

Summer 2015 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 2015 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.

Yamna Ali

Autism spectrum disorder (ASD) encompasses a range of neurodevelopmental conditions that affect more than 1% of the population. Low vitamin D levels have been hypothesized to be one factor associated with ASD. Multiple cross-sectional studies in different populations have demonstrated an association between serum 25-hydroxyvitamin D levels and ASD. However, these studies have not satisfied temporality, a criteria to infer causality. The objectives of our study was to evaluate the association between serum 25-hydroxyvitamin D levels and ASD diagnosis as well as vitamin supplementation and ASD in a longitudinal design on a population of healthy, urban, preschool-aged children using multiple logistic regression. 3586 children were included in the study and recruited from The Applied Research Group for Kids (TARGet Kids!), of which 41 had a diagnosis of ASD. Our preliminary results suggest that there may not be an association between serum 25-hydroxyvitamin D levels and ASD or vitamin supplementation or ASD. The longitudinal design satisfies a temporal relationship in which vitamin D measurement occurs before an ASD diagnosis. This is the first analytical study to assess the temporal association of vitamin D in a large cohort. The findings contribute to our understanding of a potentially modifiable risk factor, vitamin D, on ASD. Further research on other proposed risk factors for ASD should be conducted to understand the etiology of ASD.

Laura Feldman

Topic: Secondhand tobacco smoke exposure at age 2 months and food hypersensitivity through adolescence **Background:** Previous studies have demonstrated a link between early-life exposure to secondhand smoke (SHS) and allergen-specific immunoglobulin E (IgE) mediated sensitization to food allergens. However, it is unclear whether this association extends to clinical symptoms following food consumption. The objective of this study was to determine if SHS exposure at age 2 months is associated with food hypersensitivity (FHS) from childhood to adolescence. **Methods:** Data were obtained from the BAMSE birth cohort of 4,089 Swedish children born in 1994–96 and followed to adolescence. SHS exposure at age 2 months was assessed through parental report at the baseline visit. FHS was defined as the presence of parent-reported symptoms to specific food items at ages 1, 2, 4, 8, 12 and 16 years. IgE reactivity was defined as an IgE ≥ 0.35 kU_A/l to fx5[®] – a mix of milk, egg, soy, peanut, wheat and codfish allergens – at ages 4, 8 and 16 years. Specific symptoms and foods resulting in FHS were queried at age 16 years. Odds ratios (OR) and 95% confidence intervals (95%CI) from generalized estimating equations were calculated for the association between SHS exposure at age 2 months and FHS with or without IgE reactivity. Logistic regression models were used to calculate the association between the exposure and specific symptoms and foods reported at age 16 years. Estimates were adjusted for child's sex, parental allergy and socioeconomic status. **Results:** SHS exposure at age 2 months was non-significantly associated with 1.13 times greater odds of FHS (OR 1.13; 95%CI 0.97–1.32) and significantly associated with 1.37 times greater

odds of FHS with IgE reactivity (OR 1.37; 95%CI 1.01–1.84). The exposure was associated with dermatological symptoms with IgE reactivity (OR 1.99; 95%CI 1.10, 3.61) and hypersensitivity to peanut (OR 1.73; OR 1.03, 2.89) at age 16 years.

Conclusions: SHS exposure in the first 2 months of life may increase the odds of FHS with IgE reactivity to age 16 years, including dermatological symptoms, and particularly for hypersensitivity to peanut.

Jodi Gatley

My Summer 2015 practicum for my MPH in Epidemiology degree was with the Northern Medical Program (NMP) at the University of Northern British Columbia (UNBC), in collaboration with the Centre for Addiction and Mental Health (CAMH), during which my focus was epidemiological research on public health harms related to alcohol- and drug-use. I gained valuable experience writing research grant applications to both academic and governmental organizations. My central projects were two research manuscripts on the topics of the impact of Canadian minimum legal drinking age (MLDA) laws on police-reported crimes, including a first-authored manuscript on the effects of MLDA laws on sexual assault incidents. I conducted statistical analyses of crime data for these projects using R statistical software to construct and run regression-discontinuity models, and increased my knowledge in interpreting model results and statistical significance. I participated in two presentations of our lab's research at both an international peer-reviewed academic conference, and to government data holders. During grant and manuscript writing I reviewed scientific and grey literature and critically evaluated sources for background summaries. Furthermore, over the course of this practicum I collaborated with an interdisciplinary team of researchers, clinicians, and knowledge users.

Evgenia (Jenny) Gatov

With the value of self-reported health increasingly recognized, given its relationship with life expectancy, within my summer practicum placement at the Institute for Global Health Equity and Innovation (IGHEI), I explored the socioeconomic determinants of self-evaluations of health globally, using the largest sample and the most comprehensive data to date. Self-reported health (SRH) data were obtained from 116 countries (60% out of 193 member states of the United Nations, with a total sample size of 613,401 individuals) and covariates from 40 national level indices were compiled from a combination of sources. After assembling the dataset, completing data management, and generating a data dictionary and an analysis plan, descriptive analysis was performed, followed by comparisons of included and excluded countries by each covariate to examine sample representativeness. A bivariate analysis in the valid sample then examined the differences between countries reporting mainly good versus bad health. Since data were aggregated, a median and a third-quartile cut-off for the percent of individuals reporting good, very good, or excellent health were used in order to dichotomise countries. Lastly, a multiple logistic regression analysis was conducted to examine the effects of relevant covariates on SRH. These efforts resulted in a written draft for an article to be submitted for a peer review publication, a poster presentation suited for a scientific conference, and a PowerPoint deck to be shared with national and international partners. Additionally, this work will guide the design of a prospective study of a much larger sample of countries, seeking to identify correctable sources of inequity in health, worldwide.

Enkhsaikhan Jigjid

I have completed my 12-week epidemiology optional practicum at the Dalla Lana School of Public Health. I worked with Prof. Andrea A. Cortinois at the Global Health Division, DLSPH. The primary objective of this research-based practicum was to conduct a thematic content analysis of the scientific literature on the use of Information and Communication Technology (ICT) in a family/group psychotherapy. Further, the thematic analysis will be used as a foundation for development of a publication suitable for peer-review. This work was a part of a larger project, which is related to the promotion of mental health and wellbeing of families separated by migration. Overall, I have found the placement to be a truly rewarding experience, and I would encourage other students with an interest in Global Health to apply for the practicum program.

Anam Khan

Introduction: An estimated 277,000 Canadians are potentially exposed to lead in their workplace (CAREX Canada, 2012). The International Agency for Research on Cancer has labeled inorganic lead as a Group 2A carcinogen, indicating it is probably carcinogenic to humans (IARC Working Group on the Evaluation of Carcinogenic Risks to Humans, 2006). Epidemiological evidence is strongest for the cancer sites of lung, bladder, kidney, brain and stomach, but the evidence is inconsistent. This project used the 1991 Census cohort, a large nationally representative Canadian cohort, in order to examine the association between occupational lead exposure and cancer risk in male and female cohorts, while considering a dose response relationship. A secondary objective was to look at the cancer risk in certain occupations of interest in order to contextualize the findings of the primary analysis and comment on the role of concomitant exposures.

Methods: A CARcinogen EXposure (CAREX) Canada job exposure matrix was applied to the 1991 Census cohort in order to assign each individual a lead exposure status and exposure level based on the occupation and industry reported in the census. Risk estimates were calculated using Cox proportional hazards modeling.

Results: A statistically significant elevation in risk was found for various cancer sites in the male cohort including lung, bladder, breast, Mesothelioma and Melanoma. An elevated risk of bladder cancer was found in the female cohort. Although not significant, a suggestive dose response relationship was observed for Myeloma and Non-Hodgkin's Lymphoma, with exposure level, in the male cohort. Increased risk was observed for several occupations and cancer sites.

Conclusion: While there was a statistically significant elevation in risk for various cancers in this study, the role of concomitant exposures couldn't be ruled out as contributing to the increased risk. As such, further studies controlling for co-exposures need to be conducted in order to better elucidate the relationship between lead exposure and cancer.

Garvin Leung

The objectives were 2-fold: (i) to synthesize the literature on Twitter and public health surveillance and (ii.) evaluate the utility of Twitter in Toronto in public health surveillance in mass gatherings. The evidence review showed that Twitter has a potential role in augmenting surveillance of influenza as studies were able to replicate findings across different study periods and settings. However, higher quality evidence was required and a research gap was identified, as no studies looked at Toronto or non-infectious diseases. Tweets for gastrointestinal, respiratory, influenza-like illness, and heat-related illness were collected June 26th-September 10th and were correlated with other surveillance systems (ACES, Telehealth, laboratory data, iPHIS). The interim analyses provided support that Twitter may be useful to augment disease

surveillance, as there were weak statistically significant correlations between Twitter and ACES (gastrointestinal $r=0.33-0.37$, respiratory $r=0.32$) and between Twitter and Telehealth (heart $r=0.33-0.38$) at various time lags. Future analysis may provide more in-depth conclusions and findings will address current literature gap.

Rachel (Katie) MacKenzie

AMPATH (Academic Model Providing Access to Healthcare) is a partnership between the Government of Kenya, the United States Government through USAID (United States Agency for International Development), Moi University, Moi Teaching and Referral Hospital (MTRH) and a consortium of North American academic health centres including the University of Toronto. Not only does the program care for and treat HIV/AIDS patients, but increasingly supports the treatment of chronic illnesses including cancer, cardiovascular disease, diabetes and mental illness and assists in supporting vulnerable populations in Kenya. The purpose of my practicum was to work with data collected through the AMPATH electronic medical record system (AMRS) to identify key indicators and analyze performance and potential areas for improvement at the county and facility level. Additionally, data quality was assessed at the facility level. The main deliverables for this practicum were a set of templates that could be used to update the chosen indicators and easily track performance over time. I was able to collaborate with a cross-cultural interdisciplinary team to improve the accessibility of the data visualizations. The results were presented at a county-wide dissemination meeting for healthcare professionals, a quarterly AMPATH meetings and a local research dissemination presentation.

Saamir Pasha

The Region of Peel assigned two projects to manage for the practicum experience. Both projects required health status data retrieved from Canadian Community Health Survey (CCHS) or hospital discharge summaries. A strong foundation with applying statistical packages was essential for completing the assigned tasks effectively. Working on these projects developed the necessary syntax-writing skills in both STATA and SPSS. The measures included in the results sections were counts, rates (standardized & crude) and regression models. The findings for the hospital discharge project were recorded in a report format. The CCHS project led to the formation of a user manual to assist the Epidemiology team in using the new BMI correction equation syntax. Both projects were presented to the team by either a PowerPoint slide show or poster format. There were ample opportunities to learn from colleagues (i.e. shadowing an Epidemiologist and receiving GIS tutorial from Health Analyst) alongside several interactions with the diverse workforce at Peel Public Health.

Johnna Perdrizet

Background: In epidemiologic studies, the World Health Organization Child Growth Standards (WHO-CGS) are habitually applied to postnatal anthropometric data from infants born at all viable gestational ages (GA) (22-45 weeks). This method fails to account for different postnatal growth rates among infants of varying GA since the WHO-CGS are based on infants born 37-42 weeks GA. We propose strategies using 'corrected age' to address the heterogeneity of GA at birth. Corrected age is used in clinical settings to plot anthropometric measures for children born <37 weeks GA in order to obtain accurate postnatal growth indicators. **Objective:** To compare the magnitude/direction of associations between selected prenatal maternal factors and infant

anthropometric outcomes from the 2004 Pelotas Birth Cohort using different epidemiologic methods to account for GA at birth.

Methods: Epidemiologic methods used included (1) postnatal age corrected for GA at birth, (2) postnatal age without correcting for GA at birth, and (3) GA at birth as a covariate. Regression analyses were performed for each method to estimate unadjusted and adjusted associations between maternal exposures and infant anthropometric outcomes at birth, 3 month, and 12 month follow-ups.

Results: Significant changes in estimates were found when comparing all epidemiologic methods at birth and at 3 month follow-up. Correcting GA compared to not correcting GA caused measures of association to trend toward the null at birth and at 3 month follow-up. Correcting GA produced noticeably different estimates compared to including GA as a covariate in the models at each follow-up. At 12 months, estimates were similar across the methods. An attenuation of the association was found from 3 to 12 months when there was no correction for GA, and when GA was a covariate. There was no attenuation found across follow-ups when correcting GA; estimates remained constant.

Conclusions: Correcting for the heterogeneity of GA when examining associations between prenatal factors and infant anthropometric outcomes significantly change association inferences in infancy. This is an under-recognized methodological problem with significant implications for studies of early-life exposures, child growth, and later health outcomes.

Nabila Hossain Purno

My practicum was a 16-week placement at Women's College Research Institute (WCRI) under the supervision of Dr. Lorraine Lipscombe. My primary objective was to undertake a wide range of research activities focusing on women with gestational diabetes mellitus (GDM). This included developing a full research proposal for a pseudo randomized prospective cohort observational study nested within an ongoing 2x2 factorial RCT and designing a study questionnaire that would be self-administered by the participants of the sub study. My specific research project examined whether awareness of normal postpartum blood glucose status leads to higher postpartum weight retention in women with GDM. A secondary objective was to examine if the hypothesized association varies in women of different ethnicities. We had access to data from a prospective cohort of women with GDM were recruited from Diabetes in Pregnancy clinics across Ontario and followed till 12-24 months postpartum. Data were collected through medical chart review and self-administered surveys during pregnancy, early postpartum, EPP, (3-12 months postpartum) and late postpartum, LPP, (12-24 months postpartum). Exposure was defined as awareness of normal postpartum blood glucose status, measured from self-reported 75g Oral Glucose Tolerance Test (OGTT) results in the EPP questionnaire. Postpartum weight retention was defined as a difference of ≥ 1 kg between self-reported pre-pregnancy weight and current weight reported in the LPP questionnaire. For women with pre-pregnancy BMI ≥ 25 kg/m², postpartum weight retention was adjusted to reflect an additional 5% deduction from pre-pregnancy weight. A multiple logistic regression was used to analyse the data. Ethnicity was also self-reported from the surveys. The preliminary analysis showed that women who were aware of normal blood glucose levels had 19% higher odds of retaining postpartum weight, but this association was not significant at the 95% confidence interval. Odds of postpartum weight retention by exposure status varied among the different ethnic groups; but the interaction was not significant at the 95% confidence interval. Further analysis is required with a larger sample size to conclusively determine if the hypothesized

association between awareness of postpartum blood glucose status and postpartum weight retention exists.

Courtney Rady Smith

As a first year MPH (Epidemiology) student, I undertook my practicum placement at the Public Health Agency of Canada from May 4 to August 21, 2015. During my 16 week placement, I worked within the Centre for Communicable Diseases and Infection Control (CCDIC), in the Community Associated Infections Section. I collaborated with epidemiologists, physicians, nurses, and policy analysts on two main projects. My first project was the statistical analyses of survey data relating to antimicrobial resistance awareness, knowledge, and behaviors among physicians in Canada. I performed analyses in SAS and compiled the data into a formal internal report for senior management. I also presented the results at the CCDIC Speakers Series. My second project was the systematic review of pharmaceutical trials published from 2005-2015, to inform revised guidelines for *Herpes Simplex* treatment in Canada among those with HIV co-infection. The results of the review will be utilized to update the Canadian STI Guidelines. The results have also been written as a manuscript for publication in the Canada Communicable Disease Report. This practicum experience has helped me gain numerous core competencies and epidemiology-related skills, including the ability to: (a) perform advanced statistical analyses in SAS; (b) critically appraise survey methodology; (c) communicate scientific and statistical findings to non-scientific audiences; (d) write internal reports for senior management; (e) perform systematic reviews; (f) critically appraise randomized controlled trials; and (g) synthesize information to develop appropriate and actionable recommendations.

Alanna Mackenzie Smith

Background: Contamination of hospital rooms with *Clostridium difficile* spores plays a key role in the transmission of *C. difficile* infection (CDI). Audit and feedback programs (AFPs) that aim to improve the thoroughness of routine cleaning have been linked to reduced environmental contamination with *C. difficile*, but the clinical implications of these programs are unknown. The purpose of our study was to evaluate the impact of a room cleaning AFP on the incidence of hospital-acquired CDI.

Methods: An AFP based on fluorescent marking of high-touch surfaces was rolled out at St. Michael's Hospital between January-March 2012. A median of five audits were conducted per unit per quarter and cleaning staff received weekly feedback on the audit results. Hospital-acquired CDI cases diagnosed between January 2008 and June 2015 were included in an interrupted time series analysis that tested for a change in the trend of CDI incidence between the pre-intervention (January 2008 to December 2011) and post-intervention (April 2012 to June 2015) periods. The incidence of 'present on admission' (POA) CDI and hand hygiene compliance among healthcare workers were examined as potential confounders.

Results: Between 2012 and 2015, room cleaning thoroughness improved from 49% to 90%. It was determined that hospital-acquired CDI incidence was declining at a rate of 0.59 cases per 100,000 patient days per quarter prior to the intervention. Following intervention implementation, this rate of decline accelerated by an additional 1.35 per 100,000 patient days per quarter ($p < 0.05$), yielding a post-intervention slope of -1.94 cases per 100,000 patient days per quarter. Although the mean incidence of POA CDI was higher during the post-intervention period than during the pre-intervention period, it also exhibited a declining trend during the post-

intervention period. Hand hygiene compliance improved only marginally during the post-intervention period.

Conclusions: The implementation of a room cleaning AFP was temporally associated with a significantly increased downward trend in hospital-acquired CDI incidence. However, some of this decline may have been due to changes in the local epidemiology of CDI or improved hand hygiene. Future research should aim to test the efficacy of such AFPs through the conduct of a cluster randomized controlled trial.

Kandace Ryckman

For my practicum, I worked at The Hospital for Sick Children (Sick Kids) as a member of Dr. Andrew Howard's research team that specializes in injury prevention. At Sick Kids, I worked on two projects. The first was a case-control study on the association between child temperament and fracture in children 3-6 years. Cases were recruited from the Fracture Clinic at Sick Kids and healthy controls were matched from the TARGET Kids cohort study. My second project was another case-control study on whether the proportion of children walking to school predicts the odds of a school having a high historic rate of child pedestrian motor vehicle collisions after adjusting for built and social environment factors. In this position, I was able to build my skills in statistical software, analytic inference and written communication. Additionally, I gained experience in grant writing and attended many workshops for Sick Kids trainees on a wide range of epidemiology and public health topics. I have also been given the opportunity to continue working with Dr. Howard's team this fall on a project using data from the Office of the Chief Coroner for Ontario to review the graduated licensing system (i.e. G1, G2, G) and how it relates to fatalities of young drivers.