Department of Health Sciences
CARLETON UNIVERSITY

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HEALTH SCIENCES

Proposed Research Project
Master of Science in Health: Science, Technology and Policy
Carleton University, Ottawa, ON, Canada

Project 1

Project Title

Mitochondrial Patient Registry

Supervisor / Organization

Martin Holcik [external partner: MitoCanada]

Project Objective

The objective of this project is to continue with the development of the registry of mitochondrial patients in Canada as part of the MitoCODE platform. This will entail expanding on the research questions that resulted from the scoping review of the existing patient registry platforms. The secondary objective is to analyze the available electronic health records to begin to uncover links between mitochondrial and inflammatory/immune diseases.

Proposed Team

The student team will consist of 2-3 students from the MSc:HSTP program. Ideally the students will have experience with conducting literature review and analysis of databases, and basic training in epidemiology. Experience with patient partnership and/or chart review is an asset.

Duration

The duration of the project is 18 months.

Background

Mitochondrial diseases are a large group of clinically and genetically heterogeneous disorders. Clinically, they present at any age, show a wide spectrum of organ system dysfunction, and range in severity from relatively mild disease to neonatal or even antenatal lethal presentations. Prevalence estimates are variable but conservatively, mitochondrial diseases affect at least 1 in 8,500 persons. Research into mitochondrial disease processes and treatments is limited yet has great potential to improve care and outcomes for affected individuals and is also likely to have implications for those affected by more common chronic diseases that have features of mitochondrial dysfunction (e.g., Alzheimer's disease, Parkinson's disease, diabetes). Due to the variety of symptoms associated with mitochondrial disease, it often takes many years of uncertainty, frustration, and endurance for patients to receive an accurate diagnosis. Even after diagnosis is given, patients with mitochondrial diseases face another significant challenge when they learn that the treatment may not exist. An additional challenge for both patients and health professionals (clinicians and researchers alike) is the fact that there is no centralized registry of mitochondrial patients in Canada. MitoCODE is envisioned to be a comprehensive, first-in-the-world patient-centered data management platform for collecting, sharing and analysing clinical and research data, serving both as a patient and a clinician/research portal.

Logistics

The students will be based at Carleton University.

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Project 2

Project Title

To promote and assess healthy active living among children and youth

Supervisor / Organization

Dr. Mark Tremblay, Children's Hospital of Eastern Ontario (CHEO) Research Institute

Project Objective

There are several possible projects that align with the Healthy Active Living and Obesity (HALO) Research group mandate:
As a part of a multidisciplinary centre of excellence in healthy active living and obesity research for children and youth that will:

- Advance the understanding and promotion of health and wellness where children live, play and learn.
- Develop, evaluate, and mobilize innovative strategies to prevent, manage, and treat obesity and lifestyle-related diseases.

More information about the group is available at www.haloresearch.ca.

Proposed Team

The student team will consist of 1-3 students from the MSc HTSP program. Ideally, the students will have some experience with conducting literature reviews, developing Research Ethics Board applications, experience working with children, some knowledge of quantitative and qualitative methods, some knowledge of and appreciation for healthy active living, and a willingness to work hard and get engaged.

Duration

The project will require 18-20 months to complete.

Background

Any position will have elements of literature searches, research, partnership development and networking, and knowledge translation.

The Healthy Active Living and Obesity Research Group (HALO) is located within the Children's Hospital of Eastern Ontario Research Institute (Ottawa, Canada). HALO provides international leadership and research excellence in healthy active living for the promotion of health and wellness in children and youth, including the prevention, management and treatment of obesity. The HALO team is comprised of a multidisciplinary group of research scientists, clinicians, research staff, administrative support personnel, graduate and practicum students, post-doctoral fellows and medical interns and residents. Working with local, provincial, national and international partners and stakeholders, HALO is committed to advancing the understanding and importance of promoting healthy active living, with a mission to preserve, enhance and restore the health and wellness of our most precious resource, our children.

Logistics

Most project tasks will be conducted at the CHEO Research Institute. Students may be required to travel to study recruitment sites (e.g., child care centres, schools) with senior research members (car is not required). Weekly updates will be conducted via teleconference and/or in-person meetings.

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Project 3

Project Title

Social and Spatial Inequities in Cause-Related Mortality: A Multiple-Cause of Death Approach

Supervisor / Organization

Paul Peters, in collaboration with Statistics Canada

Project Objective

This project will systematically examine socioeconomic and spatial variation of mortality and evaluate the risks and prevalence for multiple causes of death. Students will combine analysis of multiple-cause mortality and socio-demographic indicators using administrative and census-linked data sources with the development of interactive data visualization.

Background

The study and practice of epidemiology and public health benefits from the use of core demographic statistics such as mortality rates, usually based on a single underlying cause of death. However, the assumption that each death is caused by exactly one disease is debatable. Additionally, research has shown that there is a relationship between the frequency of coexisting multiple causes of death and socio-demographic factors. To date, we haven't identified any studies that examine multiple causes of death using large linked cohorts to examine multiple causes of death against social and spatial inequities systematically. As such, our project will examine multiple cause mortality and examine the socio-spatial variations of coexisting multiple causes of death using Census-linked administrative data.
The analysis is expected to generate a significant amount of output data. As such, in order for these outputs to be made accessible, it is necessary for the concurrent development of a data visualization dashboard. This will allow data to be explored geographically, through interactive tables, and via dynamic charts. These dashboards have become commonplace through the COVID-19 pandemic and their utility for disseminating complex data and trends to the public cannot be understated.

Proposed Team

Member 1: Data analysis using vital statistics; Member 2: Data analysis using linked census data; Member 3: Data visualisation tool development

Duration

September 2021 - April 2023 (20 months)

Logistics

Dr. Paul Peters will provide direct supervision of students. Analysis of data will occur within the Statistics Canada Research Data Centre at Carleton University.
Michael Tjepkema from Statistics Canada will provide support on use of linked administrative data and methods.

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Project 4

Project Title

Effect of Increasing Sleep Duration on Insulin Sensitivity in Adolescents having Risk Factors for Type 2 Diabetes

Supervisor / Organization

Dr. Jean-Philippe Chaput, Children's Hospital of Eastern Ontaro (CHEO)

Project Objective

To determine if extending sleep duration improves insulin sensitivity in adolescents presenting with risk factors for type 2 diabetes.

Proposed Team

Data collection is ongoing for this research project and only 1 student from the MSc HTSP program is needed. The student will be part of a research team assigned to this project that includes one Principal Investigator, 1 PhD student, 1 MSc student, 1 research nurse, and undergraduate students.

Duration

The project will require 18-20 months to complete.

Background

The influence of sleep extension on glucose homeostasis in adolescents at risk for type 2 diabetes is unknown. This issue is of high clinical relevance given the high prevalence of sleep deprivation in this population and the accumulating body of evidence indicating that having a good night's sleep is important for the prevention of chronic diseases including type 2 diabetes. We hypothesize that compared with decreasing sleep duration, increasing sleep duration by 1.5 hours over 1 week will improve insulin sensitivity. Using a randomized, counterbalanced, 2-condition crossover design, 30 obese adolescents between 13 and 18 years of age who have insulin resistance will complete the study. Participants will sleep their typical amount at home for 1 week and will then be randomized to either increase or decrease their time in bed by 1.5 hours per night for 1 week, completing the alternate schedule on the fourth week (washout period of at least 1 week between sleep conditions). This procedure will result in a targeted 3-hour time in bed difference between conditions. Sleep will be objectively measured using actigraphy (Actiwatch) and sleep schedule adherence will be promoted by providing fixed bedtimes and wake times during the experimental weeks, and will be monitored through phone calls to the research center. We will then compare outcome measures between both sleep conditions at the end (on day 8 of each study week). The primary outcome measure will be insulin sensitivity as measured by the homeostasis model assessment of insulin resistance (HOMA-IR; hepatic insulin sensitivity) and the Matsuda index (total body insulin sensitivity).

Research Project Components:
1. Review the literature on the topic
2. Recruit participants, collect data, and analyze data
3. Present research findings

Logistics

The study is being conducted at CHEO and will comply with all COVID regulations.

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Project 5

Project Title

Strengthening Practices: A Participatory Action Research Approach to GIS Mapping and Trauma- and Violence- Informed Physical Activity

Supervisor / Organization

Drs. Francine Darroch & Paul Peters (Carleton) & Lyndsay Hayhurst (York University)

Project Objective

Through community-based participatory research (CBPR) we aim to examine, adapt, and scale-up access to trauma-and violence-informed physical activity (TViPA). The use of geographic information systems (GIS), critical spatial thinking and participatory mapping will inform and support community-developed programming and reinforce the importance of participatory research through a comparative case-study.

Proposed Team

The student team will consist of 1-3 students from the MSc HTSP program.

Duration

The project will require 18-20 months to complete.

Background

In order to examine and develop appropriate physical activity programming and to compare location specific requirements, we will employ a socio-spatial framework to gather, manage, and analyze geographically referenced information. Spatial analysis will permit the examination of community profiles, crime patterns, urban food deserts, and trends within the two communities (e.g., harm reduction and safe injection sites, proximity and use of park(s)/playground(s), emergence of tent cities).

Neighborhood-level spatial and socio-demographic data will be analyzed and heavily augmented with community-relevant local knowledge (e.g., narratives, photographs, sketch maps, video images) to document the gamut of neighborhood conditions and broader health context. We will ground this analysis in community perceptions of space and place.

This work will be also be grounded in qualitative research through semi-structured interviews and focus groups with community members. Through the application of GIS software, we will integrate participatory maps within quantitative mapping. The value of this data extends beyond the simple description of spatial variables given the data originates from stakeholder involvement and ensures the legitimacy of the research process and outcomes. Despite overlapping marginalizing circumstances, each community has diverse needs and varied physical, political, and financial landscapes.

It is anticipated that aspects of this work will involve development of online mapping tools, data generation alongside community members, and creative integration of qualitative stories within quantitative frameworks.

Logistics

Dr. Francine Darroch will be the direct supervisor. Dr. Paul Peters will support the GIS mapping. Dr. Lyndsay Hayhurst will co-supervise and facilitate the Toronto connections.

Project 6

Masters of Health Science Technology and Policy Research Project Proposal

Project Title

Understanding access to community and healthcare supports for adults with sensory disabilities in Ontario

Supervisor/Organization

Dr. Mahadeo A. Sukhai, Head of Research and Chief Accessibility Officer, CNIB

Project Objectives

1. To use an integrated series of virtual consultations to conduct a needs assessment of the community of adults with sensory loss in Ontario, focusing on access to community and healthcare supports;

2. To develop recommendations for community action based on the outcomes of the research and consultations in Objective 1

Proposed Team

The student researcher for this project will be working alongside the CNIB research and IDEA (Inclusion, Diversity, Equity and Accessibility) Teams on this project. The student researcher will be treated as a full member of the Research and IDEA teams, with supervision from the Head of Research, Dr. Sukhai. Dr. Sukhai is a PhD-level scientist and researcher with more than 20 years research experience and more than 15 years parallel experience as an accessibility professional. CNIB is unique among disability-sector non-profits in the close alignment between an academic-quality research team and a professional accessibility team. Research into accessibility and inclusion, and research done in an inclusive and accessible manner, are the twin drivers of the work of the combined teams.

Duration

This project is anticipated to take 18 months (September 2021- April 2022).

Background

In our recent COVID-19 impact survey of adults with sight loss in Canada, more than half of survey respondents indicated that they were concerned about their ability to interact with their community, and the mental health consequences of social isolation during the pandemic. Understanding the specific needs of adults with sensory loss (sight loss, hearing loss and who are Deafblind) in terms of civic engagement, accessing community and healthcare supports, and accessing information within their local communities is especially timely because of the ongoing impact of the pandemic on "nonessential" social and health services within the province.

Successful achievement of the aims of this proposal will facilitate the development and implementation of local community-specific action plans that will be effective in achieving increased community engagement for adults with sensory disabilities. The COVID-19 pandemic has significantly, disproportionately, and negatively impacted the social engagement of adults with disabilities in their local communities. Because of a lack of accessible communication formats (ASL, captioning and/or oral interpretation, Braille, large print) and the potential for social stigma associated with going mask-less or interacting with items by touch, adults with sensory disabilities have been particularly hard hit. With this in mind, it is particularly appropriate to conduct a series of linked community needs assessments focusing on this population.

Relevance to COVID-19. The proposed project will follow up on our existing preliminary data on the impact of COVID-19 on adults with sensory loss, in order to assess the long-term (more than one year) consequences of the pandemic on access to community and healthcare supports, access to information, and civic participation for this population, as well as to conduct a needs assessment grounded in the impact of the pandemic.

Who will benefit from the work. The population that will benefit most from this work will be adults, including aging adults over the age of 65, with sensory loss (sight loss, hearing loss, and who are Deafblind). We have taken the unique approach of considering this population – which represents only about 1 in 12 total of all adults in a given community, or just over 1 million adults in Ontario – as a cohesive whole, and will consider our results using community size as a variable in the analysis.

Logistics

In this project, we aim to achieve a deep understanding of the current state of the needs of adults with sensory loss in their local communities, via a set of virtual consultations (key informant interviews and focus groups; qualitative, narrative approach), Data collected from both approaches will be integrated into a coherent needs assessment and set of recommendations for action at the local/municipal level. As part of the knowledge mobilization strategy for the project, we will provide project findings to local Accessibility Advisory Committees and research participants, as well as members of the sensory loss communities in Ontario.

Data will be analyzed and disaggregated according to a series of social identities collected as part of the study, including, but not limited to, community size, age, gender identity, race/ethnicity, immigration status, and membership in Indigenous communities. Results, when compiled, will be presented to a group of community members, and we will use an inclusive design approach to develop a series of recommendations for action and implementation. We will then work with advocates at the local and municipal levels to present these data to Accessibility Advisory Committees and relevant local governments for action.