

SASKATCHEWAN EPIDEMIOLOGY ASSOCIATION 19TH ANNUAL FALL SYMPOSIUM

Tuesday, October 8, 2019
Travelodge Hotel & Conference Centre
4177 Albert Street, Regina, SK



**A world without Epidemiology:
Learning from our past, looking to the future**

ABSTRACT BOOK

Abstract Number	Title	Page Number
1	The prevalence of catastrophic out of pocket prescription drugs payments in Canada and the implications for Pharmacare	6
2	Surveying Indigenous Cancer Support Priorities in Saskatchewan	7
3	Antimicrobial resistance genes in Enterococci isolated from cattle, poultry and retail meat in Alberta, Canada	8
4	Predictors of Self-Reported Work-Preventing Upper Extremity Symptoms in Canadian Bovine Veterinarians	9
5	HIV/HCV seroprevalence, drugs of choice, and use of harm reduction services among people who inject drugs in Regina, Saskatchewan: Results from the Tracks Survey of determinants of HIV and hepatitis C among people who inject drugs in Canada	10
6	Enhanced Surveillance of <i>Neisseria gonorrhoeae</i> and its Ciprofloxacin Susceptibility Profile through Culture Independent Point-of-Care Testing	11
7	A Whole Genome Sequencing Approach of <i>Chlamydia trachomatis</i> to Ascertain Strain Relatedness and Transmission and the Possible Emergence of Antibiotic Resistance	12
8	Asymptomatic malaria and intestinal parasites co-infection among non-beneficiaries of the national deworming program in Ngie, Northwestern Cameroon	13
9	The First Large-Scale, Comprehensive Analysis of Saskatchewan's Newest STI, <i>Mycoplasma genitalium</i>	14
10	Gen2EpiGUI: A User-friendly Pipeline for Analyzing Whole Genome Sequencing Data for Epidemiological Studies of <i>Neisseria gonorrhoeae</i>	15
11	Farmers' perceptions of exoskeleton devices and their potential to prevent back injuries in Saskatchewan farms	16

12	Population-based evidence on the incidence of inflammatory bowel disease in Saskatchewan from 1999-2016	17
13	Undiagnosed/Untreated Ischemic Heart Disease Fatalities (UIHDF): Canadian Chronic Disease Surveillance System (CCDSS) Estimates for Incidence, Mortality, and Chronic Disease-related Population Attributable Fractions (PAF)	18
14	Prevalence and associated biopsychosocial factors of pregnancy-related back pain within the first 3 months after childbirth in Canada: A population-based cross-sectional study	19
15	Whole Genome Sequencing Reveals Important Features of a Nine-Month Vancomycin-Resistant <i>Enterococcus</i> Outbreak Affecting a Saskatchewan Hospital Ward	20
16	Genotypic Prediction of Antimicrobial Resistance in <i>Neisseria gonorrhoeae</i> : Association of Specific Strain Types, Phylogenetic Clades, and Antimicrobial Susceptibility Phenotypes	21
17	Canadian Mother-Child Cohort (CaMCCo): Prescription drug use during pregnancy and long-term health outcomes in the mother and child	22
18	Epidemiology support benefit: A Southwest Saskatchewan example	23
19	Health Network Geographies for Saskatchewan	24
20	Improving Childhood Immunization Rates in a First Nations Community	25
21	Applying Retrospective Social Network Analysis to an Ongoing Tuberculosis Outbreak in a First Nations Community in Saskatchewan	26
22	Health care utilization differences between First Nations and general population with Inflammatory Bowel Disease in Saskatchewan: A patient-oriented research proposal	27
23	The epidemiological evolution in Saskatchewan	28

24	The association of hypertension with the intake of fruit and vegetable among Canadian adults with an insight into socio demographic characteristics: The Canadian Community Health Survey, 2015	29
25	The Characterization of Successful Multisectoral Partnerships	30
26	Penalized Logistic Regression Methods for Modelling Rare Events Data with Application to WCB Fatality Study in Saskatchewan	31
27	Evidence of health inequity in child survival: spatial and Bayesian network analyses of stillbirth rates in 194 countries	32
28	Long-term child survival trends in Nigeria and forecasting into 2030	33
29	Disentangling pathways of influence for social determinants of childhood mortality in Nigeria: a parametric survival path analysis	34
30	A citizen science approach for adapting mobile ecological momentary assessments to capture prospective physical activity within social and physical contexts: a smart platform study	35
31	Methodology to derive objective screen time from smartphones in the digital age: a smart platform study	36
32	The Current State and Future of Real-World Evidence	37
33	Chronic disease multimorbidity among the Canadian population: Prevalence and associated lifestyle factors	38
34	Developing a Child-to-child health education program for First Nations middle school students in Rural Saskatchewan	39
35	Influence of Sleep Apnea as a Determinants of the Prevalence of Type 2 Diabetes Mellitus: A Complex Survey Analysis among Canadian Adults	40

36	Migraine: Another Health Disparity in Canada	41
37	Physical activity and chronic back disorders: Results from eight cycles of the Canadian Community Health Survey	42
38	Current evidence on prevalence and risk factors of obesity in Canadian adolescents (12-19): The Canadian Community Health Survey 2015	43
39	Physical activity and chronic back disorders in Canadian adults: Analysis of repeated measurements using the National Population Health Survey	44
40	Household Food Insecurity is Associated with Depressive Symptoms in the Canadian Adult Population	45
41	Identifying total bone mineral content risk factor-related food groups with Boosted multivariate tree for longitudinal data: Saskatchewan Bone Mineral Study	46
42	What factors are associated with changes made to improve health? Findings from the Canadian Community Health Survey, 2015-2016	47
43	Rheumatoid arthritis and the associated environmental risk factors for the development of rheumatoid arthritis among Canadian adults: The Canadian Community Health Survey, 2015-2016	48
44	An Environmental Scan of Maternal Mental Health Practices in Saskatchewan: An Update on the Implementation of the Maternal Mental Health Strategy	49

Abstract 1

The prevalence of catastrophic out of pocket prescription drugs payments in Canada and the implications for Pharmacare

Authors: Faith E. Ocran¹, PhD Candidate, Adriana Angarita-Fonseca^{2,3}, PhD Candidate, Haizhen Mou¹, PhD

¹Johnson-Shoyama Graduate School of Public Policy, University of Saskatchewan, Saskatoon, Canada;

²Department of Community Health and Epidemiology, University of Saskatchewan, Saskatoon, Canada;

³Researcher, Programa de Fisioterapia, Facultad de Ciencias de la Salud, Universidad de Santander, Bucaramanga, Colombia.

Background: The regressive effect of out of pocket health care financing mechanism on equity, household financial catastrophe and impoverishment are well documented in the literature. Canada does not have a universal prescription drugs program and around 67% of households are exposed to out of pocket prescription drugs expenditure (OOPDE). Notwithstanding, there is limited evidence regarding the distribution of OOPDE's financial burden in Canada.

Objective: To examine the distribution of the prevalence and intensity of financial catastrophe and impoverishment from OOPDE in Canada by income, age, and province.

Methods: This study used the 2016 Statistics Canada Survey of Household Spending. Catastrophic OOPDE was analysed at several thresholds using a novel budget share – capacity to pay approach. Concentration indices to determine which households overshot their budget shares was also constructed. Canada's official poverty line was used to construct a Pen's parade to show impoverishment from OOPDE.

Results: The working poor group, seniors, Quebec, Atlantic and Prairie provinces residents had a high prevalence and intensity of catastrophic spending. Also, households with lower capacity to pay experienced a higher prevalence of incurring catastrophic spending. The Pen's parade also showed most households that fell below the poverty line as a result of OOPDE were in the lower median income half of the distribution.

Policy implication: Our results showed despite the existing public-private mix of prescription drugs insurance; some households are being drawn into poverty and for some others, poverty is deepened when they make an OOPDE. A targeted insurance program for these groups is needed.

Abstract 2

Surveying Indigenous Cancer Support Priorities in Saskatchewan

Author: Lorena Stringer

Background: Cancer survival rates are also lower amongst Indigenous Canadians than non-Indigenous Canadians. Health professionals speculate that late cancer diagnosis and limited access to screening and support services are some of the main factors contributing to lower survival rate among Indigenous cancer patients. Fortunately, social supports have been found to improve cancer survival rates. Yet, there is little known about whether cancer support services meet the needs of Indigenous peoples.

Aims and Objectives: The purpose of this study is to design and validate a survey tool that will be available for use in other research regarding support needs of Indigenous cancer patients. The primary objective of this research is to develop a survey tool that accurately explores the research question. The survey will be validated using pilot respondent feedback to help improve survey accuracy. This survey will be designed and used primarily to answer the following question: What cancer care supports, or qualities of cancer care supports are of priority to Indigenous people and Indigenous communities in Saskatchewan?

Methods: Qualitative interviews will be used to create a survey to explore Indigenous cancer care supports needs. This project will pilot the survey in an Indigenous Saskatchewan community. Evaluators and survey respondents will be engaged in the process throughout survey development. As a result, this project will yield survey tool that can be used to survey Indigenous communities that will be instrumental in exploring cancer support priorities of Indigenous communities.

Conclusion: The results of this study will benefit Indigenous cancer patients, their families, and their communities. This study could help to inform health professionals and policy makers on the needs of Indigenous cancer supports. The study will also assess cancer care priorities in Saskatchewan Indigenous communities

Abstract 3

Antimicrobial resistance genes in *Enterococci* isolated from cattle, poultry and retail meat in Alberta, Canada

Authors: Rogers, Lindsay (University of Calgary, Department of Ecosystem and Public Health); Zaheer, Rahat (Lethbridge Research and Development Centre, Agriculture and Agri-Food Canada); McAllister, Tim (Lethbridge Research and Development Centre, Agriculture and Agri-Food Canada); Liljebjelke, Karen (University of Calgary, Department of Ecosystem and Public Health); Cork, Susan (University of Calgary, Department of Ecosystem and Public Health); & Checkley, Sylvia (University of Calgary, Department of Ecosystem and Public Health & Alberta Public Laboratories, Alberta Health Services)

Background and Rationale: Antimicrobial resistance (AMR) is an important threat to public health. Epidemiological studies of AMR in bacteria from food animals are improving through the use of evolving technology in bioinformatics and genomics. The objective of this study is to describe the molecular epidemiology and comparative genomics in *Enterococcus faecium* and *Enterococcus faecalis* isolated from feedlot cattle, broiler chickens and retail poultry and beef with respect to their chromosomal genes and mobile genetic elements.

Methods: Surveillance and research on AMR in bacteria isolated from Alberta poultry, cattle and retail meat has resulted in a bank of *E. faecium* and *E. faecalis* isolates. Antimicrobial phenotyping was completed following CLSI guidelines. Whole genome sequencing of isolates will be completed using Illumina MiSeq technology. Bioinformatic analysis of the sequences will follow. Comparison of the isolates' genetic relatedness and AMR genes will be done through phylogenetic trees and BLAST atlases. AMR genotype will be compared to its phenotype.

Results: Initial poultry and retail meat results show that 17.0%-66.7% of total *E. faecalis* or *E. faecium* isolates were multi-drug resistant. The majority of phenotypic resistance is to erythromycin, streptogramin, and doxycycline. After completion of DNA sequencing, it is expected that the AMR genes present will be consistent with the phenotypic profile and phylogenetic analysis will show distinct clades between species from different sample sources.

Public Health Implications: Analysis of genetic relatedness of antimicrobial resistant bacteria from food animals and retail meats provides information regarding potential transmission of genes conferring AMR between different sources which has multiple public health implications. This work helps the production animal industry provide consumers with evidence-based information on AMR in meat production. It also lays a foundation for risk-factor modelling which helps direct policy makers in their consideration of AMR in animal production. Public health is improved through consumer education and risk-factor modelling.

Abstract 4

Predictors of Self-Reported Work-Preventing Upper Extremity Symptoms in Canadian Bovine Veterinarians

Authors: Robyn Reist¹, Brenna Bath^{1,3}, Murray Jelinski², Nathan Erickson², Chris Clark², Catherine Trask¹

¹Canadian Centre for Health and Safety in Agriculture, University of Saskatchewan, Saskatoon, SK, Canada;

²Western College of Veterinary Medicine, University of Saskatchewan, Saskatoon, SK, Canada;

³School of Rehabilitation Science, University of Saskatchewan, Saskatoon, SK, Canada.

Background and Rationale: Large animal veterinarians around the world have reported high rates of upper-limb pain, but the contributors are not clear. This study aimed to identify potential predictors of work-preventing upper extremity symptoms in bovine veterinarians working in Western Canada.

Methods: Multiple logistic regression was performed on data obtained from a cross-sectional postal survey that included data on 116 members of the Western Canadian Association of Bovine Practitioners, using a dependent variable of upper-limb symptoms that prevented the veterinarian from doing normal work in the past 12 months. Independent variables focused on personal and work characteristics of the participants. Hosmer-Lemeshow goodness-of-fit and significance ($p < 0.05$) testing were used to select the final model.

Results: Height (continuous by cm, OR 0.93 [0.87-0.99]), number of other veterinarians in the practice (incremental by 1, OR 1.32 [1.05-1.66]), and practice type (mixed animal vs. primarily bovine, OR 3.20 [0.96-10.64]) were the predictors retained in the final model. No interactions were observed. Height was collinear with sex but chosen for the final model due to higher significance.

Public Health Implications: Veterinarians of shorter stature and those who have more practice colleagues had higher odds of reporting work-preventing symptoms. Many tasks involving large animals are extremely physical, and having coworkers may make it more practical to take time off for rest or recovery (i.e. 'work prevention'). It was surprising that mixed animal practitioners had higher odds of symptoms, but this may speak to a healthy worker effect. As the majority of new veterinarians and students in North America are female (thus smaller statured), it is imperative that the causes and prevention of common veterinarian musculoskeletal symptoms be studied.

Abstract 5

HIV/HCV seroprevalence, drugs of choice, and use of harm reduction services among people who inject drugs in Regina, Saskatchewan: Results from the Tracks Survey of determinants of HIV and hepatitis C among people who inject drugs in Canada

Authors: Trecker, Molly¹; Lloyd, Kathy¹; Hennink, Maurice¹

¹Population and Public Health Services—Regina, Saskatchewan Health Authority

Background and Rationale: As part of its coordination of the federal response to HIV/AIDS in Canada, the Public Health Agency of Canada (PHAC) coordinates bio-behavioural surveillance to monitor HIV and hepatitis C prevalence and associated risk behaviours among people who inject drugs. This is accomplished through periodic, cross-sectional surveys at sentinel sites across the country. We present here results of the phase 4 (2018) Tracks Survey of determinants of HIV and hepatitis C among people who inject drugs in Canada, along with comparisons to selected phase 3 (2010) results, from Regina.

Methods: Participants were recruited at four venues offering harm-reduction services in Regina. Surveys were administered interview-style, and dried blood spot (DBS) sampling was used to estimate the seroprevalence of HIV and HCV among participants. Participation is voluntary, anonymous, and requires informed consent.

Results: 205 participants were recruited and interviewed, and 202 DBS samples collected. 59.0% of participants identified as male, and the mean age was 41.7 years (SD=10.3 years). Statistically significant ($p<0.05$) increases in the injection of several substances were observed, with methamphetamine having the largest increase since 2010 (60.6% more people reporting use in 2018, $p<0.0001$). Recent (past 12 months) testing for HIV was less common in the 2018 cohort (55.8%) than the 2010 cohort (67.5%) ($p=0.01$), and HIV seroprevalence increased from 8.4% in 2010 ($n=250$) to 16.0% in 2018 ($n=200$) ($p=0.01$). HCV seroprevalence remained stable between the two time periods. Over two-thirds (69.8%) of respondents said they would use a supervised consumption site if one were available.

Public Health Implications: Saskatchewan's rates of HIV and HCV remain well above the national average, and injection drug use is the most important driver of transmission in the province. Better understanding of the prevalence of HIV and HCV, risk behaviours, HIV and HCV testing behaviour, and access to/usage of harm reduction services is critical to implementing effective prevention and control programming.

Abstract 6

Enhanced Surveillance of *Neisseria gonorrhoeae* and its Ciprofloxacin Susceptibility Profile through Culture Independent Point-of-Care Testing

Authors: Perera, Sumudu R^{1,2}, Mitzel, Kristen M^{1,2}, Hennink, Maurice³, Lloyd, Kathy³, Trecker, Molly³, Martin, Irene⁴, Parmar, Nidhi R^{1,2}, and Dillon, Jo-Anne R^{1,2}

¹Department of Biochemistry Microbiology and Immunology;

²Vaccine and Infectious Disease Organization – International Vaccine Centre, University of Saskatchewan;

³Saskatchewan Health Authority, Saskatoon SK, Canada;

⁴National Microbiology Laboratory, Streptococcus and STI Unit, Public Health Agency of Canada, Winnipeg MB, Canada.

Background and Rationale: *Neisseria gonorrhoeae* (Ng) remains an important public health concern, with 86.9 million new infections worldwide. Identification of Ng in Canada is primarily accomplished by nucleic acid amplification tests, which do not perform antimicrobial susceptibility testing. The WHO recommends discontinuing antibiotics when resistance occurs in >5% of isolates. While ciprofloxacin is no longer recommended for Ng in Canada, in local communities, gonococcal isolates can remain ciprofloxacin susceptible. Nonetheless, susceptible isolates must be identified prior to treatment with ciprofloxacin. Thus, there is an urgent need for tests that can identify those infected with ciprofloxacin susceptible Ng isolates.

Methods: A fluorescent-dye based multiplex Real-Time PCR assay was designed for the simultaneous identification of Ng and its ciprofloxacin susceptibility status. The test was evaluated first using genomic DNA from 254 Ng isolates and 23 non-Ng species. In addition, 301 Ng positive and 30 Ng negative remnant Aptima urine specimens were tested. The RT-PCR results from 83 specimens with the highest DNA concentrations were compared with their DNA sequences to determine ciprofloxacin resistance markers (i.e. *gyrA*). Finally, this test evaluated DNA extracted from 20 Ng positive and negative urines.

Results: The primers detected Ng and its ciprofloxacin susceptibility status with over 99% sensitivity and specificity using DNA from cultures. From 83 remnant Aptima urine specimens, 72% Ng positive specimens were correctly identified, and from those 92% were correctly identified as ciprofloxacin susceptible and 56% as resistant. With DNA from urines, 80% sensitivity and specificity was observed, where 16 specimens were ciprofloxacin susceptible.

Public Health Implications: We developed a novel test that can simultaneously identify Ng and its ciprofloxacin susceptibility status. This assay has the potential to be an inexpensive and rapid point-of-care test for Ng diagnosis, and facilitate the treatment of patients with ciprofloxacin susceptible Ng infections, thereby preserving last resort antimicrobials.

Abstract 7

A Whole Genome Sequencing Approach of *Chlamydia trachomatis* to Ascertain Strain Relatedness and Transmission and the Possible Emergence of Antibiotic Resistance

Authors: Mitzel, Kristen M.^{1,2}, Parmar, Nidhi R.^{1,2}, Hennink, Maurice³, Lloyd, Kathy³, Trecker, Molly³, and Dillon, Jo-Anne R.^{1,2}

¹Department of Biochemistry, Microbiology and Immunology, University of Saskatchewan, Saskatoon, SK;

²Vaccine and Infectious Disease Organization – International Vaccine Center, University of Saskatchewan, Saskatoon SK;

³Saskatchewan Health Authority, Saskatoon, SK.

Background and Rationale: *Chlamydia trachomatis* (Ct) is an obligate intracellular bacterium that infects humans causing the sexually transmitted infection (STI) chlamydia. Chlamydia is the most prevalent STI in Saskatchewan and globally. Nucleic acid amplification tests (NAATs) are used to diagnose Ct infections but they cannot provide data on strain relatedness or transmission. Therefore, there is a deficiency in information on crucial topics including comprehensive Ct transmission patterns and evolving antimicrobial resistance. Whole genome sequencing (WGS) can provide information on all these topics. In the present preliminary study, we extracted DNA from Ct positive urine specimens and analyzed the DNA for Ct genome copy number prior to WGS.

Methods: 21 Ct+ urine specimens were obtained from the Saskatchewan Health Authority (Regina). The cells were concentrated from 10 mL of urine by centrifugation for 10 minutes at 12,000xg. Total DNA was extracted from the specimens using DNA mini kit (QIAGEN) and then DNA concentration was ascertained using a Qubit. The Ct genome copy number for each sample was quantified by targeting *omcB*. The Ct+ DNA will be enriched away from human DNA using the Sure SelectXT Illumina Paired-End Sequencing Protocol. The enriched Ct+ DNA will be sequenced using an Illumina NextSeq.

Results: For the 21 Ct + urine specimens DNA concentrations ranged from 0.564 n/uL to 24.6 ng/uL. The total genome copy numbers ranged from 6,000 to 255,000 copies and did not correlate with the DNA concentration of the sample. WGS results are pending.

Public Health Implications: This study is the first Ct genomic study of its kind in Canada. These preliminary results will provide insights into the use of WGS for ascertaining strain relatedness in Ct and identify potential emerging antimicrobial resistance.

Abstract 8

Asymptomatic malaria and intestinal parasites co-infection among non- beneficiaries of the national deworming program in Ngie, Northwestern Cameroon

Authors: Marcelus U. Ajonina., Raphael A. Abong., Carine K. Nfor

Background and Rational: Malaria and intestinal parasitic infections (IPIs) are among the most prevalent of human infections in developing countries. This study assessed the prevalence of asymptomatic malaria and intestinal parasites coinfection among non-beneficiaries of the national deworming population in Ngie.

Methods: A community-based cross section study was used. Blood and stool samples were collected from those participants who gave consent to take part in the study and assayed for the presence of malaria and IPIs according to standard procedures. Data were analyzed using Pearson's Chi-square and Logistic Regression analysis and were considered significant at $P \leq 0.05$.

Results: The prevalence rates of malaria parasite, IPIs and malaria and intestinal parasites co-infection were 40.1%, 31.5%, and 10.9%, respectively. *Ascaris lumbricoides* (13.2%) was the most prevalent intestinal parasites identified. Helminths infections (19.2%) were 1.8 times (OR=1.84, 95% CI:1.45-8.62) more prevalent than protozoa infections (12.3%). IPIs were 2.7 times (OR = 2.71, 95% CI: 1.34 – 5.49) more prevalent in Teze village than any other villages. No significant association was observed between co-infection with malaria and intestinal parasitic infection ($P=0.863$).

Public Health Implications: This study revealed that malaria and IPIs still constitute a major public health problem in Ngie despite a lack of any significant association between them.

Abstract 9

The First Large-Scale, Comprehensive Analysis of Saskatchewan's Newest STI, *Mycoplasma genitalium*

Authors: Wanlin, Tasker^{1,2}, Parmar, Nidhi R.^{1,2}, Mushanski, Linda³, Minion, Jessica³, Dillon, Jo-Anne^{1,2}

¹Dept Biochemistry, Microbiology & Immunology;

²Vaccine and Infectious Disease Organization, University of Saskatchewan, Saskatoon SK;

³Roy Romanow Provincial Laboratory, Regina, SK.

Background and Rationale: *Mycoplasma genitalium* (Mg) is an intracellular bacterial STI which can cause non-gonococcal urethritis and upper genital tract infections. High prevalence and rates of antimicrobial resistance to azithromycin and moxifloxacin have been reported worldwide, but there is a concerning lack of data in Saskatchewan.

Methods: Remnant Aptima urine specimens from 1,977 collected for *Chlamydia trachomatis* (Ct) and *Neisseria gonorrhoeae* (Ng) screening were tested via the "Aptima *Mycoplasma genitalium* Assay" (MG-TMA) to determine the prevalence of Mg in Saskatchewan. Demographic data was collected. All positive specimens were tested for antimicrobial resistance via amplification and sequencing of the 23S rRNA (azithromycin resistance) and *parC* (moxifloxacin resistance) genes. Those with resistance-associated mutations were considered resistant.

Results: The overall prevalence of Mg in Saskatchewan was 9.6% (189/1,977). Women age 20-24 had the highest incidence of Mg infection (18.3%, $p < 0.001$). Mg was more prevalent in northern Saskatchewan. Ct was significantly associated with Mg ($p < 0.001$). 153 specimens were amplified by 23S rRNA PCR and 22 have been analyzed for azithromycin resistance thus far; 54.5% have resistance-associated mutations. *parC* PCR and sequencing is in progress.

Public Health Implications: Mg has a high prevalence (9.6%) in SK as indicated by our testing of remnant Aptima specimens. This is alarmingly high in comparison to the most recent reports in Canada (Alberta 6.2%, Toronto 4.2%). Mg is now routinely tested for in Saskatchewan. Our preliminary data on azithromycin resistance suggests that azithromycin should not be used to treat Mg in Saskatchewan. The use of PCR-based resistance testing and the new MG-TMA allow more rapid resistance determination and diagnosis of Mg. This will improve treatment by providing more information to clinicians so that treatment of NGU can be tailored to each patient. This will also enable the status of Mg to be monitored more effectively.

Abstract 10

Gen2EpiGUI: A User-friendly Pipeline for Analyzing Whole Genome Sequencing Data for Epidemiological Studies of *Neisseria gonorrhoeae*

Authors: Singh, Reema^{1,2}, Yarmovich, Trevor³, Kusalik, Anthony³ and Dillon, Jo-Anne R^{1,2}

¹Department of Biochemistry Microbiology and Immunology;

²Vaccine and Infectious Disease *Organization* – International Vaccine Centre; ³Department of Computer Science, University of Saskatchewan, Saskatoon, SK.

Background and Rationale: A growing number of studies apply whole-genome sequencing (WGS) in tracking the transmission and antimicrobial resistance of *Neisseria gonorrhoeae*. In order to analyse WGS data, specialized skills are required. However, for the users with limited bioinformatics skill this task is challenging. Therefore, we have developed a Graphical User Interface (GUI) for our Gen2Epi computational pipeline for *Neisseria gonorrhoeae*, named Gen2EpiGUI, to assemble short reads obtained by WGS into full-length genomes and to assign accurate strain typing (NG-MAST and NG-MLST) and AMR information (with standard nomenclature) automatically.

Methods: WGS data analysis functions in Gen2EpiGUI are implemented in five sections: 1) Raw data cleaning, 2) *De novo* assembly, 3) Full genome generation, 4) Plasmid-type identification, and 5) Strain typing & AMR prediction. All these features are listed in pull-down menus in the main interface. Functions to automatically update the underlying databases have also been implemented in the Gen2EpiGUI. At present, the interface only works with reads generated by Illumina Miseq and Hiseq platforms, and is tailored specifically for *Neisseria gonorrhoeae*. It has been validated using 631 published WGS samples of *Neisseria gonorrhoeae*, previously used for genomic epidemiological surveillance in USA and China (NCBI sequence read archive Bio-project: PRJEB2999 [USA] and PRJNA431691 [China]).

Results: Full genomes were generated after removing adapter and low-quality bases from WGS reads. The mean genome coverages are 89.1% and 88.3% for USA and China data, respectively. The mean N50, NA50, and NGA50 (N-statistics used for quality assessment) reported for all assembled scaffolds were 2224743, 248333, and 230175 for the USA datasets and 2206689, 332250, and 326724 for the China datasets. Correct strain typing and AMR information were automatically assigned to the 631 assembled genomes. Gen2EpiGUI is available at <ftp://www.cs.usask.ca/pub/combi>.

Public Health Implications: Gen2EpiGUI allows users to analyze WGS data to study *N. gonorrhoeae* in clinical settings for efficient epidemiological surveillance of this pathogen.

Abstract 11

Farmers' perceptions of exoskeleton devices and their potential to prevent back injuries in Saskatchewan farms

Authors: Abisola Omoniyi, Ornwipa Thamsuwan, Stephan Milosavljevic and Catherine Trask
Canadian Centre for Health and Safety in Agriculture, College of Medicine, University of Saskatchewan, Saskatoon, Saskatchewan, Canada

Background and Rationale: Tasks on farms are often physically demanding and involve repetitive movements, prolonged bending, and awkward postures which could pose musculoskeletal disorders (MSD). Exoskeletons are an emerging technology already implemented in manufacturing to facilitate manual work, and has potential to reduce the risk of MSD. This study looks at the possibility for this device to reduce risk of MSD associated with agricultural work tasks.

Method: Six men employed on Saskatchewan farms (mean age: 56 years) performed both standardized lifting and bending tasks and regular farm tasks, including: lifting bales, shoveling grain, and maintenance. After performing tasks with and without the exoskeleton, farmers completed a survey and interview regarding their experience with the device.

Results: Farmers responded to visual analog scale (VAS) inquiries on thermal discomfort (range 0-3.5 out of 10 discomfort), balance (range 0-7 out of 10 off-balance), movement limitations (range 0-5 out of 10 limiting), body discomfort (range 0-4 out of 10 discomfort), and safety (range 4-6 out of 10 safe). Overall ratings indicated an improvement (worsening) in performance of 5-8, where 10 is 'substantially better'. On responses to open-ended questions, farmers overall reported feeling support and stability from the exoskeleton; barriers were also identified, including the possibility of catching on surroundings and challenges in switching to seated positions (e.g. tractors).

Public Health Implications: While there are challenges in using the exoskeleton for some tasks, it does show some potential to reduce loads on the back and legs. Future analyses will investigate differences in joint angles, muscle activity, and heart rate while using the exoskeleton. These findings will support intervention design to improve the health, quality of life, and productivity of Saskatchewan farmers and workers with similar ergonomic risks.

Abstract 12

Population-based evidence on the incidence of inflammatory bowel disease in Saskatchewan from 1999-2016

Authors: Osei, Jessica Amankwah ^a; Pena-Sanchez, Juan Nicolas ^a; Fowler, Sharyle ^b; Muhajarine, Nazeem ^a; Lix, Lisa ^c

^a Department of Community Health & Epidemiology, College of Medicine, University Saskatchewan;

^b Division of Gastroenterology, College of Medicine, University Saskatchewan;

^c Department of Community Health Sciences, University of Manitoba.

Background & Rationale: Studies in Canada have reported decreasing trends in the incidence of inflammatory bowel disease (IBD) and higher incident rates of IBD in urban than in rural settings. The objectives of this study were to 1) estimate the incidence rates and trends of IBD in Saskatchewan from 1999-2016, and 2) determine if the incidence rates of IBD in urban Saskatchewan are higher than those in rural areas.

Methods: A population-based study was conducted using Saskatchewan administrative health databases. Individuals age 18+ old with newly diagnosis of Crohn's Disease (CD) or ulcerative colitis (UC) were identified using a validated case definition. A generalized linear model with a negative binomial distribution was used to estimate incidence rates and incidence rate ratios (IRR) with their corresponding 95% confidence intervals (95%CI).

Results: In 2016, the incidence of IBD was 15 (95%CI 12-18) per 100,000 population (6 [95%CI 4-8] and 8 [95%CI 6-10] per 100,000 population for CD and UC, respectively). A significant decline of 7% in the average annual incidence rate of IBD was identified from 1999-2016 ($p < 0.001$). Individuals living in urban areas had 19% higher risk of IBD (IRR=1.19, 95%CI 1.11-1.27) than those in rural settings. This association was significant among CD patients (IRR=1.25, 95%CI 1.14-1.36), but not significant among those with UC (IRR=1.08, 95%CI 0.97-1.19).

Public health implication: Despite the observed decrease in the incidence of IBD in Saskatchewan, around 150 new cases of IBD are still diagnosed annually. This incidence rate is lower than in other provinces. Additionally, urban dwellers have a 25% higher risk of developing CD compared to their rural counterparts. Health care providers and decision-makers should take into account the updated epidemiology of IBD in Saskatchewan to plan IBD-specific health care programs.

Abstract 13

Undiagnosed/Untreated Ischemic Heart Disease Fatalities (UIHDF): Canadian Chronic Disease Surveillance System (CCDSS) Estimates for Incidence, Mortality, and Chronic Disease-related Population Attributable Fractions (PAF)

Author: Puchtinger, Rolf

Government of Saskatchewan , Provincial Chronic Disease Epidemiologist, Population Health Branch, Saskatchewan Ministry of Health

Background and Rationale: Ischemic heart disease (IHD) is a common preventable chronic disease and the second leading cause of death in Canada. It is diagnosed with a range of tests in people who have symptoms of angina, and in members of high risk populations such as those with hypertension or diabetes. If the disease is detected and managed then premature death may be avoided. However, UIHDFs can occur among people who were not diagnosed with or treated for IHD prior to their cardiac death. The objective of this poster is to describe the impact of UIHDFs on IHD incidence and mortality estimates, and to assess the potentially preventable contributions of diabetes and hypertension.

Methods: Methods are based on case definitions and approaches of the CCDSS and based on administrative data. It includes case definitions for IHD with and without UIHDFs, and for diabetes and hypertension. UIHDFs are identified based on vital statistics. Age-standardized incidence rates and mortality rate ratios are compared for both IHD case definitions, and PAFs for excess UIHDFs associated with diabetes and hypertension are assessed.

Results: About six percent of all deaths in Saskatchewan are due to UIHDF. Consistent with overall mortality, the number of UIHDFs is declining. More than half of UIHDFs occur among people younger than 80 years of age and may be preventable. Including UIHDFs in mortality estimates for IHD increases relative risk of death for people with IHD by about 50%. PAF show that diabetes and hypertension contributed about 32% to UIHDF.

Public Health Implications : The CCDSS is a rich data source to support chronic disease prevention and management programs. This presentation estimates about 100 undiagnosed IHD deaths per year attributable to diabetes or hypertension that may be sensitive to additional primary prevention of and screening for IHD efforts.

Abstract 14

Prevalence and associated biopsychosocial factors of pregnancy-related back pain within the first 3 months after childbirth in Canada: A population-based cross-sectional study

Authors: Awe, Oluwakemi; Bath, Brenna; Farag, Marwa.

Background and Rationale: Pregnancy-related back pain is a common health concern among pregnant and postpartum women worldwide, yet, epidemiological data on both the rates and associated biopsychosocial factors at a national population level are limited in Canada. This study aimed to determine the prevalence and biopsychosocial factors influencing perinatal back pain severity evaluated during the first 3 months postpartum among a national sample of Canadian mothers.

Methods: We used data from the 2005-2006 Canadian Maternity Experiences Survey (n=5,925). A partial proportional odds model was developed to examine the biological/physical, psychological and social factors associated with perinatal back pain severity (none, moderate, and severe). This model takes into account the ordinal nature of perinatal back pain severity, as well as, allows the possibility for some explanatory variables to violate the proportional odds assumption.

Results: Among the study participants, 36% (24.3% moderate; 11.7% severe) reported perinatal back pain during the first 3 months postpartum, with the highest rates observed among mothers with perceived inadequate social support post-delivery (52.2%) and individuals reporting fair-to-poor health (52.1%). The significant factors influencing increased perinatal back pain severity were: maternal age <20 years; immigrant status; obese pre-pregnancy BMI; vaginal birth; poorer perceived health; high perceived stress, experience of 3 or more stressful life events; history of violent abuse; history of depression; perceived inadequate social support post-delivery; residence in Quebec or Ontario; < high school education; lower household income; and perceived lack of antenatal information on back pain.

Public Health Implications: These findings highlight the need for maternity-care professionals to be aware of persisting back problems after childbirth and offer women appropriate pain management measures, including counselling, early, before symptoms become chronic. Furthermore, maternal care services and policies would do well to consider biopsychosocial factors that may influence delayed recovery of back pain in the postpartum period when designing and implementing interventions.

Abstract 15

Whole Genome Sequencing Reveals Important Features of a Nine-Month Vancomycin-Resistant *Enterococcus* Outbreak Affecting a Saskatchewan Hospital Ward

Authors: MacKenzie, Keith^{1,2}; Kirzinger, Morgan^{1,2}; Faires, Meredith³, Perry, Benjamin^{1,2}; Wellman, Emilie^{1,2}; Minion, Jessica^{3,4}, and Cameron, Andrew^{1,2}

¹ Institute for Microbial Systems and Society, University of Regina, Regina, Saskatchewan, Canada;

² Department of Biology, University of Regina, Regina, Saskatchewan, Canada;

³ Regina Qu'Appelle Health Region, Regina, Saskatchewan, Canada;

⁴ Saskatchewan Health Authority, Regina, Saskatchewan, Canada.

Background and Rationale: Vancomycin-resistant *Enterococci* (VRE) are frequently associated with hospital settings. Due to the antimicrobial resistance of these bacterial pathogens, infected patients may face longer stays or an increased risk of mortality. In 2013, a ward within a Saskatchewan hospital identified VRE-positive cases over nine months. Our goal was to determine if this represented a single outbreak that continued despite the implementation of control interventions, or if multiple separate outbreaks had occurred.

Methods: We employed whole genome sequencing (WGS) to compare the DNA of 51 VRE isolates acquired during weekly screenings of patients. We used short- and long-read sequencing technologies to fully assemble the genome of a local "reference" isolate. This genome, combined with the Public Health Agency of Canada's SNVPhyl bioinformatics pipeline, facilitated genetic comparisons between isolates and guided our investigation.

Results: WGS identified the isolates as *Enterococcus faecium* belonging to multilocus sequence type ST80. This ST is part of a clonal complex that has been responsible for an increasing share of clinical endemics since 2009. All isolates were highly related at the genomic level, inferring that cases were part of a single outbreak. Most isolates clustered into three nodes, which correlated with the "early", "mid", and "late" stages of the outbreak. Epidemiological data suggested that unique factors contributed to VRE transmission at each stage. Importantly, the middle and late nodes were each closely related to the early node, meaning that a pathogen reservoir may have persisted throughout the outbreak. Additional bacterial factors, including a mobile genetic element, may have contributed an important role.

Public Health Implications: Our work demonstrates the power WGS brings to outbreak investigations. Genomics provides unparalleled resolution into the relationship between isolates, can inform the direction of epidemiological analyses, and uncovers important pathogen-specific features. As sequencing technologies improve in speed and cost, genomics is becoming an essential part of infectious disease control.

Abstract 16

Genotypic Prediction of Antimicrobial Resistance in *Neisseria gonorrhoeae*: Association of Specific Strain Types, Phylogenetic Clades, and Antimicrobial Susceptibility Phenotypes

Authors: Parmar, Nidhi R.^{1,2}, Singh, Reema^{1,2}, Martin, Irene³, Perera, Sumudu R.^{1,2}, Demczuk, Walter³, Kusalik, Anthony⁴, Minion, Jessica⁵ and Dillon, Jo-Anne R.^{1,2}

¹ Department of Biochemistry, Microbiology & Immunology;

² Vaccine and Infectious Disease Organization, University of Saskatchewan, Saskatoon SK;

³ Bacterial Pathogen Division, National Microbiology Laboratory, Public Health Agency of Canada, Winnipeg, MB;

⁴ Department of Computer Science, U. of Saskatchewan;

⁵ Roy Romanow Provincial Laboratory, Regina, SK.

Background and Rationale: Gonorrhea is the second most commonly reported STI globally. Development of resistance to all antimicrobials in *Neisseria gonorrhoeae* (Ng) has compromised treatment with antibiotics. Surveillance of gonococcal antimicrobial resistance (AMR) is crucial to inform treatment and to identify new resistance mechanisms. Whole-genome sequencing (WGS) can provide insight into gonococcal genomic epidemiology and AMR mechanisms.

Methods: WGS was performed on 99 gonococcal isolates (from Saskatchewan, SK) and analyzed using Gen2Epi, a pipeline incorporating read assembly, scaffolding, strain typing (ST) by MLST and NG-MAST, plasmid identification, and identification of mutations in AMR genes by NG-STAR. Whole-genome single nucleotide polymorphisms (SNPs) were identified using PathoBacTyper. The phylogenetic tree was annotated using iTOL. Information on strain demographics was collected.

Results: Phylogenomic analysis revealed 3 clades which comprised 69% (69/99) of the isolates. Clade-1 isolates (n=36) did not have significant mutations and were susceptible to antibiotics. Clade-2 isolates (n=12) carried *tetM* plasmids, and conferred plasmid-mediated tetracycline resistance (TRNG); 75% (9/12) of these isolates were from Regina. Although reduced susceptibility to cefixime and ceftriaxone was not observed, 9 isolates from clade-3 (n=21) with NG-MAST ST-10451 and mosaic PBP2 type XXXIV had significantly ($P<0.001$) higher cefixime MICs (0.125 mg/L). Ciprofloxacin resistance (n=28) was associated significantly ($P<0.001$) with *GyrA/ParC* mutations, which also included clade-3 strains. An azithromycin resistant isolate, with NG-MAST ST-304 (n=1), had *mtrR* and 23S rRNA mutations.

Public Health Implications: An expansion of NG-MAST ST-10451 in SK is alarming as it is related to ST-1407, an internationally recognized multi-drug resistant clone. NG-MAST ST-304, characterizing the single azithromycin-resistant isolate, has been noted previously in China. Implementation of genotypic predictions for gonococcal AMR can boost AMR surveillance in the province, where 95% of Ng cases are not tested for AMR because of nucleic acid amplification –based diagnostics.

Abstract 17

Canadian Mother-Child Cohort (CaMCCo): Prescription drug use during pregnancy and long-term health outcomes in the mother and child

Authors: Brandy Winquist PhD, Adjunct Faculty, Community Health & Epidemiology, College of Medicine, University of Saskatchewan; Anick Berard PhD, Professor, Faculty of Pharmacy, University of Montreal and Canada Research Chair Medications and Pregnancy.

Background: Evidence suggests that over 75% of women take at least one medication during pregnancy. Fetal drug exposure mostly occurs because more than half of pregnancies are unplanned, resulting in millions of fetuses being exposed to medications during organogenesis because women were not aware of their pregnancy. Exposure to medications also occurs during planned pregnancies, either due to maternal chronic illnesses, or acute conditions that develop during pregnancy. Yet, data on the safety and efficacy of medications used during pregnancy (for both women and fetuses) is lacking due to the routine exclusion of pregnant women from clinical trials because of concerns about potential harm to the developing fetus.

Methods: Data from Saskatchewan's clinical and administrative health databases will be used to construct a population-based pregnancy and birth cohort (CaMCCo). The cohort will be created by linking several health administrative databases and will include data on the following: maternal demographics, clinical and obstetrical outcomes; delivery information; neonatal data, including birth weight, neonatal intensive care unit (NICU) stay, and mortality; and longitudinal data on clinical outcomes and resource utilization based on administrative data on all physician visits, emergency department visits, outpatient clinic visits, and hospitalizations for both mothers and children. Postal code data will provide information on residence (northern, rural, urban) and aggregate measures of socio-economic status and social deprivation. Pharmaceutical data is available for both mothers and children. We anticipate a sample size of over 250,000 pregnancies. As a result of the breadth of the cohort and its longitudinal nature, we expect hundreds of variables for each mother to be available for study. Machine learning and data mining techniques will be among those used to identify factors associated with adverse maternal and child outcomes.

Results: In collaboration with researchers and academics from six provinces (BC, AB, MB, ON, QC, SK), we plan to launch an exciting maternal-child health research initiative. The project is a collaboration between researchers from seven Canadian universities that will create connections to the international research community (Boston, France, Norway). The objective is to build longitudinal, population-based, pregnancy-child cohorts in each province. Data will be analyzed within each province and pooled to: (1) enable researchers to study the early origins of disease and health, including in utero exposure to medication and its effects; (2) inform policies and evaluate maternal-child health programs; and (3) support surveillance on birth defects and maternal-child health outcomes.

Public Health Implications: At present, Saskatchewan lacks the data infrastructure necessary to conduct high-quality research in the field of maternal-child health. However, the novel infrastructure that is being planned as part of this initiative will enable policy-relevant investigations that respond in a timely manner to local and national priorities. We anticipate this cohort will quickly become an important evidence base for policy makers to understand and mitigate health-related risks for Saskatchewan families and future population.

Abstract 18

Epidemiology support benefit: A Southwest Saskatchewan example

Author: Dr. David Torr, Medical Health Officer, Medical Director, Health Promotion and Chronic Disease prevention, Saskatchewan Health Authority.

(306) 831 7631;

David.Torr3@saskhealthauthority.ca

Conflicts of interest: none

Background: Historically, epidemiological services in rural Saskatchewan have been lacking, limiting research, surveillance, and outcomes. However, a few epidemiological supports have been enabled, making important contributions.

One example is the radon study done in south west Saskatchewan, highlighting the value epidemiologist supports provide to advancing knowledge and intervention for better population health.

Radon, a radioactive gas, is the second largest contributor to lung cancer. Awareness is still lacking, especially since radon has no smell, odor or taste. According to the World Health Organization, radon is the most common naturally occurring source of ionizing radiation, entering houses and basements through cracks, leaks, and other openings. Exposure to radon over time increases the risk of developing lung cancer.

Methods: Following a national residential radon survey done by Health Canada in 2011 that showed Saskatchewan households to have a high rate of elevated radon, (particularly the southwest with 24%), a community-based intervention study was conducted in southwest Saskatchewan in 2017, with epidemiological support, engaging residents through both a public awareness campaign and a study done through local public health clinics.

Results: 45% of households tested were found to have higher levels than 200BQ/cubic meter. Local awareness on radon risk was improved, and interventions done. This data has also been contributed to a study of radon in Western Canada.

Public Health Implications: With epidemiology support, increased awareness, testing, mitigation and formation of mitigation resources has been achieved. This initiative illustrates the value of epidemiological supports in health.

The vision is for an equitable and sufficient supply of epidemiologist support in health for achieving better population health.

Abstract 19

Health Network Geographies for Saskatchewan

Authors: Marko Josh, Saskatchewan Health Authority; Murphy Lara, Saskatchewan Health Authority; Creighton Tracy, Saskatchewan Health Authority; Laura Schwartz, Health Quality Council; Adrienne Danyliw, Saskatchewan Health Authority; Michelle Schmalenberg, Saskatchewan Health Authority; Margaret Baker, Ministry of Health; Andrea MacKay, Saskatchewan Medical Association; Sheila Anderson, Saskatchewan Health Authority; Denise Macza, Ministry of Health ; Dr. Kevin Wasko, Saskatchewan Health Authority ; Dr. Janet Tootoosis, Saskatchewan Health Authority.
josh.marko@saskhealthauthority.ca, 101-310 Idylwyld Drive North, Saskatoon, SK, S7L 0Z2.

Background and Rationale: Many provinces across Canada have moved to integrated community care and Connected Care is a strategic priority within the Saskatchewan Health Authority (SHA). Health Networks are a large scale system change being developed in Saskatchewan to ensure patients get the right care at the right time from the right provider, as close to home as possible. Health Network attributes include collaborative teams of health professionals providing fully integrated services meeting the needs of individuals and communities.

Methods: Health Network geographies were created to align with existing administrative and Statistics Canada Census boundaries. Health network boundaries were created by analyzing demographic (age groups, ethnicity), socio-economic (income, employment, education, housing), and chronic disease prevalence (asthma, COPD, diabetes, heart disease, heart failure, hypertension) information. Previously created small area geographies were the building blocks upon which health network boundaries were constructed. Key stakeholders, including physicians, primary health staff and external agencies were consulted during a month's long validation process.

Results: A total of 38 Health Networks were created, 9 in Saskatoon and Regina, and 29 in rural areas and the North. Population size ranges from 7,313 in the North to 87,922 in Saskatoon. Geographically large Networks are seen in the northern areas of the province. Variation in demographic and socio-economic make up is evident between Networks.

Public Health Implications: Health Networks have the potential to create better teams, respond to the health needs of communities and reduce the need for acute care services in Saskatchewan. Health Networks and associated Small Area Geographies enable population and public health data to be delivered at the local level so that resource planning can be evidence-informed. Work is underway to creating profiles of each of the Networks so that resources can be applied in the most efficient way possible.

Abstract 20

Improving Childhood Immunization Rates in a First Nations Community

Authors: Ndubuka N^{1,3}, Gardipy-Mckenzie C¹, Gupta S¹, Akinjobi G¹, Cardinal R², Lariviere J², Robert C², Smith T²

¹Northern Inter-Tribal Health Authority;

²Stanley Mission Health Centre;

³University of Saskatchewan.

Background: Immunization is the most effective public health intervention for saving lives and promoting good health. The proportion of children immunized is a key indicator of population and public health system performance. Childhood immunization coverage rates vary widely across northern First Nations communities particularly for 1-year and 2-year-old population.

Objective:

1. To increase 1-year old childhood immunization coverage rate from 82% to 90% by March 31, 2019
2. To increase 2-year old childhood immunization coverage from 80% to 90% by March 31, 2019

Methods: A quality improvement research conducted in a First Nation community health center in northern Saskatchewan. We defined up-to-date immunization as full receipt of the vaccine series as recommended by the Saskatchewan Immunization Manual. A root cause analysis of low immunization was conducted. Two Plan-Do-Study-Act cycles of change were also completed.

Result: There was an increase in immunization coverage rate in the 1 and 2 year old from 82% to 99% and 82% to 87% respectively.

Public Health Implications: By improving childhood immunization rates through culturally appropriate interventions, First Nations communities have an opportunity to avert high cost of medical treatment and lost wages from taking care of sick children. The economic benefits of vaccination extend far beyond the treatment costs. Children whose lives are saved through immunization programmes not only contribute to the economy but also bring social value to the community. Immunization, and thus improved health, can yield broad benefits in improved cognitive development, educational attainment and labour productivity.

Abstract 21

Applying Retrospective Social Network Analysis to an Ongoing Tuberculosis Outbreak in a First Nations Community in Saskatchewan

Authors: Klaver B^{1,2}, Hourigan S¹, Akinjobi G¹, Nelson S¹, Ndubuka N¹.

¹Northern Inter-Tribal Health Authority, Prince Albert, SK;

²Public Health Agency of Canada.

Background: In June 2014, a tuberculosis (TB) outbreak was declared in a First Nations on-reserve community in Northern Saskatchewan. By 2016, the outbreak had been transmitted to a neighbouring community. At this point contact investigations began to miss contacts, resulting in isolated clusters of cases that had identical TB fingerprints to the outbreak cases. We conducted a retrospective social network analysis to reveal unknown relationships between the cases and to uncover transmission pathways.

Objective: To conduct a tuberculosis outbreak analysis in a northern Saskatchewan community and provide recommendation as appropriate.

Methodology: Quantitative statistical analysis was done using R software. Data for descriptive statistics was collected through the TB Information System (TBIS) of TBPC Saskatchewan and the NITHA TB case database. Qualitative interviews were conducted using questionnaires that focused on themes of social patterns and lifestyle, accommodation, TB knowledge, and TB experience. A social network map was created, which connected outbreak cases, named contacts, and unnamed contacts to households.

Results: A total of 23 households and 215 people were identified between 2014 and June of 2018, of which 38 individuals were unnamed contacts. Through the social network analysis, all 6 previously isolated cases were linked by household to a smear positive outbreak case, which indicated probable transmission events. Additionally, there were 20 unnamed contacts connected by household to a smear positive case suggesting possible exposure and latent tuberculosis infection.

Public Health Implications: Using a retrospective social network analysis all previously isolated cases now have probable transmission pathways that were unidentified with traditional contact investigation. Furthermore, 20 unnamed contacts require follow-up assessments. Future TB outbreak management strategies should utilize social network analysis in real-time, in complement to traditional contact investigation and TB fingerprint analysis, to identify missed contacts that may have been infected.

Abstract 22

Health care utilization differences between First Nations and general population with Inflammatory Bowel Disease in Saskatchewan: A patient-oriented research proposal

Authors: Marques Santos, Jose Diego; Brass, Colten; Peña-Sánchez, Juan-Nicolás; Fowler, Sharyle; Jennings, Derek.

Contact information: Marques Santos, Jose Diego, BN, MSc. (C),
Department of Community Health & Epidemiology, College of Medicine, University of
Saskatchewan
Email: jmm837@mail.usask.ca

Conflicts of Interest: The authors declare no conflict of interest.

Background and Rationale: Indigenous people experience barriers to access to health care, and Indigenous patients with inflammatory bowel disease (IBD) have expressed concerns about barriers to access IBD care. The limited evidence of IBD among Indigenous people highlights the need of studies measuring and comparing access to and use of IBD care. This research proposal aims to compare health care utilization between First Nations and people from the general population diagnosed with IBD in Saskatchewan.

Methods: A population-based retrospective cohort study will be conducted using administrative health databases of Saskatchewan from 1998 to 2017. As a patient-oriented research initiative, outcomes of interest (outpatient gastroenterologist visits, colonoscopies, IBD-related hospitalizations and surgeries, and IBD medication claims) were chosen in collaboration with Indigenous patients and family advocates (IPFAs). The IPFAs have been involved in the project since its conception and one of the IPFAs has been part of the student's advisory committee that guides this project. A validated algorithm will be applied to identify IBD cases, and the self-declared Indigenous status will be used to divide IBD cases between First Nations and individuals from the general population. Potential confounders will be considered such as sex, disease duration, comorbidities, and place of residence. Cox-proportional and logistic regression models will be run to estimate hazard (HRs) and odds (ORs) ratios, along with their corresponding 95% confidence intervals.

Expected Results and Public Health Implications: We hypothesize that First Nations people with IBD experience delays in confirming their diagnosis, a lack of access to disease-related care, and poorer negative IBD-related outcomes (i.e., IBD-related hospitalizations and surgeries). These results would have particular relevance to raise awareness about IBD among Indigenous people, and to promote further studies across Canadian provinces.

Abstract 23

The epidemiological evolution in Saskatchewan

Authors: Rosalie Tuchscherer, Helen Bangura, John Manalo

Epidemiology has been a key activity of public health in Saskatchewan for more than 100 years. The province has faced several major public health challenges since its inception which impacted how epidemiology and public health practice evolved including the Spanish flu, the polio epidemic, Western Equine encephalitis, West Nile virus and the upsurge in diabetes among special populations. The poster reviews various aspects of the epidemiological evolution over the past decades in Saskatchewan.

The study comprised a historical review of relevant drivers that affect the health of the public including legislation, technology, media, health information privacy, and globalization. The project studied how epidemiology evolved as these drivers evolved and the role epidemiology played in improving public health practice and subsequently, improving the health of the public.

The study results show how legislation and policy changed the composition of notifiable diseases over time and the attention to personal health privacy. It shows how technological advances improved the type of data, granularity and quality of data, how the timeliness and accuracy of information impacted the management of infectious and chronic diseases and how the ability to integrate data resulted in a more fulsome profile of the burden of diseases and the public health response in Saskatchewan. The poster shows that emerging globalization, the migration of world populations, the ease of travel, social media, and journalism all impact the approach to the study and communication of epidemiological concepts.

Whereas there is still a long way to go, the path travelled from the state of public health epidemiology in Saskatchewan decades ago compared to the present shows progress toward improving the health of the public.

Corresponding contact:

Helen Bangura

CD Epidemiologist

Population Health Branch

Ministry of Health

Email: hsbangura@health.gov.sk.ca

Abstract 24

The association of hypertension with the intake of fruit and vegetable among Canadian adults with an insight into socio demographic characteristics: The Canadian Community Health Survey, 2015

Authors: Pardis Keshavarz¹, Shafiee Mojtaba¹, Jandaghi Parisa¹, Punam Pahwa², Hassan Vatanparast¹

¹College of Pharmacy and Nutrition and School of Public Health, University of Saskatchewan, Saskatoon, Canada;

²Department of Community Health and Epidemiology and Canadian Center for Health and Safety in Agriculture, University of Saskatchewan, Saskatoon, Canada.

Conflict of interest: The authors have no conflict of interest to declare.

Background: Hypertension (HTN) is the leading cause of cardiovascular diseases and chronic kidney disease. Fruit and vegetable (F&V) consumption is related to many health benefits, health considered as an indicator of diet quality. This study examines the prevalence of hypertension among Canadians and its association with F&V consumption among Canadian adults across the sociodemographic and lifestyle characteristics.

Methods: We used representative sample of 98,225 adults (≥ 18 years) from the Canadian Community Health Survey (2015-2016). In this population, 44,994 (45%) of respondents were men and 53,231 (54.19%) women. A logistic regression model was utilized to capture the differential effects of HTN across F&V consumption and sociodemographic characteristics. Weights were used to account for unequal probability of selection and Taylor Linearization robust variance estimation was used to account for stratification and clustering in the design.

Results: The prevalence of HTN was 18.5%. Significant disparities were found in HTN prevalence by demographic and lifestyle characteristics. The frequency of HTN is significantly higher among males, who are ≥ 65 years old, who are overweight and obese, lower income families, households with one person and who had poor health perceived. The regression analysis indicated significant relationship between F&V consumption (5 and more vs less than 5) (OR=1.91 CI:1.62-2.25) and after adjusting for other covariates in multivariable model it was no longer significant (OR:1.17 CI: 0.96-1.43). Those who have HTN are more likely to have diabetes and heart disease and those with hypercholesterolemia have higher risk of HTN.

Public health implications: Identifying the socio-demographic and lifestyle characteristics of individuals with HTN and its relationship with F&V consumption could increase the effectiveness of policies aimed at developing the intervention and prevention strategies across different age groups especially for the old population. The need for a multifaceted approach based on the variation of socio-demographic characteristics is also suggested.

Abstract 25

The Characterization of Successful Multisectoral Partnerships

Authors: Allap Judge, MPH(c)^{1,2,4}, Margot Gough, MPH^{2,4}, Natalie Kallio, MA^{2,4}, Jacob Alhassan, PhD (c)^{2,3,4}, Lise Gauvin, PhD⁴ and Nazeem Muhajarine, PhD^{2,3,4}. Alj046@usask.ca, (587) 436-2056

¹ School of Public Health, University of Saskatchewan;

² Saskatchewan Population Health and Evaluation Research Unit;

³ Community Health and Epidemiology, University of Saskatchewan;

⁴ Multisectoral Urban Systems for health and Equity in Canadian cities (MUSE).

No conflicts of interest

Background and rationale: When using a population health approach, complex health problems often demand the efforts and resources of many organizations. Therefore, multisectoral partnerships (MPs) between public health organizations and municipalities are critical for promoting health and transforming built environments. Despite the increased frequency of MPs in the public sector, limited attempts have been made to evaluate and understand how well they function to achieve their specified purpose in public health interventions.

Methods: Literature reviews were conducted to characterize the enablers and barriers of successful MPs and to analyze existing partnership assessment tools. An in-depth analysis was conducted on two specific tools: The Wilder Collaboration Factors Inventory and The Self-Evaluation Tool for Action in Partnership (SETAP) to determine which tool would be more effective in assessing the quality of MPs dedicated to built environment changes that promote active living and healthy diet in Saskatoon.

Results: The results indicated that successful partnerships require a shared vision, adequate resources, clear organizational structure, strong leadership and interpersonal relationships, diverse membership, and positive community engagement. The comparative analysis of the Wilder and SETAP tools indicated that the Wilder tool focuses on the vision, goals, and accountability in a partnership, while the SETAP tool assesses the dynamics, equity, and quality of a partnership. This comparison revealed that each tool alone was not sufficient to understand partnerships in Saskatoon, therefore an integration of both tools was recommended.

Public Health Implications: Several factors result in successful MPs. Understanding these success factors can improve and support stronger partnerships between public health organizations and municipalities. These stronger partnerships can then effectively transform built environments and foster healthier cities. Therefore, it is recommended that Saskatoon MPs quantitatively assess their partnerships, and a survey with questions from both the Wilder and SETAP tools will be administered to these MPs this fall.

Abstract 26

Penalized Logistic Regression Methods for Modelling Rare Events Data with Application to WCB Fatality Study in Saskatchewan

Authors: Roya Gavanji,^{1,2} Catherine Trask,² Sean Tucker³, Cindy Feng¹

¹ School of Public Health, University of Saskatchewan, Saskatoon, Saskatchewan, Canada;

² Canadian Centre for Health and Safety in Agriculture, College of Medicine, University of Saskatchewan, Saskatoon, Saskatchewan, Canada;

³ Faculty of Business Administration, University of Regina, Regina, Saskatchewan, Canada.

E-mail: r.gavanji@gmail.com

Background and Rationale: Occupational injuries are a serious public health concern for workers around the world. Among all occupational injuries reported to the Workers' Compensation Board of Saskatchewan from 2007-2016, 177 (0.06%) out of 280,704 injury claims were fatal. Although workplace injuries are relatively rare, they have tremendous impact on the workers, their family, as well as a company's overall productivity, hiring/training costs, and insurance premiums. To help inform prevention of fatal claims, this study identified factors that increase the probability of fatal claims in Saskatchewan.

Methods: WCB Saskatchewan's administrative occupational injury claims data from 2007-2016 was used for modeling fatal occupational injury. Potential covariates included worker and incident characteristics. Penalized logistic methods including Firth were compared before and after doing variable selection using lasso and elastic net, to identify the best model for calculating odds ratio and 95% confidence intervals (CI) for probability of a WCB claim being fatal (vs. non-fatal).

Results: Based on Firth's logistic of the selected variables under the elastic net (the best-fitting model), odds of a claim being fatal was 5.5 (95% CI: 3.59-12.46) times higher among men than women and was 5.50 (95% CI: 3.59-12.46) times higher seniors aged 65-85 compared with those who are aged 14-24. Odds of having fatal claims among those who work in primary industry is 2.85 (95% CI: 1.07-9.39) higher than those working in social sciences. The odds of injury being fatal for machinery is 51 (95% CI: 10.38-505.38) times higher than chemical products.

Population Health Implications: Men are at higher risk of a claim being fatal. Primary industry and machinery have a disproportionate share of fatal claims. This knowledge can improve workplace safety by learning from past incidents, identifying risk factors, and implementing targeted prevention strategies. Through development of effective interventions, we hope to prevent fatal injuries in Saskatchewan.

Abstract 27

Evidence of health inequity in child survival: spatial and Bayesian network analyses of stillbirth rates in 194 countries

Authors: Adeyinka Daniel Adedayo^{1,2}, Olakunde Babayemi Oluwaseun³, Muhajarine Nazeem^{1,4}; DA Adeyinka daa929@usask.ca

¹Department of Community Health and Epidemiology, College of Medicine, University of Saskatchewan, Saskatoon, SK S7N 5E5, Canada;

²National AIDS & STIs Control Programme, Federal Ministry of Health, Abuja, Nigeria;

³Department of Environmental and Occupational Health, School of Public Health, University of Nevada, Las Vegas, NV, USA;

⁴Saskatchewan Population Health and Evaluation Research Unit, Saskatchewan, SK S7N 2Z4 Canada.

Conflicts of interest: None

Background: Estimated at 2.6 million annually, stillbirths worldwide have stayed alarmingly high, in contrast to neonatal and under-five mortality rates. It is a neglected public health challenge globally, with less attention to its social determinants. We examined spatial patterns of country-level stillbirth rates and determined the influence of social determinants of health on spatial patterns of stillbirth rates. It estimated probabilistic relationships between stillbirth rates and significant determinants from the spatial analysis.

Methods: Using country-level aggregated data from the United Nations databases, it employed ecological spatial analysis and artificial intelligence modeling based on Bayesian network among 194 World Health Organization member countries.

Results: From the spatial analysis, thirty-seven countries formed a cluster of high values (hot-spots) for stillbirth and 13 countries formed a cluster of low values (cold-spots). In multivariate regression, gender inequality and anaemia in pregnancy were significantly associated with spatial patterns of higher stillbirth rates, while higher antenatal care (ANC) coverage and skilled birth attendants during delivery were associated with clusters of lower stillbirth rates. The Bayesian network model suggests strong dependencies between stillbirth rate and gender inequality index, geographic regions and skilled birth attendants during delivery. The Bayesian network predicted that the probability of low stillbirth rate increased from 55% to 100% when the percentage of countries with high skilled birth attendants during delivery increased from 70% to 90%, high ANC coverage increased from 55% to 73%, high prevalence of anaemia in pregnancy decreased from 27% to 8% and high gender inequality index decreased from 44% to 15%.

Public Health Implications: Recognizing the urgency in reducing stillbirths globally, multi-prong strategies should be designed to promote gender equality and strengthen the reproductive and maternal health services in Africa, Eastern Mediterranean, South Eastern Asia, and other countries with disproportionately high stillbirth rates.

Abstract 28

Long-term child survival trends in Nigeria and forecasting into 2030

Authors: Adeyinka Daniel Adedayo^{1,2}, Muhajarine Nazeem^{1,3}; DA Adeyinka daa929@usask.ca

¹Department of Community Health and Epidemiology, College of Medicine, University of Saskatchewan, Saskatoon, SK S7N 5E5, Canada;

²National AIDS & STIs Control Programme, Federal Ministry of Health, Abuja, Nigeria;

³Saskatchewan Population Health and Evaluation Research Unit, Saskatchewan, SK S7N 2Z4 Canada.

Conflicts of interest: None

Background: Under-five mortality rate (U5MR) in Nigeria is among the highest globally. Limited evidence on the future of child survival that can guide health programming in the country is a cause for concern. We estimated the future trend and expected annual reduction rates (ARR) needed to achieve the Sustainable Development Goal (SDG) targets by 2030 for neonatal mortality rate (NMR) and U5MR for Nigeria.

Methods: This study is a time series of NMR and U5MR for Nigeria from 1964 to 2017. Historical data on yearly neonatal (aggregated) and under-5 (aggregated and sex-specific) mortality rates were obtained from World Bank. After comparative analysis between Group method of data handling type (GMDH-type) artificial neural network (ANN), autoregressive integrated moving average (ARIMA) and Holt-Winters exponential smoothing models using aggregated U5MR, GMDH-type ANN was selected as the best fitting model based on low error rates, hence used to forecast NMR and U5MR from 2018 to 2030.

Results: The NMR and U5MR should decline to 26 and 66.7 deaths per 1000 live births in 2030 from 32.9 and 100.2 live births in 2017. The projected ARR for the NMR and U5MR of 1.6% and 3.1% are below the estimated 7.8% and 10.7% required to achieve SDG targets for Nigeria. We envisioned widening gap in mortality rates—worse for females.

Public Health Implications: Nigeria is not likely to achieve SDG targets for child survival and disparity in mortality rates may worsen for females. Stakeholders in Nigeria need to adequately plan for child health to accelerate SDG targets.

Abstract 29

Disentangling pathways of influence for social determinants of childhood mortality in Nigeria: a parametric survival path analysis

Authors: Adeyinka Daniel Adedayo^{1,2}, Muhajarine Nazeem^{1,3}; DA Adeyinka daa929@usask.ca

¹Department of Community Health and Epidemiology, College of Medicine, University of Saskatchewan, Saskatoon, SK S7N 5E5, Canada;

²National AIDS & STIs Control Programme, Federal Ministry of Health, Abuja, Nigeria;

³Saskatchewan Population Health and Evaluation Research Unit, Saskatchewan, SK S7N 2Z4 Canada.

Conflicts of interest: None

Background: Childhood mortality remains a challenge in Nigeria, with little progress towards achieving sustainable development goal 3 (SDG-3). There has been limited evidence about the potential pathways that can inform policies and programmatic actions. The objective of this study was to measure the ways in which neonatal, infant and under-five mortalities are mediated through child-, maternal-, household- and community-level factors in Nigeria.

Methods: This is a parametric survival path analysis of the 2016/2017 Nigeria Multiple Indicator Cluster Survey that included a weighted population of 30 960 live births within five years prior to the survey commencement (September 2016). There were three outcome variables; survival times for neonates, infants and under-five children. The independent variables were 5 child-, 8 maternal-, 9 household- and 3 community-level factors.

Results: There was positive direct effect of child spacing beyond 2 years, female child and maternal age at birth between 20 and 34 years on neonatal, infant and under-five survival. With exception of neonatal deaths, maternal post-secondary education was observed to have direct protective effects on infant and under-five mortalities. Conversely, in all the models, multiple birth and birth order beyond third-born directly had negative effects on childhood mortality. Our findings confirm that region, area of residence, infrastructural development, maternal education, contraceptive use, previous birth interval, maternal satisfaction and maternal age at birth operate indirectly on the neonatal, infant and under-five mortality risks.

Public Health Implications: This study recognises the considerable pathways by which child-, maternal-, household- and community-level factors exert their major effects on childhood survival in Nigeria. In order to accelerate progress towards SDG-3 for Nigeria, stakeholders should implement more aggressive policies that will address childhood mortalities along the identified pathways.

Abstract 30

A citizen science approach for adapting mobile ecological momentary assessments to capture prospective physical activity within social and physical contexts: a smart platform study

Authors: Tarun Katapally, MS, PhD,^{1,2,3} Luan Chu, MS^{3,4}

¹ Johnson Shoyama Graduate School of Public Policy, University of Regina,

Email: Tarun.Katapally@usask.ca;

² Johnson Shoyama Graduate School of Public Policy, University of Saskatchewan;

³ College of Medicine, University of Saskatchewan, Email: cml779@mail.usask.ca;

⁴ Canadian Center for Health and Safety in Agriculture, Saskatoon, Saskatchewan.

Background and Rationale: Ecological momentary assessments (EMA) are increasingly being used to monitor health behaviors among populations across the life course. The aim of this study is to develop a novel, replicable methodology of time-triggered mobile EMAs to capture prospective PA within free-living social and physical contexts by leveraging citizen-owned smartphones running on both Android and iOS systems, and to validate this innovative measure with traditional self-report of PA.

Methods: Data were obtained from the adult cohort of the SMART Platform, an innovative citizen science and mobile health initiative for active living surveillance. A convenience sample of 538 citizen scientists (≥ 18 years) from the two largest urban centers in Saskatchewan, Canada (Regina and Saskatoon) provided PA data during 8 consecutive days in 2017 and 2018 using a custom-built smartphone app. Self-report PA was captured using International Physical Activity Questionnaire (IPAQ). The EMA not only captured light, moderate, and vigorous PA, but also physical and social contexts of PA via complex looped linking of intensity and context questions. For both measures, PA intensity was categorized into mean light and moderate-to-vigorous PA/day, and physical contexts of mean PA/day were categorized into domains. Wilcoxon signed ranks tests and Spearman correlation procedures were conducted.

Results: Light and moderate-to-vigorous PA was not significantly different, and showed moderate correlation between IPAQ and EMA. However, PA across domains showed significant differences between IPAQ and EMA, with PA being significantly under-estimated by IPAQ.

Conclusion: These findings suggest that modified EMAs not only capture comprehensive prospective PA, but can also provide critical contextual information of PA accumulation by minimizing recall bias.

Implications for practice and policy: Approximately 6 billion smartphones are estimated to be in circulation by the year 2020, thus these ubiquitous tools can be leveraged via citizen science to capture accurate active living patterns of large populations in free-living conditions through modified EMAs.

Abstract 31

Methodology to derive objective screen time from smartphones in the digital age: a smart platform study

Authors: Tarun Katapally, MS, PhD,^{1,2,3} Luan Chu, MS^{3,4}

¹ Johnson Shoyama Graduate School of Public Policy, University of Regina,

Email: Tarun.Katapally@usask.ca;

² Johnson Shoyama Graduate School of Public Policy, University of Saskatchewan;

³ College of Medicine, University of Saskatchewan, Email: cml779@mail.usask.ca;

⁴ Canadian Center for Health and Safety in Agriculture, Saskatoon, Saskatchewan.

Background and Purpose: Time on screens (screen time) on multiple digital devices due to varied motivations has become an integral part of population behaviour. Nevertheless, there is a significant gap in objective evidence related to screen time accumulated over mobile devices, such as smartphones. This study aimed to develop an accurate, reliable, and replicable methodology to derive prospective objective screen time (i.e., screen-state) usage from all types of citizen-owned smartphones,

Methods: Data were obtained from the adult cohort of the SMART Platform, which consists of a convenience sample of 538 adults (≥ 18 years) from the two largest urban centres in Saskatchewan, Canada (Regina and Saskatoon). Participants used a custom-built smartphone app that captured data for 8 consecutive days to provide a complex series of objective and subjective data. Objective time-stamped smartphone screen-state was captured through the screen-state sensor that recorded every ON and OFF screen notification. Subjective screen time data were obtained via a modified sedentary behavior questionnaire.

Results: The findings showed that objective screen-state from smartphones can be derived and assessed across a range of smartphone notification and continuous usage cut-points that take into consideration varied measurement errors. When objective measures were compared with subjective reporting, the results indicated that participants consistently under-reported screen time.

Conclusions: This study advances a replicable methodology that can be used to prospectively derive objective screen-state. Another approach this study offers is linking objective and subjective measures of smartphone screen time to capture not only the accurate measurement of screen-state, but also essential context of behaviours (Internet surfing, texting, etc.).

Implications: As there is no indication that digital mobile device usage will decline in the future, and as these devices are being increasingly leveraged for mobile health applications, it is critical to understand both the positive and negative impacts of this technology on human health.

Abstract 32

The Current State and Future of Real-World Evidence

Authors: David A. Tran, Riaz Alvi

Contact Information: David.Tran@saskcancer.ca, (639) 635-3036

Affiliation: Department of Epidemiology and Performance Measurement, Saskatchewan Cancer Agency, Saskatoon, Saskatchewan

Conflicts of Interest: None

Background & Rationale: Randomized controlled trials (RCTs) are thought of as the gold standard for understanding efficacy and safety of new medical technologies. However, RCTs have inclusion and exclusion criteria that make extrapolation and generalizability into real-world practice difficult. Real-world evidence (RWE) can complement RCTs as it leverages data that reflects real-world treatment practices, effectiveness, treatment adherence, and population - bridging the gap between RCTs and the real-world¹.

The usage of real-world data (RWD) to generate real-world evidence (RWE) is becoming of increasing relevance in health-care decision making. RWD is generally defined as health care data collected outside of a clinical trials environment; administrative data, electronic health records (EHRs), product/disease registries, billing/claims activities, and data from personal/mobile devices^{1,2}. The digitization and availability of healthcare data has been growing at an exponential rate, and the role of RWE in health-care decisions is evolving.

Results: There are two important dimensions of RWE, the setting which evidence is generated (population defined by the data source, collection method and quality), and the methodological approach used to analyse the data^{1,2}. The aim of the poster is to sensitize readers to the literature, and provide an overview of RWD and RWE – strengths, limitations, and its potential role in our health care system. The information will be supported by examples of work being conducted at the Saskatchewan Cancer Agency and Canadian work in oncology drug funding decisions.

Public Health Implications: The adoption of RWE is especially important in drugs for life-threatening and orphan diseases, areas of unmet need, and where conducting clinical trials is either unethical or unfeasible. RWE is a vital component of proving and creating value – Payers, providers, and patients are focused on outcomes, and RWE is the language in which those outcomes are demonstrated³.

References:

1. Suvarna VR. Real world evidence (RWE) - Are we (RWE) ready? *Perspectives in clinical research*. 2018;9(2):61-63.
2. Sherman RE, Anderson SA, Dal Pan GJ, et al. Real-World Evidence — What Is It and What Can It Tell Us? *New England Journal of Medicine*. 2016;375(23):2293-2297.
3. Anbil PS. Is There Evidence in Real-World Evidence? 2019; <http://www.pharmexec.com/there-evidence-real-world-evidence>. Accessed August 29, 2019, 2019.

Abstract 33

Chronic disease multimorbidity among the Canadian population: Prevalence and associated lifestyle factors

Authors: Nigatu Geda¹, Janzen Bonnie² and Punam Pahwa^{2,3}

¹ School of Public Health, University of Saskatchewan, Saskatoon, Canada;

² Dept of Community Health & Epidemiology, Collège of Medicine, University of Saskatchewan, Canada;

³ Canadian Centre for Health and Safety in Agriculture, University of Saskatchewan, Canada.
pup165@mail.usask.ca.

Background and Rationale With increasing prevalence of most chronic diseases, multimorbidity is becoming an important public health concern in the Canadian population. The purpose of this study is to estimate the prevalence of multimorbidity in the general population based on 14 major chronic diseases and examine associations with lifestyle/behavioral factors.

Methods: We used 2015-2016 Canadian Community Health Survey (CCHS) data. It is a cross sectional complex multi-stage survey based on information collected from 109,659 participants aged 12+, covering all provinces and territories. Multimorbidity was measured by counting the co-occurrence of two or more chronic diseases within a person. Multiple logistic regression modelling (accounting for unequal probability of selection and design factors such as stratification and clustering) was used to assess the adjusted effects of the lifestyle variables on the likelihood of experiencing multimorbidity.

Results: The overall prevalence of multimorbidity was 33%. The likelihood of experiencing multimorbidity was significantly higher for females, older people, white Canadians, widowed/divorced/separated, those with primary education or less, for non-immigrants compared to the landed immigrants, for non-working and lower income groups ($p < 0.001$). Adjusting for sociodemographic variables, four lifestyle factors were significant predictors of multimorbidity: having a sedentary lifestyle (OR=1.06; CI:1.01-1.11), cigarette smoking (OR=0.79; CI:0.74-0.84), being obese (OR=1.37; CI:1.32-1.43) and overweight (OR=2.65; CI: 2.54-2.76), and alcohol intake (OR=0.83; CI: 0.75-0.91). There were also significant interaction effects of sex and smoking, and immigration status and alcohol intake on multimorbidity.

Public Health Implications: Given the high prevalence of multimorbidity among the general Canadian population, these findings imply that policy makers and service providers should give more attention to the behavioral/lifestyle factors which significantly predicted multimorbidity. Policy and program efforts that promote health lifestyle should be a priority concern.

Abstract 34

Developing a Child-to-child health education program for First Nations middle school students in Rural Saskatchewan

Authors: Aiyer, Harini^{1*}; Premkumar, Kalyani¹
Department of Community Health and Epidemiology
*harini.p.aiyer@usask.ca

Conflicts of Interest: None

Background and Rationale: Saskatchewan has the second highest number of Indigenous Peoples in Canada. The Indigenous communities that live on reserves face several barriers to accessing healthcare due to lack of accessibility and extensive travel time. There is a need for culturally sensitive health education to empower indigenous youth with health information to increase their health literacy and ultimately increase their agency.

Methods: This project proposes to conduct a pilot study adopting the child-to-child approach to design a health education program for middle school students on a reserve in Saskatchewan. It will use videos as a platform for sharing information. The study will follow a Concurrent Mixed Methods Design (QUAL + Quant). In-depth semi-structured interviews and sharing circle discussions will inform the qualitative portion of the study. Pre-test and post-test questionnaires will be used to measure the change in subject knowledge of the students. Every stage of the program, including the curriculum development, will actively involve community Elders, school teachers, health professionals, and student representatives.

Public Health Implications: The Child-to-Child approach to health advocacy has the potential to empower children with health information that can facilitate health behavior change in themselves, their families, and their communities. The Child-to-Child approach has been implemented in several countries globally and has been successful in increasing the health literacy of middle and high school students in remote, rural communities by empowering them with health information. The students become health advocates in their families and communities and are capable of responding to diseases in their communities.

Abstract 35

Influence of Sleep Apnea as a Determinants of the Prevalence of Type 2 Diabetes Mellitus: A Complex Survey Analysis among Canadian Adults

Authors: Alam, Md Saiful, Punam Pahwa

Contact info:

MD Saiful Alam

MSc. Student

Department of community health and epidemiology

University of Saskatchewan

Conflicts of interest: The authors declare no conflict of interest. This project is not externally funded, hence external influencer had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

Background and rationale: Type 2 diabetes mellitus (T2DM) is highly preventable, yet Canada is experiencing a substantial increase in prevalence over the past few decades, which adversely impacts individuals as well as the community. A limited research has been conducted to assess the association between sleep apnea and type 2 diabetes in Canadian population. Hence the purpose of this study is to investigate the association between sleep apnea and T2DM along with the presence of other notable predictors (such as BMI, income, and age) of T2DM by using the Canadian Community Health Survey (CCHS) 2015-16 dataset.

Methods: For this study, a nationally representative sample of 100,679 respondents aged ≥ 18 years (46% male; 54% female) who participated in CCHS 2015-16 was used. We analyzed data using logistic regression method accounting for (i) unequal probability of selection via weights provided by Statistics Canada and (ii) design effects (stratification and clustering) via Taylor Linearization technique.

Results: Respondents having sleep apnea had a higher tendency (20.13%) to develop T2DM compared to non-sleep apnea patient. Sleep apnea (OR 1.65, CI: [1.41 - 1.92]) had shown a strong association with T2DM. Canadian adult males had demonstrated a higher prevalence (7.79%) of T2DM compared to females (6.05%). Increasing age (age 60-74, OR 5.99, CI [0.55 - 64.96]) and obesity (OR 2.06, CI [0.24-17.43]) significantly contributed to the higher prevalence of T2DM. . Statistically significant interactions were observed between household size and education, immigrant status and household income and between age and BMI.

Public health implications: Significant association of sleep apnea with diabetes prevalence is a unique finding and demands future research to explicate the underlying mechanisms. Additional findings based on significant interactions may inform future public health programs, to focus interventions specially tailored for vulnerable groups such as immigrants and of low socio-economic status.

Abstract 36

Migraine: Another Health Disparity in Canada

Authors: Lizbeth Hernández-Ronquillo^{1,2}, Jose F. Téllez-Zenteno², Lillian Thorpe¹, Bonnie Janzen¹ and Punam Pahwa^{1,3}

¹Community Health and Epidemiology, University of Saskatchewan;

² Department of Medicine, Division of Neurology, University of Saskatchewan, Saskatoon, SK, Canada;

³ Canadian Centre for Health and Safety in Agriculture (CCHSA), Saskatoon, SK, Canada.

Conflict of interest: No conflict of interest

Background and rationale: Previous Canadian studies measuring the prevalence of migraine headache have mainly focused on biological associated factors. This study determines the prevalence of migraine headache and associated factors for self-reported migraine headache in a Canadian population aged 12 years and older.

Methods: Using data from the 2015-2016 Canadian Community Health Survey, the prevalence of migraine headache was determined through self-reported, health professional diagnosis. Individual, demographic, and contextual exposures were assessed. A weighted logistic regression analysis was performed to account for the unequal probability of selection. Robust variance estimates were obtained via Taylor linearization technique.

Results: The overall prevalence of self-reported migraine headache was 10.5%, with a higher prevalence in females (14.6%), and individuals aged 40-49 years (14.4%). Weighted logistic regression analysis indicated the following factors were associated with self-reported migraine headache: self-identified Aboriginal status (OR:1.22, 95%CI:1.05,1.41), low income HH (OR:1.16, 95%CI:1.01, 1.32) and individuals with stroke (OR:1.47, 95%CI: 1.1,1.9), Individuals who self-reported migraine headache also disclosed poorer health (OR:3.06,95%CI:2.90,4.70), and greater use of hospital emergency service (OR:3.50, 95%CI:2.34,5.22). Significant interactions included: sex and age (higher prevalence in females aged 40-49 years); sex and anxiety (higher prevalence in females with anxiety disorders); mood disorder and use of the emergency room (higher rates in individuals who self-reported migraine headache and mood disorder were higher uses of emergency room services); and anxiety disorder and perceived health (higher rates in individuals who self-reported migraine headache and anxiety disorder also reported poor self-perceived health).

Public Health implications: We found significant demographic, contextual, and individual characteristics associated with individuals who self-reported migraine headache in Canada. These finding will expand the knowledge of migraine headache, as well as assist in the development and targeting of prevention and primary health services.

Abstract 37

Physical activity and chronic back disorders: Results from eight cycles of the Canadian Community Health Survey

Authors: Angarita-Fonseca Adriana^{1,2}, Trask Catherine³, Bath Brenna⁴

¹PhD Candidate, Community Health and Epidemiology Department, University of Saskatchewan, Canada;

²Researcher, Programa de Fisioterapia, Universidad de Santander, Colombia;

³PhD. Associate Professor, Canadian Centre for Health and Safety in Agriculture [CCHSA], University of Saskatchewan, Canada;

⁴PhD. Associate Professor, School of Rehabilitation Science, University of Saskatchewan, Canada.

Contact information of presenting author: email: adri.angarita@usask.ca;

cellphone number: +3068803430

Conflicts of Interest: None.

Background and Rationale: Although two recent meta-analyses concurred that physical activity reduces the likelihood of reporting chronic low back pain, there have been inconsistent findings about the association between physical activity and chronic back disorders.

Objective: To examine the association between physical activity levels and chronic back disorders in Canadian adults aged 18-65.

Methods: The Canadian Community Health Survey (CCHS, 2007-2014 cycles), an annual cross-sectional survey, was used in this study. Chronic back disorders were defined as: having back problems, excluding fibromyalgia and arthritis, which have lasted or are expected to last 6 months or more and that have been diagnosed by a health professional. A physical activity index (combination of transportation and leisure time) was used to classify people into three categories: active, moderately active, and inactive. Analyses involved logistic regression adjusted for age, gender, urban/rural residence and province of residence, with weighted estimates across cycles pooled using fixed-effects meta-analyses. Stata 14 was used in all the analysis.

Results: The sample comprised 344,666 respondents between 2007 and 2014. Being moderately active and inactive was associated with higher odds of reporting chronic back disorders compared to being active (pooled adjusted odds ratio [OR] = 1.08, 95% confidence interval [CI], 1.03 to 1.12 for being moderately active and OR= 1.291, 95%CI 1.25 to 1.34 for being inactive).

Public Health Implications: Being actively engaged in transportation and leisure-time physical activity may protect against chronic back disorder. Further research is needed to better understand the mechanisms involved.

Abstract 38

Current evidence on prevalence and risk factors of obesity in Canadian adolescents (12-19): The Canadian Community Health Survey 2015

Authors: Gupta, Suvadra¹, Pahwa, Punam¹

¹University of Saskatchewan

Contact: sdg314@usask.ca

Conflicts of interest: We declare that the authors do not have any conflict of interest.

Background: Overweight and obesity are considered primary risk factors for a number of chronic diseases. Limited research is available with a focus on adolescents. Objective: To determine the prevalence of obesity in Canadian adolescents between 12 to 19 years of age and associated factors using the Canadian Community Health Survey (CCHS): 2015-16 data.

Methods: We analyzed the CCHS 2015-16 data for population aged 12 to 19 from 8 provinces and 2 territories. Obesity was determined from self-reported height and weight measurements. Covariates including socio demographic characteristics, food insecurity, and daily consumption of fruits and vegetables as well as multiple interaction terms were tested for association with obesity. A multivariable weighted logistic regression model was fitted and strength of association was informed by odds ratios estimates and confidence intervals.

Results: More than one-fifth of the Canadian adolescents aged 12 to 19 years were obese and the highest rate of obesity was found in Québec. Household food insecurity significantly predicted obesity among adolescents (OR=1.818, 95% CI: 1.19-2.75). Adolescents that consumed fruits and vegetable 5 to 10 times a day had significantly lower odds of being obese (OR =0.68, 95% CI : 0.51-0.91). , Adolescents from severe food insecure households were three times more likely to be obese compared to the food secure households (OR= 3.18, 95% CI:1.15-8.94). Interaction between age and sex, age and household food insecurity, times of vegetables and fruits consumption and sex significantly predicted the probability of obesity.

Public Health implications: A number of physical and psychological changes occurs in human body during adolescence. Thus, detailed information on the risk factors of obesity in adolescents is critical for designing effective interventions to combat obesity.

Abstract 39

Physical activity and chronic back disorders in Canadian adults: Analysis of repeated measurements using the National Population Health Survey

Authors: Angarita-Fonseca Adriana^{1,2}, Trask Catherine³, Punam Pahwa⁴, Bath Brenna⁵

¹PhD Candidate, Community Health and Epidemiology Department, University of Saskatchewan, Canada;

²Researcher, Programa de Fisioterapia, Universidad de Santander, Colombia;

³PhD. Associate Professor, Canadian Centre for Health and Safety in Agriculture [CCHSA], University of Saskatchewan, Canada;

⁴Professor, Community Health and Epidemiology Department, University of Saskatchewan, Canada;

⁵PhD. Associate Professor, School of Rehabilitation Science, University of Saskatchewan, Canada.

Conflicts of Interest: None.

Background: Longitudinal studies investigating the relationship between physical activity (PA) and chronic back disorders CBD in the general Canadian adult population are scarce and inconclusive.

Objective: To investigate the association between self-reported leisure-time PA, utilitarian walking and cycling and CBD among a cohort of Canadian adults over 16 years, accounting for several bio-psychosocial variables.

Methods: We included 13929 participants aged 18 years and older from Statistics Canada's National Population Health Survey using nine repeated biennial measures between 1994 and 2011. Based on self-reported frequency and duration in over 20 leisure-time activities, individuals were categorized into: 1) active; 2) moderately active; and 3) inactive. Utilitarian walking/cycling was collected as time usually spend walking/cycling to work/school or while doing errands. CBD was defined as self-reported back problems, excluding arthritis, which have lasted at least six months. Using marginal models (MM) and transition models (TM) based on generalized estimating equations, we determined the respective association between 1) PA variables and CBD within the same survey cycle, and 2) PA variables within the previous survey cycle and subsequent CBD. Some potential effect modifiers were evaluated.

Results: Although leisure-time PA was not associated with CBD in the MM, those being active during leisure-time in the previous cycle had a significantly lower likelihood of reporting CBD at the subsequent cycle after adjusting for previous CBD, bio-psychosocial, behavioural and other factors. In addition, women who reported utilitarian biking >5 hours per week had greater likelihood of having CBD in the MM. BMI in the MM and previous CBD in the TM were effect modifiers of the relationship between utilitarian walking and CBD.

Conclusion: A history of inactivity is associated with subsequent reporting of CBD at a population-based level. Further research is needed to better understand this relationship and the potential of PA-based strategies to prevent CBD.

Abstract 40

Household Food Insecurity is Associated with Depressive Symptoms in the Canadian Adult Population

Authors: Shafiee Mojtaba¹, Vatanparast Hassan^{1,2}, Janzen Bonnie³, Serahati Sara², Keshavarz Pardis¹, Jandaghi Parisa¹, Pahwa Punam^{3,4}.

¹College of Pharmacy and Nutrition, University of Saskatchewan, Saskatoon, Canada;

²School of Public Health, University of Saskatchewan, Saskatoon, Canada;

³Department of Community Health and Epidemiology, University of Saskatchewan, Saskatoon, Canada;

⁴Canadian Centre for Health and Safety in Agriculture, University of Saskatchewan, Saskatoon, Canada.

Presenter author: Mojtaba Shafiee; Email: mos866@mail.usask.ca.

Corresponding author: Punam Pahwa; 104 Clinic Place, S7N 2Z4 Saskatoon SK, Canada; Tel.: +1-306-966-8300; Email: pup165@mail.usask.ca.

Conflict of interest: The authors have no conflict of interest to declare.

Background and rationale: It is essential to identify factors associated with depression as a highly prevalent and disabling mental disorder. We aimed to examine the association between depressive symptoms and household food security status among the Canadian adult population.

Methods: This is a cross-sectional study of the adult population in the five provinces and a territory (Northwest Territories) of Canada using data from the 2015-2016 Canadian Community Health Survey–Annual Component (n=19,118). Depressive symptoms were assessed using the 9-item Patient Health Questionnaire. Household food insecurity was measured using the Household Food Security Survey Module. A weighted logistic regression analysis (with robust variance estimation technique) was performed to examine the association between depressive symptoms and household food security status, adjusting for demographic, geographic and socioeconomic characteristics.

Results: Approximately 22% of Canadian adult population reported mild-to-severe depressive symptoms. However, the prevalence varied between provinces and territories, ranging from 16.4% in Prince Edward Island to 23.1% in Nova Scotia. Younger adults and females had significantly greater odds of mild-to-severe depressive symptoms (ages 18-24 years compared to ≥65 years, OR: 3.32, 95% CI: 2.09-5.27, p<0.001; and OR: 1.80, 95% CI: 1.43-2.27, p<0.001, respectively). Household food insecurity remained a predictor of mild-to-severe depressive symptoms, even after adjustment for potential confounders (OR: 2.87, 95% CI: 2.33-3.55, p<0.001). In the multivariable model, having multiple chronic diseases, having lower income, and having a past history of illicit drug use were among the three most important predictors of depressive symptoms. Unemployed participants had higher prevalence of mild-to-severe depressive symptoms, which tended to be more evident in males than in females and in younger adults than in older adults.

Public health implications: Household food insecurity is associated with depressive symptoms in Canadian adults, which requires additional research in a longitudinal design to further elucidate the nature of this relationship.

Abstract 41

Identifying total bone mineral content risk factor-related food groups with Boosted multivariate tree for longitudinal data: Saskatchewan Bone Mineral Study

Authors: Serahati Sara¹, Vatanparast Hassan^{1,2}, Pahwa Punam^{3,4}, Shafiee Mojtaba², Jandagi Parisa²

¹School of Public Health, University of Saskatchewan, Saskatoon, Canada;

²College of Pharmacy and Nutrition, University of Saskatchewan, Saskatoon, Canada;

³Department of Community Health and Epidemiology, University of Saskatchewan, Saskatoon, Canada;

⁴Canadian Centre for Health and Safety in Agriculture, University of Saskatchewan, Saskatoon, Canada.

Presenter author: Sara Serahati; Email: sas047@mail.usask.ca.

Corresponding author: Hassan Vatanparast; 104 Clinic Place, S7N 2Z4 Saskatoon SK, Canada; Tel.: +1-306-966-8866; Email: vatan.h@usask.ca.

Conflict of interest: The authors have no conflict of interest to declare.

Background: The raising prevalence of osteoporosis and bone health issues is one of the major concerns in aging population particularly in Canada. Identification of the association between individual dietary intake and bone health has been an active field of research. However, nutrients and foods have synergistic effects on each other. This study aims to identify food groups predictive of total body bone mineral density (TB-BMD).

Methods: In this longitudinal study from 1991 to 2018, 131 participants with the age range of 8-14 years at baseline, from the Saskatchewan Bone Mineral Accrual Study (BMAS) were used in this study. TB-BMD was measured using dual-energy X-ray absorptiometry. Dietary intake data from multiple 24-h recalls were summarized into 25 food group intakes. Boosted multivariate tree for longitudinal data was used to analyze the data. Boosted multivariate tree provides a powerful approach for analyzing longitudinal data in which measurements are gathered for each subject over time.

Results: currently data analysis are in final stages. Results will be ready before the conference.

Public health implications: Taking into account the increasing prevalence of osteoporosis, worldwide, particularly in Canada, and the burden of this disease on societies, preventive strategies during the early stages of life is important. The result of this study could help health professionals and policy makers to develop guidelines and strategies based on which individuals could have better food choices.

Abstract 42

What factors are associated with changes made to improve health? Findings from the Canadian Community Health Survey, 2015-2016

Authors: Aiyer, Harini^{1*}; Janzen, Bonnie¹, Pahwa, Punam¹

¹Department of Community Health and Epidemiology

*harini.p.aiyer@usask.ca

Conflicts of Interest: None

Background and Rationale: Limited research has looked at changes made to improve health in a Canadian context. The objective of this study is to examine data from the Canadian Community Health Survey 2015-16 to identify the demographic and lifestyle characteristics associated with making healthy lifestyle changes.

Methods: The study design is cross-sectional and respondents were 12 years or older. The dependent variable is whether a change was made to improve health over the past year (yes/no). Independent variables include sex, age, ethnicity, and educational attainment, as well as individual factors such as body mass index (BMI), physical activity index, smoking, drinking and illicit drug use. Other covariates are household smoking status and the presence of at least one chronic illness. Univariate analysis using chi-square analyses and logistic regression has been conducted. Future analysis will involve multivariable logistic regression. The results presented are weighted and all analyses will be performed using STATA 15.

Results: Preliminary results show that 55.64% of the general Canadian population made changes to improve health. Indigenous Canadians (OR= 1.31; 1.11,1.55) and visible minorities (OR= 1.31; 1.08, 1.58) had higher odds compared to Caucasians.

When compared to those with less than a secondary school education, the odds of making a change were greater for those with a secondary school graduation 1.62 (OR=1.62; 1.35, 1.94) and those with a post-secondary certificate (OR=1.47;1.31, 1.66) Those with at least one chronic condition were 1.38 (95% CI: 1.23, 1.55) times more likely than others; individuals with a mental health condition were 1.85 (95% CI: 1.58-2.15) times more likely to make changes than those without.

Public Health Implications: This knowledge can be useful in designing public health programs to improve the adoption of healthier lifestyles especially among more vulnerable groups, facilitate long-term maintenance of healthy lifestyle choices, and reduce disparities in disease risk.

Abstract 43

Rheumatoid arthritis and the associated environmental risk factors for the development of rheumatoid arthritis among Canadian adults: The Canadian Community Health Survey, 2015-2016

Authors: Parisa Jandaghi¹, Hassanali Vatanparast¹, Mojtaba Shafiee¹, Pardis Keshavarz¹, Sara Serahati², Pahwa Punam²

¹ School of Pharmacy and Nutrition, University of Saskatchewan, Saskatoon, SK S7N 2Z4, Canada;

² School of Public Health, University of Saskatchewan, Saskatoon, SK S7N 2Z4, Canada.

Background and Rationale: Arthritis as a multifactorial chronic inflammatory disease is a major public health problem in Canada, causing chronic pain and mobility limitation, especially in elderly adults. The prevalence of arthritis has been increasing because of aging population in Canada, so we aimed to determine the prevalence and potential risk factors including lifestyle, demographic and socio-economic factors among different province and ethnic groups in Canadian population.

Methods: Cross-sectional data from the Canadian Community Health Survey 2015-2016 was used to investigate the prevalence and associated risk factors for arthritis in adults (n=98,228). All Canadian provinces were included in the study. Data on history of arthritis and potential factors including age, sex, weight, height, marital status, income, education, fruit and vegetable intake, physical activity, smoking status, alcohol use, life stress, immigration status, ethnicity, were captured through self-report. In addition to descriptive statistics, weighted Logistic regression analyses with robust variance estimation procedure were used to determine the relationship between arthritis and potential factors in a univariate and multivariable model.

Results: Over 21% of Canadian adult reported having arthritis with higher prevalence in women (OR:1.97, 95%CI:(1.72-2.26)) and obese individuals (OR:4.39, 95%CI:(1.67-11.51)), and older age groups (OR: 71.66, 95%CI:(43.10-119.16)). Province of residence and ethnicity differences were also observed. Except for marital status, smoking and alcohol, all aforementioned potential factors were significant (P≤0.05) in multivariable model. We found interaction between age and BMI, age and smoking, BMI and alcohol, and sex and stress in predicting arthritis.

Public Health Implications: Based on our findings, aging is the most important factor among other risk factors of arthritis, interacting with BMI, smoking, so elderlies should be focused in the population by policy makers.

Abstract 44

An Environmental Scan of Maternal Mental Health Practices in Saskatchewan: An Update on the Implementation of the Maternal Mental Health Strategy

Authors: Maeve, McLean, MPH Candidate¹, Warkentin, Jordyn, MPH Candidate¹, Judge, Allap, MPH Candidate¹, Bowen, Angela, Professor², Winqvist, Brandy, Executive Director of Academics and Learning³

¹School of Public Health, University of Saskatchewan, Saskatoon, Saskatchewan Canada;

¹College of Nursing, University of Saskatchewan, Saskatoon, Saskatchewan, Canada;

³Saskatchewan Health Authority, Saskatchewan, Canada.

*Corresponding Author:

Maeve McLean

School of Public Health

University of Saskatchewan,

104 Clinic Place,

Saskatoon SK, Canada, S7N 2Z4

Telephone: 306-290-4339

Email: maeve.mclean@usask.ca

Conflict of Interest: There are no known financial or personal circumstances that may compromise, or have the appearance of compromising the research team's judgement in conducting or reporting the current research.

Background and rationale: High rates of anxiety and depression among mothers is an ongoing and persistent health concern in Saskatchewan. In the province, one in four new mothers will experience severe anxiety or depression. Maternal anxiety and depression has been associated with a number of individual, social, and economic costs. Following the release of the Maternal Mental Health Strategy (MMHS) in 2009, implementation appeared inconsistent, with a lack of commitment from all regions. At the request of the Saskatchewan Health Authority (SHA), this environmental scan was undertaken to evaluate the implementation status of the MMHS across the province.

Methods: A survey was designed to compare each program's usual practice with best practice guidelines for education, screening and treatment, outlined by the MMHS. The survey was sent out to key informants in public health, community mental health, primary healthcare, KidsFirst, and specialized programs. The survey included both closed-ended and open-ended questions. Redcaps was used to gather survey information and data was analyzed using SPSS and NVIVO software.

Results: While improvements have been made, including greater awareness of MMH and use of the EPDS, future efforts should aim to increase healthcare provider training, online MMH resources, partner screening, the use of the WASTE and TWEAK to screen for family violence and substance use among mothers, the accessibility of medication and social support treatment options and to reduce MMH wait times for care.

Public Health Implication: Findings shows that there continues to be discrepancies between the MMHS and the implementation of its strategic recommendations across service lines and geographical zones throughout Saskatchewan. While there are some valid explanations for these gaps, they may also represent unequal access to resources, screening, and treatment for mothers. We are hopeful that the new SHA will be a bridge to rectify these gaps.