Presenter's Name: Chaplin, Ava

Additional Authors: Simon A, Kohalmi S

Abstract Title: Impact of the COVID-19 Pandemic on Undergraduate Research in the Department of Biology at the University of Western Ontario: Effect on project types, learning outcomes, and student perceptions.

Introduction: The COVID-19 pandemic has prompted academic institutions across the world to adopt online or blended models of learning. As a result, laboratory and research-based classes, which play a pivotal role in the undergraduate experience of students in the fields of science, technology, engineering, or math (STEM), have been heavily constrained. This study aims to assess how restricted access to laboratories due to the COVID-19 pandemic has impacted: (1) the number and types of undergraduate research projects performed in the Department of Biology at the University of Western Ontario, (2) the experience and satisfaction-levels of students performing these projects, and (3) students' perceived learning outcomes.

Methods: A literature review, an examination of administrative documents, and a survey of over 60 students who completed an undergraduate research project in Biology in the 2020/2021 academic year or in the 4 years prior was conducted to assess the impact of the COVID-19 pandemic on undergraduate research. As well, in keeping with the One Health approach, a stakeholder map was constructed.

Results: Data analysis, which consists of both quantitative and qualitative methods, is still underway although it is expected to be completed in time for the Pathology Research Day.

Discussion: Results from this study will allow for a greater understanding of the impact of the COVID-19 pandemic on post-secondary education and undergraduate students' research experience. Findings may be of use to other departments and educational institutions that are seeking to improve their own undergraduate research courses amidst the COVID-19 pandemic or looking to incorporate experiential-based learning techniques into existing online courses.

Presenter's Name: Marginean, Teodora

Additional Authors: Gibson CJ, Olea Popelka FJ

Abstract Title: Emerging from the 'fog of war' – communications and the role of media during COVID-19

The rapid emergence and spread of COVID-19 has led to the greatest global disruption to daily life in the 21st century. During this pandemic, decision-makers have relied on media outlets such as television networks and newspapers to disseminate information about health risks and personal protective directives to concerned citizens. The public looks to these media outlets for clear and concise communication, but messaging from multiple, conflicting sources and authorities have led to mass confusion and frustration.

This project examines communications during the pandemic in Ontario to elucidate what messages worked, what went wrong, and what authority or expert groups dominated COVID-19 discourse as sources of information. The research particularly aims to gain deeper insight on the effects of media messaging on public perception and understanding of mask-wearing and restriction directives. An analysis of articles from newspapers representing local and national perspectives will allow for a better understanding of messaging relayed to the public from different authorities, while the creation of a stakeholder map and identification of colleagues working on similar research topics will highlight areas for improvement during this pandemic and future crises. Factiva and Canadian Business and Current Affairs, two news databases, were used to search for and select articles from the Toronto Star (n = 4680) and Globe and Mail (n = 1220). Key information such as headlines, experts mentioned, and tone will be extracted and categorized in Excel. Using grounded theory principles, the content of these articles will be analyzed and coded to identify overarching themes and sub-themes. Acknowledging the multitude of experts involved in this issue, Kumu.io software will be used to map key stakeholders identified from the database analysis and will elucidate cross-discipline collaborations and involvement in decision-making. Colleagues from Western University will also be identified, and connections will be established to share resources and create potential knowledge translation tools.

These findings will allow us to produce a list of lessons learned that can aid in improving media communications during future crises. Gaps, errors, and successes in messaging will be useful knowledge not only for media outlets, but for public health experts and government authorities. A One Health lens is applied throughout the research project for a multisectoral understanding of messaging regarding human health, animal health, and environmental health.

Presenter's Name: Nichols, Vanessa

Additional Authors: Frisbee, SJ

Abstract Title: Socioeconomic Characteristics in Patient Use of Virtual Cardiac Rehabilitation During COVID-19

Cardiovascular disease (CVD) is the second leading cause of death in Canada and puts a significant burden on our health care system. Cardiac Rehabilitation and Secondary Prevention (CRSP) Programs teach patients how to be more active and make lifestyle changes that can lead to a stronger heart and better health. In response to the COVID-19 pandemic, CRSP programs across Canada have suspended in-person services and have been forced to rapidly transition to remote-only care. This rapid transition means that all aspects of treatment including exercise training, therapeutic education and communication with the care team, are through digital means only. Resumption of patient intake requires a screening and triaging process to maximize limited resources and social return. Patients were subsequently assigned to one of four priority categories [Red, Yellow, Green, Blue] using clinical judgement to assess patient risk and determine eligibility for virtual care.

This is a retrospective cohort study using summary tables of demographic and clinical information from a single CRSP site in Ontario, Canada.

The primary aim of this paper is to analyze the demographic and socioeconomic factors associated with each triage category of patients who utilized CRSP services during the pandemic. These findings can be used to identify vulnerable patient populations who may not engage with virtual programming, yet still require medical care in a changing health care delivery landscape.

Presenter's Name: Postill, Gemma

Additional Authors: Postill G, Olea-Popelka FJ, Daley M

Abstract Title: The Earliest Indication of the COVID-19 Pandemic's effects on Suicides in Ontario

Introduction: The COVID-19 pandemic has impacted mental health through both the uncertainty it creates and the social isolation response. Suicide rates can be used to understand such impacts and if available in real-time, would improve mental health outcomes during the pandemic. Ontario's digital cremation records, which include 70% of all deaths in Ontario, provide a real-time source of mortality data and has been used to estimate all-cause mortality early in the pandemic. The goal of this thesis was to address this need by analyzing cremation data to identify the changes in the number provincial suicides in 2020 compared to the baseline and contextualized these results with a One Health approach.

Methods: The suicide records were identified from the cremation data by manner or cause of death variable in the record utilizing the interpreter Python. The 2020 suicide records were also be assessed for mention of 'COVID-19' in the cause of death text. The records were first separated by year as either 2020 or baseline data (2017-2018). The suicides in 2020 were compared to the baseline in terms of month, sex, age, and geospatial location. A review of scientific and 'grey' literature related to mental health and suicide was conducted to assess the human, animal, and environmental variables that influence suicide rates and the relevant stakeholders who work to reduce suicide rates.

Results: Overall, the results indicated that the pandemic had a protective effect on the number of provincial suicides with 961 suicides in 2020 compared to the 2017-2019 average of 1134 suicides. The only month that showed an increase was September (+5.9% increase over the baseline), with most of the increase occurring the week following Labour Day, which had a +63.2% increase over the baseline. The demographic analysis revelated that the only sex/age groups that showed a percentage increase in the number of suicides were females aged 19-29 years (+5.8%) and females aged 30-44 years (+25.7%). The literature review emphasized the complex mixture of risk factors (unemployment, divorce, and isolation) and protective factors (collective action, companion animals, and social support programs) that contributed to these results. The stakeholder map highlighted the need for integrated action to address the multiple risk factors.

Discussion: This was the first study to utilize cremation data to estimate, in near real-time, changes to the number of suicides in Ontario. These findings demonstrated the utility of cremation data to provide timely mortality information during a public health emergency. These early estimates of suicides are critical for understanding the mental health impact of COVID-19 and also for enabling evidence-based mental health resource allocation. The results are consistent with other literature, which highlights that the pandemic adversely affected women's preferred coping strategies (social support and emotional-focused coping) more than men's preferred coping strategies, making women more vulnerable to the negative mental health impacts of the pandemic. Additionally, the association of suicide rates with economic variable found with the One Health literature review necessitate that cremation records continue to be used to the monitor the effects that continued economic effects of the pandemic such as the discontinuation of CERB.

Presenter's Name: Qian, Yu Chen

Additional Authors: Ni R, Peng T

Abstract Title: Developing novel ssDNA aptamers targeting receptor binding domain of SARS-CoV-2 S-protein for potential diagnosis and therapy uses

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), more commonly known as COVID-19, is a novel contagious respiratory virus discovered in 2019. The spike proteins of SARS-CoV-2 bind to angiotensin-converting enzyme 2 (ACE2) on human cell membranes and allow for viral entry into the host's cells. Currently, therapeutic interventions are non-specific, and detection methods remain costly and time-consuming, but DNA aptamers may potentially solve these problems. ssDNA aptamers spontaneously fold into unique 3D structures and can bind target proteins with high affinity and specificity. We have created, PCR-amplified, and purified an ssDNA library composed of random oligonucleotides 90 base pairs in length. Using systematic evolution of ligands by exponential enrichment (SELEX) technology, we will isolate the aptamers with the greatest affinity and specificity for the SARS-CoV-2 S-protein. Interaction of ssDNA aptamer with SARS-CoV-2 S protein RBD will be determined using Enzyme-Linked Aptamer Assay (ELAA) and Western Blot. Finally, we will determine whether ssDNA aptamer(s) targeting SARS-CoV 2 S-protein RBD inhibits the virus from binding to ACE2. Using antibodies and Western Blot, we will evaluate the effects of ssDNA concentration on SARS-CoV-2 S-protein RBD interaction with ACE2. These aptamers have the potential to be developed into lost-cost and precise novel diagnostic and therapeutic tools for COVID-19.

Presenter's Name: Ryan, Sarah

Additional Authors: Sidahmed A

Abstract Title: Cytokine and Chemokine Levels in Immunocompromised and Immune-Competent Covid-19 Patients and Correlation to Clinical Outcomes

The Coronavirus disease 2019 (Covid-19) is caused by respiratory infection by severe acute respiratory syndrome coronavirus 2. Previous studies have shown that cytokine release syndrome (CRS) may be implicated in the pathophysiology of Covid-19. CRS is caused by the elevation of pro-inflammatory cytokines and chemokines. It is unknown whether immunocompromised Covid-19 patients experience elevations in cytokine and chemokine levels. We hypothesize that chemokine and cytokine levels will be lower in immunocompromised Covid-19 patients compared to immune competent Covid-19 patients. Furthermore, we hypothesize that cytokine and chemokine levels will be correlated to disease severity and clinical outcomes. We will conduct a literature search on PubMed and Western Library's Omni databases. Included will be observational studies which include patients receiving treatment for rheumatological conditions, patients with solid organ transplants, or patients with hematological malignancies. Studies involving patients in registered clinical trials for Covid-19 therapeutics or vaccines will be excluded. We expect immune competent patients to exhibit higher levels of cytokines and chemokines than immunocompromised patients. We then expect that elevated inflammatory biomarker levels be correlated to clinical outcomes and disease severity. The findings of this study could contribute to finding pharmacological therapeutics to target the Covid-19 immune response and elucidate the pathophysiology of Covid-19. The findings could also translate to clinical practice to identify at-risk patients for Covid-19 complications or more severe disease.

Presenter's Name: Sutherland, Janice

Additional Authors: Not Applicable

Abstract Title: Exploring the Relationship of Socioeconomic Position on the Learning Gap in Children Resulting from School Closures during the COVID-19 Pandemic: Health Consequences Examined

COVID-19 is a novel zoonotic disease and in a one-year time frame has shown the world the interconnections between health, politics, society and the social determinants of health. In March 2020 increasing cases in Ontario led to the province closing all elementary and secondary schools. Education is understood to be a key social determinant of health. The impact of lower educational attainment across the life-course are increased health disparities and a shorter life span. These risks arise as lower educational attainment is linked to an individual potentially having a lower income and decreased access to the resources needed to enhance an individual's health and overall well-being. With the transition to online learning an unequal burden of risk was placed on lower socioeconomic status populations who may have limited access to the tools required to participate in online learning. This disruption in learning may enhance the existing gap that exists in academic achievement related to the relationship between student and parent socioeconomic position and access to resources. For my thesis project I aim to document the impact of shifting to online learning across socioeconomic status through comparison of narratives about experiences with online learning and by analyzing the standardized test results by population socioeconomic status. I will compare the pre and post-pandemic Education Quality and Accountability Office (EQAO) scores. From there I will identify potential risks to the health of the children from the lower socioeconomic status populations.

Presenter's Name: Tong, Jaryd

Additional Authors: Lazo-Langner A, Chin-Yee B, Chin-Yee I

Abstract Title: Improving Diagnostic and Epidemiologic Detection of SARS-CoV-2

SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) is an RNA virus that has infected people in over 200 countries and territories dating back to December 2019. The virus belongs to a family of coronaviruses which have a zoonotic origin and it is thought that the virus originated from bats and made the jump to humans. The virion consists of many structural proteins, the main one being the spike protein which facilitates entry of the virus into our cells, allowing the RNA virus to be released into the cytoplasm of our cells. Due to the infectious nature of the disease, it is essential for rapid and accurate testing to be conducted. Currently, the gold standard for testing is Nucleic Acid Amplification Testing (NAAT), which relies on laboratory techniques such as RT-PCR. Although testing has been successful, there are still issues such as costs and sensitivity that need to be addressed. Our study aims to create a diagnostic algorithm, combining clinical information, laboratory information and serological tests, to create different risk categories for SARS-CoV-2 positivity, using the NAAT as the gold standard. The clinical and laboratory information was analyzed using two-tailed T tests and 2x2 contingency tables to determine if there are significant differences between patients that are positive for SARS-CoV-2 and those that are negative based on the NAAT. Serological values were used in comparison to the NAAT test to create Receiver Operating Characteristic (ROC) curves. Logistic regression models are currently being created using SPSS to construct a model that can accurately create risk groups to determine if a patient is positive for COVID-19. We expect to be able to create a model combining clinical, laboratory and serological values that can predict COVID-19 positivity. We are currently in the stages of testing different models in SPSS and some serological cut-off values have shown some results that could be applicable to a model; however, we are continuing to run statistical models to create one that is feasible and accurate. COVID-19 is still very prevalent and the costs of doing PCR testing can be fairly expensive. Therefore, by creating a diagnostic algorithm that can be close to as accurate as PCR testing, it can be used as a preliminary step to determine if a patient is at high risk for COVID-19, where a confirmatory PCR test would be done, or if they are low risk and no further testing would be needed at the time.

Presenter's Name: Yuan, Mei

Additional Authors: Yuan M, de Vrijer B, Eastabrook G, Frisbee J, Olea-Popelka FJ, Frisbee SJ

Abstract Title: A One Health approach to investigate the impact of COVID-19 pandemic response on perceived stress, postpartum depression, and pregnancy outcomes in women in Southwestern Ontario

The 2019 novel-coronavirus (COVID-19) has globally affected many people physically, mentally, socially, and economically. The challenges posed by COVID-19 may have led to increased feelings of stress and worry, especially within the pregnant population as they may be more vulnerable to additional stress experiencing pregnancy during the pandemic. Epidemiologic data supports that there is a steady increase in the proportion of complex pregnancies in Canada, associated with increased in pre-existing morbidities such as depression and obesity. Evidence show that higher levels of stress may be linked with higher levels of depressive symptoms and result in adverse pregnancy outcomes.

This project was undertaken to investigate the relationship between perceived stress and postpartum depression with subsequent implications for pregnancy outcomes and to assess the impact of the environmental and social determinants of health on these relationships. For this project, the environment will be operationalized to include the social environment of the mother. Key stakeholders in different sectors will also be identified to more rapidly disseminate and implement findings from the research to improve overall maternal health. Although One Health has been traditionally used to investigate infectious disease, the approach and principles are rapidly expanding to investigate non-infectious disease and chronic health problems. The motivation is to intentionally integrate knowledge from comparative medicine as well as understand health problems in their environmental context to approach the health issue from a more holistic perspective. This will contribute to enhancing the accuracy of understanding problems and the development of better solutions.

With REB approval, the research project include women who recently gave birth, recruited through posters and information sheets in the obstetrical clinics in Victoria Hospital in London, Ontario, to complete a 30-minute remote questionnaire. The questionnaire assesses domains such as the participant's level of perceived stress, perceived social support, postpartum depressive symptoms, healthcare satisfaction, as well as the impact of the COVID-19 pandemic response on their life and pregnancy. The collected data will be analyzed independently and in conjunction with the women's medical and pregnancy history. This cohort of data will also be compared to pre-pandemic data from the 2007 Canadian Maternity Experiences Survey to explore potential impact of the pandemic response to perceived stress levels and postpartum depressive symptoms. Furthermore, a connection map is currently being curated to encourage future collaborations between relevant stakeholders that contribute to maternal wellbeing in their respective fields.