Summer 2019 Practicum Abstracts – MPH Epidemiology

S.L.
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OBJECTIVE: To comprehensively assess whether children with postnatal cytomegalovirus (CMV) infection develop long-term neurologic and/or cognitive sequelae in later childhood.
METHODS: Using population-based longitudinal data from the Avon Longitudinal Study of Parents and Children (ALSPAC) cohort, we employed modified Poisson regression to assess the relationship between postnatal CMV infection and adverse neurocognitive outcomes in children. Serological measurements of CMV infection were obtained at 7 years (n=4,988), and using this data we classified children as either 'positive' or 'negative' for CMV based on a predetermined cut-off. Suboptimal neurological and cognitive developmental outcomes were compared between CMV-positive and CMV-negative children using the Wechsler Intelligence Scale for Children (WISC) at 8 years; the Wechsler Objective Language Dimensions (WOLD) at 8 years; the Test of Everyday Attention for Children (TEA-Ch) at 8 and 11 years; the Neale Analysis of Reading Ability (NARA) at 9 years; the Counting Span Task for working memory at 10 years; and the Wechsler Abbreviated Scale of Intelligence (WASI) at 15 years.
RESULTS: With adjustment for confounding variables, it was found that postnatal CMV infection was associated with impairment in total IQ (measured by WISC at 8 years) (IRR=2.50, 95% CI 1.35-4.62); selective attention, ability to divide attention, and attentional control (all measured by TEA-Ch at 8 years) (IRR=1.48, 95% CI 1.01-2.15; IRR=1.74, 95% CI 1.09-2.77; IRR=1.71, 95% CI 1.15-2.55, respectively); as well as reading comprehension (measured by NARA at 9 years) (IRR=1.93, 95% CI 1.12-3.33). A secondary sex-stratified analysis also revealed a differential effect of CMV infection on the various neurocognitive outcomes between males and females.
CONCLUSIONS: In this large-scale prospective cohort, our results provide evidence for adverse neurocognitive effects of postnatal CMV infection, particularly within the cognitive domains of intelligence, attention, and reading. We also found evidence suggesting that sex has influence on this relationship. If confirmed, these results support the implementation of preventative measures to combat postnatal CMV infection.

J. V.

Institute for Mental Health Policy Research

Project description. The historical and ongoing legacy of colonization has left a lasting impact on Indigenous communities in Canada, resulting in widespread social and health inequities. Relative to non-Indigenous Canadians, Indigenous peoples are met with a disproportionate burden of mental health challenges, which is often coupled with co-occurring substance use and violence-related issues. The Centre for Addiction and Mental Health has partnered with five First Nation communities in Southwest Ontario to work towards the collection of local community data on mental health, substance use and violence-related challenges to develop and implement mental wellness strategies that prioritize community strengths and resiliency (as opposed to vulnerability).

Key activities. As a practicum student, I contributed to the latter phases of the project with respect to one First Nation community. Some of my contributions are as follows:

1. **Knowledge translation and exchange** – revised a research report based on suggestions from the community, co-facilitated an online voting process for community members to identify a strategic area of focus within mental health to guide participatory action research (and strategy development), and communicated findings to the community based on exploratory quantitative analyses (and interpreted statistical outputs)
2. **Scoping review** on Indigenous community-wide mental wellness strategies that have been evaluated – conducted thematic analysis of extracted data and prepared an initial draft manuscript for potential journal publication
3. **Statistical analyses** – performed categorical and logistic regression analyses on survey data from the community to elucidate relationships between substance use and relevant variables using SPSS

Lessons learned. I gained an invaluable opportunity to assist in the facilitation of community-based participatory research in a First Nation community, and learned first-hand about the importance of collaboration and mutual learning. As an epidemiology student working on community-based research, I've learnt that it is important to decolonize quantitative analytic approaches (as is the case with the actual conduct of research) through effective knowledge translation.

J. N.

OCI, The Princess Margaret Cancer Centre (UHN)

This practicum is offered by Geoffrey Liu Lab (COMBIEL) at Princess Margaret Cancer Centre, co-supervised by Dr. Geoffrey Liu and Dr. Wei Xu. During the practicum, I have worked on multiple projects with multiple medical students and residents, by providing expertise in study design, data wrangling, and statistical methodologies under the guidance of the practicum supervisors. Projects analyzed cancer patient data from PMCC, and attempted to answer regarding treatment toxicities prevalence, predictors for adverse outcomes, and quality of life for cancer patients. The practicum allowed me to greatly develop my quantitative skills, specifically data visualization, model building (linear, logistic, GEE), correlational analysis, and statistical assumptions and theories.
Apart from developing quantitative skills, one of the most valuable experiences from the practicum was to work in a team environment with experts from various disciplines. The ability to clearly communicate ideas and needs between medical experts and epidemiologists was a very crucial skill in this practicum. I have found this practicum experience to be very intellectually stimulating as I often find myself researching better statistical methods, looking for biases in studies and our current data, and asking new research questions. Through the projects, we hope to identify the current burdens of toxicities, identify patients at high risk, help better manage patient symptoms, and facilitate evidence-based decision making in oncology.

A.C.M.
Ontario Tobacco Research Unit

My practicum took place at the Ontario Tobacco Research Unit (OTRU) which is jointly sponsored by the Dalla Lana School of Public Health and The Centre for Addiction and Mental Health. Although OTRU's original focus was in tobacco control research, they have expanded their purview to e-cigarette and cannabis research as well. During my practicum my main responsibility was to examine e-cigarette use among Canadian youth and young adults. My primary project assessed what factors were associated with perceived addiction to vaping among youth and young adult regular e-cigarette users. In this position, I was able to utilize and improve upon several core competencies of the epidemiology

program. Specifically, I had to understand and describe current public health legislation in regard to e-cigarettes, evaluate the strengths and weaknesses of the data that was available to me, manipulate that data in a statistical software package (SAS), use statistical methods to conduct multivariable hypothesis testing on that data and lead the authorship of a manuscript arising from my analysis. Using the same data set, as well as the longitudinal data from the same sample, I will continue to explore e-cigarette-related behaviors among Canadian youth and young adults. In addition to leading authorship on multiple manuscripts, I was also able to observe and participate in various other aspects of the research process, making for an incredibly well-rounded experience.

A.G.

The Applied Research Group for Kids (TARGet Kids!)

Viral upper respiratory tract infections (URTI) are the most common infectious disease in North America. URTI is the most common reason for emergency department visits and unscheduled outpatient visits in Canada comprising 10% of emergency department visits for children under 10 years of age. Influenza, RSV and adenovirus, which collectively comprise 25% of respiratory infections in children, are the most common viruses that lead to illness, acute otitis media, outpatient visits and hospitalization. Several groups have estimated the direct and indirect costs of URTI in preschoolers to be between $261 and $276 per URTI with influenza being the costliest virus, contributing $809 per URTI. The objective of our study was to evaluate the association between laboratory diagnosed URTI viral type in children and the parent reported symptom severity in a randomized control trial on a population of generally healthy children using a generalized linear mixed effects model. The URTI viral types tested for in the laboratory were Adenovirus, Coronavirus, Enterovirus/ Rhinovirus, Influenza A, Parainfluenza virus, Metapneumovirus and Respiratory Syncytial Virus (RSV).750 children were included in the study and recruited from The Applied Research Group for Kids (TARGet Kids!). Our preliminary results suggest that there is an association between URTI viral type that a child is exposed to, and the parent reported symptom severity. Children with Adenovirus had the greatest difference in parent reported symptom severity. It was estimated that children with an Adenovirus have 1.48 times as many symptoms as the average child with a virus other than Adenovirus after adjusting for correlation within subjects. This is one of the first longitudinal cohort study examining relationship between URTI viral type and symptom severity. The findings contribute to our understanding of URTIs in children.

A.M.

University of Toronto Scarborough/ICES central

The primary purpose of this practicum was to investigate the relationship between chronic medical conditions and severe perinatal mental illness among migrants in a population-based cohort study using health administrative. As a secondary project, I also assisted with the screening, data abstraction, and meta-analysis for a systematic review assessing the literature on the association between pre-pregnancy multimorbidity and maternal outcomes. The practicum was supervised by Dr. Hilary Brown, an assistant professor and researcher at the Interdisciplinary Centre for Health and Society at the University of Toronto Scarborough with affiliations with the Dalla Lana School of Public Health, Women's College

Research Institute at Women's College Hospital, and ICES (formerly known as the Institute for Clinical Evaluative Sciences). The work for the primary objective was largely completed at ICES at Sunnybrook Health Sciences Centre. While this work was primarily independent, I met with Dr. Brown regularly to receive feedback on my progress and overcome any challenges that I could not handle on my own. The analysis was performed using SAS Enterprise Guide at the ICES facilities. The final product of this project was a manuscript detailing the methods and findings of our research and will be submitted to an academic journal for publication. The systematic review was primarily completed at Dr. Brown's offices at the Interdisciplinary Centre for Health and Society at the University of Toronto Scarborough. My work on this project consisted of title and abstract screening of search results, data extraction, and meta-analysis. Dr. Brown held monthly meetings throughout the practicum with other students and post-doctoral fellows on her team where we had the opportunity to present our own research and discuss current topics in maternal health.

D.M.

Peel Public Health

How and Whether to Use the Population Prevented Fraction in a Regional Public Health Unit. Introduction - The population prevented fraction (PPF) indicates the total potential disease load that is prevented by a protective behaviour, such as wearing a helmet to avoid head injuries. It tells a good news story about how a population is looking after its own health. A public health unit in Ontario was interested in this measure as they realised that they could report on risk factors yet could not due so for beneficial factors. Whether the PPF could be used in a regional population health assessment group was the question. Method - A literature review was conducted to determine the current uses of the PPF and to find methodological papers, through Medline, Embase and hand-searching. A total of 16 articles were chosen that demonstrated how best to use the PPF. The regional-version of the Canadian Community Health Survey was analysed to determine the prevalence of an exposure, and several Ontario databases were used, such as the Coronary Mortality data set, to find the counts of outcomes. Two full examples were developed. Results - The main formula for PPF is Pe * (1 –RR), with Pe being the prevalence of exposure and RR being the relative risk. Where there is a concern about confounding, it is invalid to add an adjusted RR and another formula must be used. Instead of Pe, Pe|D must be used, which is the prevalence of the exposure in those who are diseased, etc. Since RRs are almost always adjusted, this was a problem for a regional public health unit because their data sources did not include the Pe|D, since data sources available include only counts and cross-sectional surveys. Discussion - This project was more nuanced than it first appeared because of the pitfalls and limitations in using the PPF. Careful consideration should be given before using the PPF. In particular, how certain is the relative risk and is there a true protective link, rather than being simply statistically associated? What is the role of confounding in the relative risk? The PPF should only be calculated when there is true certainty. It is a very good formula that tells good news about a population and tells powerful statements. Epidemiologists should look for opportunities to use it.

M.E.

Public Health Agency of Canada

My practicum placement was with the Public Health Agency of Canada. This is a federal government agency that aims to improve the health of Canadians. While coordinating with other organizations, the agency focuses on preventing disease and injuries, promoting a healthy physical and mental lifestyle, and supporting informed decision making. Other roles of the agency include preparing for and responding to public health emergencies, applying international research to the development of public health programs, forming and reforming public health policies and delineating recommendations on health issues for health professionals. I was assigned to the Domestic and International Zoonoses Technical team from the Centre for Food-borne, Environmental and Zoonotic Infectious Diseases. Our team is responsible for covering all zoonotic infectious diseases/events internationally and domestically. Majority of this team's work encompasses investigating travel-related cases, as much of the harsh Canadian climate does not permit for the persistence of many of the zoonotic infections. During my time here I was involved on a variety of projects where I gained a diverse set of skills. Apart from regular weekly check-in meetings with my team, I also took part in weekly technical meetings where new and monitoring international zoonotic infectious diseases and events were discussed. For the majority of my placement I worked on assessing the quality of provincial laboratory data for the Retro Three project, a project that aims to launch a national surveillance-based system for select zoonotic pathogens that currently aren't nationally notifiable. I have also worked on a second project that plans to publish a report that discusses the Zika post-peak outbreak period. I have worked on analyzing data in SAS and formulating questions for both these projects which has allowed me to gain a range of skills and knowledge on variety of topics. In addition, it has fostered an interest for me international infectious diseases.

S.P.

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

I completed my practicum 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 main projects: a systematic review and the development of a surveillance knowledge product. The first project was a systematic review to identify studies that have validated health administrative database algorithms for autism spectrum disorder (ASD), attention deficit disorder with/without hyperactivity (ADHD), and fetal alcohol spectrum disorder (FASD). During my work on this project, I drafted the protocol and the application to register the protocol with PROSPERO, as well as collaborated with library services to develop the search strategy. I also performed level one and two screening of search results to determine study inclusion in the review, developed and populated data extraction tables, and drafted a methods section for the final paper. I will continue to be involved in the completion of this systematic review through publication. The second project was the development of a surveillance knowledge product on

developmental disorders based on Statistics Canada's 2017 Canadian Survey on Disability. For this project, I completed a research proposal to gain access to Statistics Canada's Federal Data Research Centre (FRDC), including a detailed analytical plan. I wrote and ran SAS code for use in Statistics Canada's Real Time Remote Assess (RTRA) program and the FRDC. I also presented these outputs in the form of tables and summarized the results to be included in an infographic. Finally, I contributed to the draft of the publication concept approval and created a mock-up of the infographic. The skills and experience that I have gained through my practicum with PHAC will be valuable as I complete my degree this fall and has provided me with practical career skills.

Y.Y.M.

Public Health Ontario

Introduction: For Canadians, the average sodium intake is 3400 mg per day which is much over the 2300 mg upper recommended limit. Although sodium is a necessary nutrient for the maintenance of physiological functions, excess sodium can contribute to high blood pressure and increases the risk of heart disease and stroke. Food reformulation has been identified by the World Health Organization as an effective solution to reduce sodium intake as the main source of sodium in many countries is processed foods. Despite numerous countries around the world utilizing food reformulation to reduce population sodium intake, Canada has not implemented a strategy since its previous one which ended in 2016. Objectives: Determine the effectiveness of other policies by modelling these strategies on the Canadian population and investigating how much the sodium intake of Canadians would change. Secondly, determine if any of these population-level interventions would create social inequities. Methods: The 2015 Canadian Community Health Survey – Nutrition was used as the data source to model the sodium reduction targets set by the UK and US. The study sample included males and females 19 years and over with complete dietary and covariate information who were not pregnant or breastfeeding (N=13519). Descriptive statistics and multilinear regression, with socioeconomic position (income, education and food security) as the focal association, was analyzed. Age, sex, misreporting and energy were controlled for where possible. Results: Mean sodium intake was lowered the most by the UK targets (-12.1%), followed by the Canadian targets (-4.6%) while the US targets increased sodium compared to baseline (+5.1%). At baseline, there appeared to be some social gradients in sodium intake where those with lower education consumed more sodium (less than high school: p=0.0006, completed high school: p=0.0214). Targets impacted males more than females and did not appear to create social inequities. Conclusion: Canada can greatly improve upon their previous sodium reduction strategy to meet the upper recommended sodium limit. Components from the UK strategy can be adopted to further reduce sodium.