaboration (between EMR vendors, BORN, practitioners, and public health professionals) to improve data quality of EMRs as a surveillance tool for healthy weights.

Wayne Khuu

Background: A Capstone project on 'Sex differences in comorbidities in patients with non-traumatic brain injury in inpatient rehabilitation settings' took place in the Acquired Brain Injury Research Lab (ABIRL) at Toronto Rehab. The ABIRL works to improve the quality of life for persons with Acquired Brain Injury (ABI). The main areas of research include population-based studies, girls and women with ABI, TBI in vulnerable populations, work-related TBI, and research based theatre for knowledge translation.

Methods: The Capstone project is comprised of 4 separate studies, including a systematic review of methods to measure comorbidity in relation to predictive validity of inpatient rehabilitation (IR) outcomes such as functional outcome, a descriptive study on sex differences in comorbidities using data from the Discharge Abstract Database and National Rehabilitation Reporting System through the Institute for Clinical and Evaluative Sciences (ICES), a validation study to compare the predictive validity of various methods of comorbidity measurement for rehabilitation outcomes in patients with nTBI, and a multivariable modeling study to investigate predictors of functional outcome in these patients.

Results: At the halfway point of the Capstone, and end of the first practicum, ICES is in the process of creating the data set. The results of the systematic review showed that various methods are used to measure comorbidity, including number and type based on standardized codes in administrative databases, as well as indexes, such as the Charlson Comorbidity Index; though none of the measures have been validated for function outcome in patients with nTBI in IR.

Conclusion: This study is still in progress. The data from ICES will be used to describe sex differences in comorbidity and developing predictive models of functional outcome for patients with nTBI in IR.

Emily Shing

Research Abstract: Adverse Events Following Varicella Vaccines in Ontario

Background: In 2004, two monovalent varicella vaccines (Varilrix® and Varivax® III) were added to Ontario's publicly funded immunization schedule, recommended for children 15

months of age. By 2011, MMRV vaccine (measles, mumps, rubella, varicella; Priorix-Tetra®) was introduced to the schedule as a second dose of varicella for children 4 years of age.

Objective: To describe adverse events following immunization (AEFIs) reported in Ontario after administration of varicella-containing vaccines over a 4 year period.

Methods: AEFIs reported following administration of varicella vaccines between January 1, 2010 and December 31, 2013 were extracted from the integrated Public Health Information System (iPHIS). Net doses of varicella vaccines distributed from January 2010 through December 2013 were used to calculate AEFI reporting rates (per 100,000 doses distributed). Events were grouped by provincial case definitions and serious AEFI were defined using the World Health Organization definition. Case-level review was completed to assess serious events and varicella/zoster-like rashes. Statistical analyses were conducted on SAS version 9.3 and Microsoft Excel 2010.

Results: Overall, there were 162 AEFIs reported following monovalent varicella immunization, for an annualized reporting rate of 14.6 per 100,000 doses distributed. Ages of reported cases ranged from 9 months to 70 years (median 4.5 years), with the greatest proportion of reports in children 12-23 months (38.9%). The most commonly reported events were systemic rash (37.3%), pain/redness/swelling at the injection site (29.2%), and allergic skin reactions (20.5%). There were 10 serious events (0.9 per 100,000 doses distributed); all involved hospitalization and were recovered at the time of reporting. Further review found 8 reports with varicella-like rash (0.7 per 100,000 doses distributed) and one report of shingles developing 6 months after immunization, subsequently laboratory confirmed as vaccine-strain varicella zoster virus (VZV).

There were 8 AEFIs reported following MMRV immunization since its implementation in 2011 (reporting rate, 8.7 per 100,000 doses distributed). Median age among MMRV AEFI reports was 5 years (range, 1 to 10 years). No serious events were reported among MMRV reports.

Conclusions: Our findings were consistent with previous post-marketing safety data for varicella vaccines; no safety signals were detected. Serious events were rare. Ongoing monitoring will further establish the safety profile of varicella-containing vaccines in Ontario.

Esther Kim

Background and objectives: Higher left ventricular mass (LV) is a strong predictor of cardiovascular mortality in hemodialysis patients. Although several parameters of preload and afterload have been associated with higher LV mass, whether these parameters independently predict LV mass remains unclear.

Design, setting, participants, and measurements: This study examined 391 adult incident hemodialysis cohort enrolled in the Predictors of Arrhythmic and Cardiovascular Risk in End Stage Renal Disease (PACE) study designed to study arrhythmic and cardiovascular risk. The main exposures were systolic and diastolic blood pressure (BP), pulse pressure, arterial stiffness by pulse wave velocity (PWV), volume status estimated by pulmonary pressures using

echocardiogram and intradialytic weight gain. Predialytic and interdialytic BP measurements were reported by the dialysis units and analyzed as the 3-month average value prior to the study visit and the measurement closest to the visit. The primary outcome was baseline left ventricular mass index (LVMI).

Results: All systolic, diastolic blood, and pulse pressure measurements were significantly associated with LVMI by linear regression regardless of predialysis or interdialytic measurements. Adjusting for cardiovascular confounders, every 10mmHg higher systolic or diastolic BP was significantly associated with higher LVMI (SBP β=7.59, 95% CI: 4.70,10.48; DBP β=10.05, 95% CI: 5.07,15.03), and pulse pressure was also associated with higher LVMI (β=0.79, 95% CI: 0.38,1.19). Intradialytic weight was also associated with higher LVMI but attenuated effects after adjustment (β =3.25, 95% CI: 0.64,5.82). PWV and pulmonary pressures were not associated with LVMI after multivariate adjustment (β=0.48, 95% CI: -1.14,2.09;and β=-0.01, 95% CI: -0.63,0.61, respectively).

Conclusions: Higher systolic, diastolic, or pulse pressure, regardless of timing with dialysis, is associated with higher LV mass. These results suggest that afterload reduction may be particularly important in preventing higher LV mass in incident hemodialysis.

Brandy Lewis

My project with the pharmaceutical policy team at the Centre for Health Services Policy Research (CHSPR) at the University of British Columbia investigated disparities in seniors' risk of exposure to potentially inappropriate prescription drugs by sex and gender, ethnicity, and socioeconomic status. Through my experience as a summer student, I had the opportunity to put content introduced in coursework directly into practice. My knowledge of applied epidemiologic methodologies was substantially expanded upon following the process of conceptualizing a research question and sequentially leading the project through stages of development, including devising an analytic plan. My placement at CHSPR was unique as I had the opportunity to incorporate health services research frameworks and sex and gender based analysis theory as a complement to traditional epidemiologic approaches.

Tahmina Nasserie

Location: The Child Maltreatment team within the Surveillance and Epidemiology division at the Public Health Agency of Canada (PHAC).

The main purpose of my practicum was to examine how child functioning issues cluster amongst cases investigated for maltreatment or risk of maltreatment as part of the 2008 cycle of the Canadian Incidence Study of Reported Child Abuse and Neglect (CIS-2008).
The data used in this study were collected by child welfare workers in the thirteen Canadian provinces and territories. Data were collected on a wide range of variables, including 18 child functioning concerns. Principle component analysis was used to identify constructs within the 18 child functioning items. This analysis found that principal component analysis was

most suitable for 7-15 year olds and identified four principal components for this age category. The results of this analysis may be used to categorize child functioning variables in proceeding cycles of the CIS. This would allow for child welfare workers to complete *CIS Maltreatment Assessment: Child Assessment Form* more efficiently, which could allow for a longer sampling period and an increase in response rates. This analysis provides insight on how to conceptualize child functioning variables when conducting secondary analyses of CIS data. This may improve the reliability and validity of analyses conducted in future studies and allow for comparisons between studies. This analysis is also useful for healthcare professionals who provide services to children who are abused or neglected. An understanding of how functioning issues cluster could indicate to healthcare professionals that a child may be experiencing several related symptoms. Finally, policy-makers, funders and program managers who are involved in developing prevention or treatment programs would benefit by understanding which child functioning concerns may cluster together and how to design programs to address multiple health needs for children who are maltreated or at risk of being maltreated.

Deepit Bhatia

Objectives: To examine whether implementation of painted cycle lanes in the downtown core of Toronto, Canada is associated with a reduction in cyclemotor vehicle collisions.
Methods: A quasi-experimental design was used to evaluate frequency of bicycle/motor-vehicle collisions pre- and post-installation of seven cycle lanes in Toronto, Canada. Study data was obtained from Toronto Police Service reports for collisions occurring between 1991 and 2010. A zero inflated Poisson model was used to determine the effect of cycle lane installation on CMVC frequency.
Results: Over the study period (January 1, 1991 to December 31, 2010), a total of 23,959 collisions between cyclists and motor vehicles were reported in Toronto. Of these collisions, 329 occurred on the 7 lane segments included in this analysis. The regression analyses did not show a significant increase in CMVCs after the installation of cycle lanes on the included lane segment. There was a 19% reduction in the frequency of collisions per segment-month (IRR = 0.81, 95% CI: 0.65, 1.01). There was no increase in the frequency of collisions that resulted in minimal/minor injuries (IRR = 0.84, 95% CI: 0.59, 1.20) or in major/fatal injuries (IRR = 0.72, 95% CI: 0.51, 1.01).
Discussion: One strength of this study was in its design – we were able to use publicly available data and control for known and unknown confounders by using pre--post methodology. Furthermore, by restricting our dataset and matching by year, we were able to mitigate the effect of the secular trend in cycling. One limitation, common amongst cycling studies, was the lack of exposure data. Our estimate was conservative due to the increase in cycling and use of bike lanes in Toronto.
Conclusion: Cycle lanes show a modest effect in reducing collisions between cyclists and motor vehicles. We recommend their use as they promote cycling, reduce congestion, and appear to be safer than cycling with motor vehicle traffic. Further research is needed on intersection treatments, cycle tracks, and bike volumes.

Laera Gattoni

I thoroughly enjoyed my experience at PHO. I was provided with the opportunity to learn and use data skills I previously did not possess in addition to having an extremely strong study team who provided wonderful feedback and guidance. The study team itself did not only included individuals from one department or team, but was truly multidisciplinary, including those from other departments and specialties. In addition to being able to focus on all aspects of a specific data heavy project, I was also given (and took advantage of) many opportunities to learn more about PHO and other groups within the organization including webinars, weekly rounds, journal club, and mandatory PHO training and presentations. I experienced a true and complete exposure to operations at PHO, which emphasized its importance and contribution to the public health sector. Even though, within the organization, there are many different fields of study, initiatives, disciplines, and manners on research conduct, it was extremely impactful to experience how they all contribute to one organization with the health of Ontarians, communities within Ontario, and Canadians as a central focus.

Qi Jing Sun

I have completed my epidemiology practicum at Women's College Hospital, resided in the city of Toronto during the summer of 2014. I worked with Dr. Mohammad R. Akbari in the Breast Cancer Research Group. The primary objective of this research-based project was to design an analysis pipeline and execute the data preprocessing and quality control assessments for Illumina's Infinium HumanMethylation450 data. This practicum were comprised of three main areas of activities: conducting a comprehensive literature review on epigenome-wide association studies, developing an analysis pipeline for Infinium 450K methylation data, and executing the DNA methylation data analysis plan. In addition to gaining the valuable practical experience analyzing population-level data and statistics, it was through this project that I was offered a novel perspective on the role of genetics in public health. Overall, I have found the placement to be a truly rewarding experience, and I would encourage other students with an interest in genetic epidemiology to apply for the practicum program.

Russanthy Velummailum

My practicum took place at the Institute for Clinical and Evaluative Sciences, with the CANHEART research team. My project incorporated data analysis of self-reported data from the Canadian Community Health Survey, Public Use Microfile, 2011-2012 cycle. The purpose of this paper is to study the interprovincial variation in ideal cardiovascular health across Canada, which will have important implications for health policy and planning in terms of health care resource allocation. We will also determine the proportion and geographic distribution of the prevalence of certain cardiovascular health risk factors. This study also aimed to create a multivariable model to predict ideal cardiovascular health. Additionally, we are interested in studying which regions are managing cardiovascular risk factors better.

James Wilton

I undertook a 3 month practicum in the HIV/STI unit at the British Columbia Center for Disease Control (BCCDC). During my time at the BCCDC I worked on two projects. The first project was a quality assessment of data from HIV case report forms. CRFs are completed as part of the public health follow-up of new HIV diagnoses and are an important component of HIV surveillance. The data quality assessment was used to make recommendations to a provincial working with regards to how the CRF could be revised to improve data quality. The second project investigated the impact of a new type of HIV testing technology (implemented in Vancouver in 2009) on the identification of acute HIV infections. This new test, also known as pooled NAAT, has a shorter window period and can detect HIV earlier after infection. More specifically, I analyzed several datasets to understand whether social marketing campaigns implemented at the same time as the new test were able to increase awareness of the test and motivate more informed testing behaviours. Overall, this practicum was very successful and gave me experience working in both a research and surveillance environment.

Aimee Huynh

I completed my first practicum at the Centre for Global Child Health (C-GCH), which is dedicated to improving the lives of children and their families in resource-poor environments through research, capacity building, advocacy, and policy. I worked with the centre's research team and completed an evidence review and program analysis of mass food fortification efforts in low and middle-income countries. I learned how to carry out a systematic review using reproducible methods, completed in duplicate. I created a comprehensive search strategy, applied the search to various databases, carefully screened the potential studies, extracted data, performed quality assessment, and carried out meta-analyses and a subgroup analysis. Furthermore, I had the opportunity to present my work to the rest of the team at C-GCH and make use of their useful feedback. Not only did I gain useful methodological and analysis skills through this experience, I was able to learn a great deal about an effective public health approach to improving the nutrient status of those living in low and middle-income countries. I am happy to say that I have been invited back by the C-GCH to continue working on this project throughout the fall. I strongly believe that this project can have a great impact in the field global health nutrition and look forward to seeing it through.

Emily Keats

My 16-week practicum at the Centre for Global Child Health (C-GCH) provided me with an invaluable learning experience that effectively supplemented all that I learned throughout my first year as an MPH student. Many skills were put into practice, including how to develop and conduct extensive literature searches, screen results and abstract data, critically appraise articles, and analyze data through meta-analysis. I now have a solid understanding of systematic review

methodology. Even more important than the methodological skills that I was able to fine-tune, was the experience that I gained by working with such a diverse and seasoned group of people. Attending the weekly research rounds opened my eyes to public health in a real-world setting, and allowed me the opportunity to grasp the positive impact that research and practice can have on vulnerable populations. My supervisor in particular, Dr. Zulfiqar Bhutta, is a major player in the global field of nutrition as it relates to maternal and child health. Having the opportunity to work closely with Dr. Bhutta both inspired me, and taught me a great deal. My practicum experience overall was a great one, and I would recommend C-GCH to any future MPH students.

Andrew Lam

Choosing the Northern Inter-Tribal Health Authority for my first practicum was one of the smartest decisions that I made. During the four months here, I was involved in many aspects of public health practice by attending interviews, meetings and conferences, and through the projects I completed. I revised the health status report, completed a literature review for communicable disease (CD) surveillance systems, created and piloted a questionnaire, evaluated the CD program, and contributed to a TB investigation. The exposure to public health practice at NITHA has been a rewarding experience for my professional development and career.