CONFERENCE ABSTRACT BOOK OPEN ACCESS

The 1st Annual 2022 Conference for Undergraduate Health Research (CUHR): Innovations in Science

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Abstract
The 2022 Conference for Undergraduate Health Research (CUHR) was a 2-day academic conference for undergraduates to showcase their research work. CUHR 2022 was hosted by York University and welcomed 79 virtual oral presentations from 14 countries. CUHR aimed to promote interdisciplinary health research, by providing a platform to disseminate research works with implications for human health. CUHR's inaugural theme, Agents of Change, seeks to bring a group of next-generation health researchers as transformational leaders in science. CUHR accepted summer research, volunteer research, independent study, honours thesis, and internship projects. CUHR 2022 concluded on May, 28th 2022. For full itinerary of the 2022 CUHR, please visit http://www.uhre.ca.

Keywords: undergraduate research, health science, agents of change

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Conference Abstracts

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Oral Presentations in Day 1 Room A

Glycaemic dynamics in a woman with gestational diabetes mellitus

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Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. The newborn to GDM pregnancies associates with metabolic, haematological and cardiological disorders, respiratory distress, and neurological impairments. Continuous glucose monitoring (CGM) records allow analyzing glycaemic excursions related to the activity of patients during their daily routine. We analyzed the glycaemic dynamics pre-pregnancy

and during pregnancy in women with GDM, hypothesizing that women with GDM before her pregnancy have an unstable glycemia. Methods: CGM FreeStyle Libre TM device was used for glycaemia recording before (149 times, 6 months before pregnancy) and during (107 times, 32 weeks of pregnancy) pregnancy in a woman diagnosed with GDM at 24 weeks of pregnancy. The woman showed normal body mass index and was non-diabetic before getting pregnant. After GDM diagnosis, the woman was under controlled diet and exercise. CGM data were analyzed for average ($\bar{X}$), standard deviation (SD), coefficient of variation (%CV), interquartile range (IQR), mean of daily differences (MODD), mean amplitude of glucose excursion (MAGE), low (LBGI) and high (HBGI) blood glucose index. Results: The metrics $\bar{X}$, IQR and HBGI were higher in pregnancy compared with pre-pregnancy (157 vs 115 mg/dL, 53 vs 42 mg/dL, 11.6 vs 5.6, respectively). However, SD, %CV, and MAGE were lower in pregnancy (25 vs 27 mg/dL, 15.6 vs 23.1, 11 vs 15.4 mg/dL, respectively). Conclusion: GDM is associated with changes in the glycaemia dynamics compared with the pre-pregnancy period. Higher IQR and HBGI may reflect a more unstable glycaemia in pregnancy that could be ameliorated by reduced variability and intensity of changes in glycaemia. This is a pilot study in a longitudinal analysis of a patient with GDM, therefore more data is needed. (Support: FONDECYT 1190316, U Talca and UMCG PhD fellowships, VRI and DIDEMUC PUC fellowships)

Enter meeting ID here: A cross-sectional study on the impact of the study from home (SFH) setup on the macronutrient intake of undergraduate students in the College of Home Economics, UP Diliman

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The consequences of infectious diseases and in particular, the COVID-19 pandemic, have devastated numerous populations since its onset. The widespread increase in cases and casualties compelled countries worldwide to declare a state of public health emergency. Education systems have also been affected, as governments worldwide have pushed for the closure of schools to minimise the transmission of the virus. In the Philippines, the government transitioned from traditional to flexible learning. Several studies have established that the pandemic has caused changes in an individual's lifestyle, nutrition-related behaviour, and intake. Notably, a decrease in overall caloric intake was observed due to poor diet quality. This becomes a concern for students, specifically undergraduate students, as they are vulnerable to malnutrition and unhealthy nutritional habits due to their lack of time for proper meals considering their heavy workload, as well as possible lack of social support and self-discipline. Given these circumstances, this study aims to explore the impact of the pandemic on nutritional intake by examining the association of the study from home (SFH) setup on the macronutrient intake of undergraduate students in the College of Home Economics, University of the Philippines Diliman (CHE-UPD). This will help in understanding how the SFH setup has affected study-life balance in relation to nutritional status. The study participants will consist of students from the CHE-UPD to gather high response rates due to their accessibility to the researchers. Their sociodemographics and perceived daily time spent on academic-related activities will be collected using questionnaires before conducting the non-consecutive three-day 24-hour food recall to assess their usual macronutrient intake. The data from the questionnaires will be analysed using frequency and percentages in order to get the proportion of distribution of the respondents, while the association between the daily time spent on academic-related activities will be analysed using Spearman correlation.

The potential use of focused high-energy extracorporeal shockwave therapy for the control of *Streptococcus mutans* and Candida albicans biofilms

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Antimicrobial resistance has become a global problem in the field of health care. Because of this, new treatment methods have been used and others are under development. Focused high-energy extracorporeal shockwave therapy (fhESWT) has been effective for the treatment of a wide variety of conditions including biofilm-mediated diseases. However, its use in dentistry remains unexplored, where chronic biofilm-mediated diseases, such as dental caries and periodontitis, are among the most prevalent worldwide. The aim of this study was to investigate the effect of fhESWT on the growth of the clinically-relevant microorganisms *Streptococcus mutans* and *Candida albicans* in mono-species and dual-species models in vitro. For this study, an interdisciplinary approach was employed. A 3D printed model was created in order to facilitate the application of fhESWT

on *S. mutans* UA159 and *C. albicans* 90028. fhESWT were applied at increasing impulses of 0, 250, 500 and 1000. After application, serial dilutions were plated to obtain CFU counts and growth curves were carried out using a multimodal plate reader. Subsequently, biofilm formation was evaluated in a microplate assay with crystal violet staining. Significance was determined with ANOVA, considering a p-value of <0.05. No significant results were obtained for CFU counts and growth curves before and after fhESWT application for both *S. mutans* and *C. albicans*. Nevertheless, significant reductions were observed for *S. mutans* biofilm formation after the application of fhESWT compared to control. In the case of *C. albicans*, a trend towards growth inhibition was observed after the use of fhESWT, but this did not reach significance. In the dual-species model, a low number of impulses was associated with biofilm inhibition; however, the opposite was observed after 500 and 1000 impulses. The use of fhESWT is a promising alternative for the growth modulation of clinically relevant oral microorganisms and biofilms.

Ex vivo mouse models of renal fibrosis induced via ureter obstruction and cisplatin

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Renal fibrosis is a common endpoint for chronic kidney disease which affects about 10% of the global population. It is characterized as an accumulation of the extracellular matrix that can lead to end stage renal failure. Current research models include in vivo mouse models which induce fibrosis via ureter obstruction or cisplatin treatment. However considerable resources are required to generate and maintain these in vivo models, limiting current research into fibrosis and potential therapeutics. This study aims to generate ex vivo models of renal fibrosis using ureter obstruction and cisplatin treatment. The renal artery of mouse kidneys was cannulated and attached to a bioreactor allowing for ex vivo organ perfusion. Fibrosis was then generated by ureter obstruction or a one-time high dose (10mg/kg) of cisplatin. Ureter obstruction kidneys were cultured for 4, 11, and 21 days, while cisplatin treated kidneys were cultured for 1, 4, and 7 days. Masson's Trichrome and Sirius Red stains were used to detect collagen accumulation, which was used as an indicator of fibrosis. Preliminary results indicate accumulation of collagen with both models as time progresses. However, longer time points and further data analysis including but not limited to RNA sequencing and immunofluorescence staining to determine the levels and patterns of relevant renal fibrosis markers are required. Furthermore, assessing kidney function through oxygen consumption and urine production can provide insight into the effectiveness of the ex vivo mouse model for renal fibrosis.

A systematic review on evolving clinical practice guidelines (CPGs) for population screening; evidence from last three decades (1991-2020)

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Evidence-based guidelines for health policy and medical treatment including diagnostic testing for certain conditions should be based on the best available scientific evidence, and tests to screen for certain diseases are increasingly common in medical practice. However, over the last few decades, selection and detection criteria for screening and disease definitions for several important disorders have changed significantly. Major health organizations have recommended changes in several common disease definitions, often resulting in the expansion of the criteria for screening, diagnosis, and treatment, leading to overmedicalization and overuse of health services. In this study we aim to conduct a systematic literature search to reveal changing patterns in Prostate Specific Antigen (PSA) testing for routine Prostate Cancer (PCa) screening. We followed the standard procedure for systematic literature reviews, including a Prisma Flowchart and a two-phase screening method to select the final pool of research articles to be included in the study for data extraction and visualization. We screened 1880 articles for title and abstract in pairs, 53 of them were selected for full-text screening, and finally with extra articles from reviews we extracted data from 97 articles. After, we collated and visualized the results to evaluate how some of the major

policy thresholds, such as the recommended starting age for screening, screening interval and the threshold of PSA for biopsy referral changed over time, across different countries and institutions, spanning the period of 1991-2020. When we compare the screening recommendations for starting ages, screening intervals and biopsy thresholds among major health organizations in the United States and Europe, we see that despite the universal nature of the scientific evidence base, they adopt different and conflicting guidelines. We conclude that there is urgent need for better decision-support tools as a guide for health policy makers and clinicians regarding clinical practice guidelines (CPGs).

The role of the kidney in maintaining brain perfusion during acute anemia: Can experimental studies inform clinical care?

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Evidence of increased stroke incidence in patients with renal failure suggests that the kidneys play an important role in supporting brain perfusion. In addition, surgical patients with anemia (low hemoglobin) surgery have an increased risk of kidney injury, stroke, and mortality by undefined mechanism. We assessed the relationship between the kidney and brain utilizing a model of acute blood loss and fluid resuscitation (hemodilutional anemia) to test the hypothesis that the kidney plays a central role in maintaining brain perfusion. The goal of this study was to determine if removal of both kidneys (bilateral nephrectomy) in anesthetized rats affected brain oxygenation before and after initiating acute hemodilutional anemia. With Animal Care Committee approval, we performed sham or bilateral nephrectomy on anesthetized rats prior to acute hemodilution of 50% of their blood volume with hydroxyethyl starch (n=6). Heart rate, mean arterial pressure, arterial blood gases-oximetry and brain microvascular pO2 (OxyLED, oxyphor G4) were measured. Analysis by two-way ANOVA repeated measure was performed with $p<0.05$ taken to be significant. Measured values for heart rate and mean arterial pressure were not different between groups. Brain microvascular pO2 were lower at baseline in nephrectomised rats (20.2 ± 1.8 vs 32.8 ± 1.7, $p<0.001$). Following hemodilution, microvascular brain pO2 in the nephrectomised rats decreased further, significantly below baseline values (15.0 ± 1.8 vs 20.2 ± 1.8, $p=0.022$). Differences resolved after 60 minutes. Bilateral nephrectomy resulted in an acute reduction in brain microvascular oxygenation at baseline. This effect was more pronounced after acute hemodilutional anemia. These data support the hypothesis that the kidney contributes to maintain brain oxygenation under both resting conditions and after the hemodynamic stress associated with acute anemia. This suggests that the kidneys play a central role in ensuring optimal brain oxygen delivery. This information may be used to optimally treat anemic patients at risk of acute blood loss, renal injury, and stroke.

A cross sectional analysis assessing the healthfulness of menu items of Canadian chain restaurants by applying proposed Canadian front of package regulation thresholds: A research study

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Health Canada recently proposed the regulations requiring Front of Package Labelling (FoPL) on pre-packaged food items if the item is "high in" sodium, sugar and/or saturated fats (3S nutrients). However, these FoPL regulations are not applicable to foods sold in the restaurant sector, although eating out at restaurants has increasingly become a part of Canadian diets. The aim of this study was to examine the proportion of menu items in Canadian chain restaurants that would carry a FoPL, using the thresholds established for pre-packaged foods. Data were obtained from the 2020 University of Toronto MenuFLIP Database containing nutritional information from 141 Canadian chain restaurants. After exclusion of toppings/add-ons and items missing any 3S nutrients, 16,524 menu items were analyzed. Food items or meals meeting or exceeding 15% Daily Value (DV) or 30% DV respectively for any of the 3S nutrients, were assigned an FoPL. Most (89.3%) of the menu items would carry at least one FoPL, with 50.6% requiring two FoPL. Sodium (65.2%) and saturated fats (65.9%) were the two nutrients with the highest proportion of FoPL. When analyzed by food category, 78% and 80.4% of the beverages and desserts respectively, would carry an FoPL for sugar. Entrées and starters would carry the highest proportion of FoPLs for sodium (88.3% and 93.2%, respectively) and saturated fats (80.1% and 76%, respectively). These results show that a large proportion of menu items exceeded the thresholds for 3S nutrients set by Health Canada, and would require high in warning FoPL, if applied to this sector. Restaurants can be desirable for many reasons such as convenience; however, Canadians should have increased

accessibility to the nutritional quality of menu items. These results suggest that Health Canada should consider the broader application of healthy eating policies and regulations, including FoPL, to include the restaurant sector.

The correlation between mobile phones, gaming musculoskeletal pain in the upper extremities and among children and adolescents in Israel

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Musculoskeletal disorders are more common among children and adolescents these days, due to more frequent usage of mobile devices. It is currently estimated that about 75% of the world's population is exposed to high risk ergonomic factors due to abnormal position for long hours a day. However, only a few research has been done about the correlation between gaming, mobile phone use, and musculoskeletal pain in general and among children in particular. This study aimed to evaluate the relationship between the prevalence of musculoskeletal pain in the upper extremities among children and adolescents in Israel and the prolonged use of mobile phones and gaming. Another goal is to examine differences in pain level between males and females. Hundred subjects, aged 11-18 years will be recruited via social media. Each subject will answer an online survey, specifically built for the current study, which rate usage time and refer to gender, device type and level of pain during and after use. Furthermore, each subject will answer a formal questionnaires of pain - Standardized Nordic Questionnaire (SNQ) and Visual Analog Scale (VAS). In addition, videos taken at the time of use will be analyzed with The Rapid Upper Limb Assessment (RULA), in order to evaluate the ergonomic risk factors. The subjects will be divided into two groups – only mobile phone users and mobile phone and gaming users. Data analysis will be conducted for each group separately. The correlation between ergonomic risk factors and pain will be tested whiting each group and compared between the groups. Data is being collected now. The results will serve as a base for an ergonomic risks prevention and intervention.

The association between glycaemic index and load and cardiovascular disease mortality: A systematic review and meta-analysis

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The glycemic index (GI) and glycemic load (GL) are proposed to predict risk of cardiovascular disease (CVD) and associated deaths. The evidence for the association for GI/GL with all-cause and CVD mortality is inconsistent. We therefore conducted a systematic review and meta-analysis to explore the relation between high GI and high GL diets with mortality from all-causes, CVD, MI, and stroke. We aimed to assess the association of GI/GL with total and CVD mortality and its components. MEDLINE, EMBASE, and Cochrane were searched through October 15, 2021. Prospective cohort studies of ≥1 year investigating the association between GI/GL and mortality for all-causes, CVD, stroke, and MI were included. Using Cochrane methodology, full article review and data extraction were conducted by two independent investigators. Data were analysed using the generic inverse variance method with random effects model. The number of studies included for GI/GL were: all-cause mortality 12/11, CVD mortality 12/10, stroke mortality 4/3, MI mortality 1/1. The significant associations for GI were: all-cause mortality (RR, 1.16 [95% CI, 1.07-1.26]; p=0.0004), CVD mortality (RR, 1.14 [1.01-1.28]; p=0.03), and stroke mortality (RR: 1.31 [1.06-1.61]; p=0.01). For glycemic load, significant associations were found for stroke mortality (RR, 1.31 [1.06-1.61]; p=0.01). Subgroup analysis showed significant associations only for women for GI and all-cause mortality (RR, 1.16 [1.08-1.23]; p<0.0001) and CVD mortality (RR, 1.32 [1.10-1.59]; p=0.003) and for GL and all-cause mortality (RR, 1.15 [1.05-1.25]; p=0.001) and CVD mortality (RR, 1.26 [1.04, 1.54]; p = 0.02). The associations seen in men did not reach significance. The test for subgroup differences between sexes reached significance (P<0.05) for GL and all-cause mortality (Chi^2=5.88, df=1 (P=0.02)). High GI was associated with increased all-cause mortality, CVD mortality, and stroke mortality, with significant associations in women but not men.

Effects of a 12-week resistance and plyometric exercise training program with greek yogurt supplementation on markers of systemic inflammation - a secondary analysis

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Wholefood dairy products contain protein (i.e., whey and casein) and other bioactive micronutrients (e.g., calcium, vitamin D) that modulate metabolic processes and can help to ameliorate systemic inflammation. Greek yogurt (GY) is a fermented dairy food that elicits some anti-inflammatory effects making GY of particular interest for modulating inflammation. Therefore, this secondary analysis aimed to examine the effects of GY supplementation versus an isoenergetic carbohydrate pudding (CP) on systemic inflammatory cytokines (interleukin-6 [IL-6], IL-1Beta [1L-1B], IL-10, tumour necrosis alpha [TNF-a]) following 12 weeks of resistance/plyometric exercise training in young, healthy, normal-weight males. Thirty males, who were low dairy consumers and naïve to resistance exercise, completed 12 weeks of resistance/plyometric training (3days/week) combined with supplementation of either 200g of GY 3x/day on training days, and 150g 2x/day on non-training days or 47g of an isoenergetic bolus of CP on the same schedule. Rested, fasting blood samples were obtained at baseline (week 0), weeks 1 and 12, and serum concentrations of IL-6, IL-1B, IL-10, TNF-a were analyzed. IL-1B decreased significantly in both groups at week 12 from baseline and from week 1 (time effect, $p = 0.021$). IL-6 reduced significantly between weeks 1 and 12 in the GY group only (interaction, $p = 0.049$). TNF-a was elevated at week 12 compared to baseline in the CP group only (interaction, $p = 0.041$). There were no main effects or interactions for IL-10. This is the first study to investigate the effects of GY and exercise training on systemic inflammation. These results, in healthy young males, indicate an anti-inflammatory effect of GY with exercise given the observed pro-inflammatory cytokine responses, specifically IL-6 and TNF-a. Future research should be primarily designed to investigate the influence of GY supplementation with exercise in different populations to fully elucidate GY's influence on systemic inflammatory markers.

Oral Presentations in Day 1 Room B

A systematic review of patient-reported outcomes of cognitive dysfunction in multiple sclerosis

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Multiple sclerosis (MS) is a relatively common neurodegenerative disease that adversely affects physical functioning, mental health, and cognitive functioning. Cognitive dysfunction in MS is associated with declines in quality of life (QOL), employability, and day-to-day functioning. Reports of cognitive dysfunction from persons with MS (pwMS) could offer practical and ecologically valid experimental endpoints, as well as outcomes to track patient changes over time and screen for who require a neuropsychological battery. Therefore, we reviewed patient-reported outcome (PRO) measures of cognition used with pwMS to (i) assess their feasibility in clinical/experimental settings; and (ii) evaluate their relationships to clinical variables and health outcomes. PubMed and PsycInfo databases were searched from 2010 to 2021 to yield 3103 articles. Of these, 41 articles were removed for being duplicates and 2845 were removed during title and abstract screening for failing to meet inclusion criteria. Full texts of the remaining 217 articles were screened and data were extracted from texts meeting inclusion criteria. Of the cognitive PRO measures used in these studies, some were MS-specific and others were generic. Some cognitive PROs were associated with disease course, QOL, employment, daily functioning, neurologist ratings of disability severity, etc. Thus, cognitive PROs show promise for use in MS clinical care and research.
A valid and reliable cognitive PRO could better incorporate the voices of pwMS into their care, help clinicians decide which pwMS require neuropsychological referral, and provide a tool to monitor changes in cognitive functioning. In research, an effective cognitive PRO could be used as a screening tool for recruiting cognitively impaired pwMS and as an endpoint in clinical trials to evaluate the effects of new drug therapies or other interventions on cognition. However, investigation of their validity and reliability, and relations to objective tests, depressive symptoms, and physical functions, is necessary before their implementation in routine practice.

Do ecological models for invasive, non-indigenous species connect to the one health framework to better inform management of the ongoing COVID-19 pandemic and future pandemic prevention strategies?

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Past pandemics and epidemics were often caused by viruses and/or zoonotic diseases. The current scientific consensus is that the COVID-19 pandemic, caused by the novel SARS-CoV-2 virus, has its origins in a non-human animal species. The overall objective of this Biology honours thesis, completed in 2021, was to review the emerging data, grey literature, and peer-reviewed research about COVID-19, and place it in the context of the scholarly literature about the ecology of non-indigenous invasive species. Four questions were explored: (1) Do ecological models describing patterns of invasion for non-indigenous species explain the global spread of the SARS-CoV-2 virus? (2) What insights do these models provide for managing the COVID-19 pandemic? (3) Many invasive, non-indigenous species are considered threats to Biosecurity and Human Security, two concepts that have their policy roots in political science. The One Health Framework and its models recently emerged from the interdisciplinary space that includes health practitioners, ecologists and political scientists, with the goal of providing a rationale for policymakers to invest in proactive management strategies that prevent future pandemics. I explored the connections between these concepts. (4) Finally, we compared the national responses to the COVID-19 pandemic between New Zealand and United Kingdom. New Zealand's Biosecurity Act informed their Zero-Covid approach in 2020. This resulted in reduced mortality and economic impact in the first year of the pandemic. The SARS-CoV-2 virus spread in accordance with the predictions of invasive species models. When policy recommendations rooted in these models were adopted, there was reduced Covid-19 mortality and percentage impact on GDP (New Zealand vs. United Kingdom). The One Health and Human Security frameworks both emphasize the value of diverse policy and interdisciplinary experts working together to create coherent, integrated prevention strategies, now and in the future.

COVID-19 health & labour realities of migrant Asian women in Toronto, Ontario

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Amidst the COVID-19 pandemic, immigrant Asian women in Toronto, Ontario, experienced heightened discrimination. Precarious immigration status rendered many women ineligible for emergency income support and thereby unable to stay at home, physically distance, or stop work to survive. At the same time, im/migrant women involved in more feminized labour (such as a holistic practitioner or erotic worker) reported increased harassment from local law enforcement. Most egregious was the attack on three Asian businesses in Atlanta on 16 March 2021. The attack resulted in the murder of eight people, six of whom were Asian women. Within Canada, Butterfly Toronto: Asian and Migrant Sex Workers Support Network, is still inundated with the continuous request for crisis support. This research project is interested to explore the intersection between labour and immigration legislation in Canada, particularly as experienced amidst COVID-19, from the perspective of migrant Asian women. The main research question is: how did COVID-19 reconfigure health and workplace realities for migrant Asian women in feminized labour? Through a systematic review of literature and relevant documentation, I will examine existent labour and immigration legislation that structure everyday realities for im/migrant Asian women in the Greater Toronto Area. I will use this research to inform a pilot program (created in collaboration with Butterfly Toronto) and propose strategies to manoeuvre the racial and gendered vulnerabilities created through law enforcement.

Burnout among nurses in Moi Teaching and Referral Hospital, Kenya

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Burnout, a psychological state characterized by emotional exhaustion, depersonalization and loss of professional accomplishment can occur among persons especially those that are overworked. Nurses in Kenya work under a high patient-nurse ratio of 8 nurses per 10,000 population. Moi Teaching and Referral Hospital (MTRH) is a national referral hospital and the second largest hospital in Kenya serving a population of 24 million people. The study aimed at assessing burnout among nurses at MTRH. A descriptive cross-sectional study was carried out among 278 participants (nurses) at MTRH. Stratified simple random sampling was employed. Maslach burnout inventory was used in data collection and the data was analyzed by stata 13 software. Descriptive and chi-square statistics were computed. A total of 255 participants returned the questionnaires.

The results found that 17.1% of the participants reported a high degree of emotional exhaustion, 39.3% moderate degrees and 43.7% a low degree. Notably, 42.5% of the participants reported a high degree of depersonalization, 22.6% moderate, and 29.4% low degrees. Only 3.6% of the respondents did not experience depersonalization. Notably, 42% of the participants had low professional accomplishment, 17.2% moderate, and 40.8% a high professional accomplishment. Nurses aged 50-59 years had a significant high professional accomplishment compared to other age groups (p <0.01). In addition, nurses that were managers, clinical nurse educators and auditors also had a significant high professional accomplishment compared to those working in other departments (p < .01). Working in the renal unit and a master's level of education were associated with depersonalization, p<0.001. High emotional exhaustion was associated with working in the medical wards (p<0.001), diploma level of education (p<0.001), and being married (p = 0.02) while more years of practice was associated with reduced emotional exhaustion (p=0.99). Most nurses cited that the hospital need to employ more staff in order to reduce the levels of burnout

The effect of family stories on coping with cancer

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Coping with cancer can be extremely challenging. As well as being physically trying, cancer has been associated with psychological factors like depression and anxiety. When one is able to improve their coping skills, it can also increase their ability to manage their illness, their sense of wellbeing, and even more positive physiological response, including enhanced immunity. This literature review and supporting survey delve into the power of family stories to construct the resiliency, hope, and strength that can contribute to effective coping skills. The literature reveals that delving into one's own past and referencing family stories of resiliency can contribute to patients' wellbeing, be conducive to coping, and perhaps improve one's physical health. Family stories – whether passed through the generations or newly discovered – provide a sense of well-being and aid with coping, in a way that is especially pertinent for those dealing with adversities, such as life-threatening illness. We conducted a survey of individuals diagnosed with various types of cancers at different stages in their treatment. In response to open-ended questions, participants provided anecdotes of familial inspiration, such as when family members displayed resilience and courage in the face of their own cancer diagnoses or other illnesses, or in relation to family immigration stories. Study participants expressed the effect that these family stories had on their own coping skills as helping them "feel less isolated and alone." One participant stated, "I learned to live in the moment, enjoy life, keep a positive outlook as much as I can." And another was inspired by "my mother's strength in coping with the unknown in terms of her future". "I felt empowered…", was how one participant expressed the effect of a family story of resilience on her own ability to cope.

Pain management among patients with sickle cell diseases in Moi Teaching and Referral Hospital (MTRH), Eldoret, Kenya

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An estimated 300,000 children are born with Sickle Cell Disease (SCD) worldwide and three-quarters of these births are in sub-Saharan Africa, with 50-90% of children born with sickle cell disease before they reach their fifth birthday. Sickle cell disease is the most common haemoglobinopathy in Kenya with a high prevalence in western Kenya, about 4.5% of children born with SCD and 18% being born with sickle cell trait. Pain is one of the most common crises experienced by sickle cell disease patients. However, there is still a lack of effective management of sickle cell pain in these patients. This could be owing to ineffective management standards and a wide range of practices that vary by region and population. Sickle cell disease is commonly treated in MTRH, but there is a lack of published information on pain management in sickle cell disease patients, so this study aims to bridge that knowledge gap. The study's objective was to assess pain management among patients with sickle cell diseases in MTRH, Eldoret, Kenya. The study adopted a descriptive cross-sectional study design. 29 sickle cell patients were recruited using a simple random sampling method into the study. Information relevant to demographic data, pain characteristic, pain management approaches and barriers to pain management were collected using a standardized structured questionnaire. Ethical approval was sought. Descriptive statistics including frequencies and percentages were used for continuous variables with Fisher's exact being used to determine the significance of association between categorical variables. Results from 28 participants were analyzed. The mean age was 28 years with a minimum and a maximum age of 2 and 34 years respectively. Pain was reported by 19 (67.9%) of the respondents, with the majority of them experiencing severe pain 13 (46.4%). Pain was shown to be significantly associated with occupation, whereby self-employed respondents were more likely to experience pain (67.7%, p=0.05). Majority of the patients 19(67.9%) had experienced at least one episode of pain since the

last clinic visit, with most of them 10(35.7%) having more than 5 pain episodes. 24(85.7%) of the respondents were currently on pain medications and NSAIDs being the most prescribed medication 14(50.0%) as compared to opioids 4 (14.3%). Among the barriers to effective pain management, pain was associated with patients who had more than 3 clinic attendance (47.4%, p=0.894), and patients who had challenges in accessing SCD medications (73.6%, p=0.360). The most cited challenge was unavailability and unaffordability of SCD medications (85.7%, p=0.400). Unavailability and unaffordability of SCD medications was a barrier to effective pain management. Therefore, understanding and overcoming some of these obstacles to effective pain management can help reduce mortality and morbidity rate among SCD patients. The study therefore recommends that the government should make SCD medication affordable and available in local health facilities.

Implementing best practices when conducting a web-survey: Review of a recently administered web-survey and current literature

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Over the last few decades engagement in internet use and online communication has increased, and with the restrictions of the pandemic, investigators have optimized online research. While this offers greater accessibility, ability to target unique population types, reductions in cost and time efficiency, the chances of collecting fraudulent responses increases, particularly with anonymous and incentivised surveys. The aim of this study is to critically examine strategies for ensuring data integrity when conducting web-surveys based on current literature and knowledge acquired from a recently administered web-survey. A critical review of current literature was conducted to identify articles which addressed methods for preventing or identifying fraudulent data when conducting online research. These findings were applied to our analysis of web-survey data collected from an anonymous pan-Canadian cross-sectional survey to investigate the needs of blood cancer survivors. The survey was advertised on social media and provided a modest honorarium. To detect and prevent fraudulent responses within our study, based on current literature, similar questions were compared for inconsistencies, open-ended responses were reviewed to identify resemblances, personal information was collected to discern matches, and CAPTCHA was implemented. Additional measures suggested in current literature include targeted recruitment by distributing the survey through email with single use links specific disclaimers stating that participants will not be compensated if suspected of falsified responses and that investigators may contact participants to confirm eligibility, as well as further implementing software to collect paradata and metadata. It is essential to take precautions and implement strategies to prevent the collection of fraudulent data responses when conducting online research to ensure high data quality, avoid erroneous results and maintain validity and reliability of the research.

Impact of COVID-19 on utilization of maternal healthcare services in public facilities within Eldoret municipality-Kenya

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Maternal healthcare aims to promote a holistic approach to heath which encompasses physical, mental, emotional and social wellbeing. Utilization of maternal health services is important as it helps reduce both maternal and infant mortality which occur as a result of complications from pregnancy, birth and immediate post-partum. Utilization of family planning methods available helps to reduce both unplanned and unwanted pregnancies. During the peak of COVID-19 infections there was fear associated with the infection and containment measures put in place by the government could have impacted the uptake of maternal health care services. The study aimed at assessing the effect of COVID-19 pandemic on the utilization of antennal, family planning and post-natal care services. Retrospective study design was used. Study site was four public health care facilities in Eldoret Municipality namely Huruma Sub County Hospital, Kapsoya Health Centre, Pioneer Health Centre and West Maternity Hospital which were purposively selected. Data was collected using a records review checklist. Records that were reviewed included hospital register from five months before COVID-19 in 2019 and 2020 and five months into COVID-19 in 2020. Data were analyzed using Microsoft Excel and SPSS version 25. The results reveal that there was a 10.5% decrease in antenatal clinic uptake from 9769 to 7906. There was 3.4% increase postnatal clinic uptake from 1351 to 1447. A percentage increase of 7% was seen contraceptive uptake from 7351 to 8478. Despite the restrictions, lockdowns and challenges caused by pandemic results indicate that there has been an increase utilization of maternal health services; postnatal clinic, contraceptive uptake however, antenatal clinic uptake decreased. The findings therefore depicts that women in Eldoret Municipality are aware of the importance of utilizing maternal healthcare services to their benefit. Key words; COVID 19, Maternal Healthcare Services

Oral Presentations in Day 1 Room C

Pain-related content in autobiographical memory of youth undergoing major surgery

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Few studies have investigated the association between post-surgical pain and autobiographical memory in the pediatric population and, to our knowledge, no study has examined whether the content in recalled memory is associated with children's post-surgical pain. This study aimed fill these gaps by examining whether the episodic specificity of physiological-related content in the memories recalled by youths four weeks after surgery is related to the average of first three days post-surgical pain. Patients were recruited as part of a larger study investigating psychosocial and biological factors in pediatric post-surgical pain. Thirty-seven children undergoing major surgery (e.g., spinal fusion) were recruited. Youths' pre-surgical and post-surgical pain levels were measured using self-report 11-point Numerical Rating Scale (NRS). Memory interviews were administered 3-4 weeks after surgery. Participants were asked to recall the first day after their surgery. Memory interviews were coded for content related to pain and medical or surgical procedures which was further categorized into episodic (any details related to the first day after surgery) and semantic categories (details irrelevant to the first day after surgery). Non-parametric Kruskal-Wallis tests did not demonstrate significant differences in the proportion of episodic pain ($H(2) = 0.22$, $p = 0.90$), episodic medical/surgical ($H(2) = 2.62$, $p = 0.27$), semantic pain ($H(2) = 1.4$, $p = 0.50$), or semantic medical/surgical details ($H(2) = 4.02$, $p = 0.13$) between the different levels of post-operative pain intensity.

Examination of scientific reasoning tasks in a sample of adolescents

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Scientific reasoning involves using tools that have been developed for research but can also be applied for judgment and decision-making. Examples include understanding the use of falsification strategies, the limits of correlational evidence, and understanding converging information on judgment and decision-making tasks. Compared to adult samples, relatively less research has been conducted on these paradigms in developmental samples, such as adolescents. In the current research study, adolescent performance on several scientific thinking tasks is examined. In particular, general performance patterns are broadly compared with data patterns that have been reported on parallel tasks in adult samples. It was hypothesized that adolescents would display similar response patterns as adults, regarding the level of accuracy and frequency of different types of incorrect responses. It was also hypothesized that scientific thinking would be significantly positively correlated with cognitive abilities and actively open-minded thinking (AOT), a thinking disposition. One hundred and forty-eight (n = 148) adolescents completed an experimental battery of several judgment and decision-making tasks, including scientific thinking and the AOT scale. The data were collected from one independent school across North America, in person. Results from this study indicate that the sample adolescents showed incongruent performance on scientific reasoning compared to previously studied adult samples. Specifically, variable performance was evidenced through frequency response patterns across the 13 scientific reasoning tasks, with participants performing poorly in more items than others. In addition, while correlational analyses indicate that the Scientific Reasoning subtest with the AOT scale was positively correlated, its numeric value was considerably low. Further study of these tasks using online administration and a more balanced and representative sample will be useful to replicate the current study.

Caregivers' behavioural responses to infant pain: The role of culture and physiology

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Pain due to vaccination procedures is a common experience in infancy and childhood. Parents' behaviour responses to their child's pain and distress have been frequently associated with children's pain outcomes. Among many predictors of parents' behaviour responses, culture has been linked to how caregivers behave when soothing their distressed infant. Furthermore, physiological arousal due to situational anxiety is known to impact behaviour in stressful contexts, with higher physiological arousal resulting in less frontal lobe processing (including thinking through the lens of culture) hence, acting more instinctively. The objective of the current study was to examine the direct associations between caregivers' (1) acculturation and (2) physiological arousal, and their behavioural responses towards their infant in pain and (3) to examine whether physiological arousal moderates this association.159 parent-toddler dyads were recruited from two pediatrician practices in Toronto. Parents were on average 35 years old, and the children were 12 months old. Parents were educated (most with university or college degrees or higher) and culturally diverse. Dyads were videotaped during the infant's 12-month immunization appointments, and their cardiac data were collected. The caregivers filled out questionnaires which included questions about their cultural identity. Nine multiple linear regressions were conducted to examine the three research questions. Results suggest acculturation predicts caregivers' behaviour response to their infant in pain. Specifically, caregivers who identified more with mainstream North American culture showed more proximal soothing behaviours, while caregivers who identified with collectivist heritage culture used less verbal reassurance when soothing their infant in pain. However, caregivers' physiological arousal did not predict caregiver behaviours nor moderate the relationship between caregivers' acculturation and behaviour response. The findings from this study further our understanding of the mechanism by which a caregiver's culture and physiological arousal interact and how they may affect behaviours.

The influence of parenting styles on the levels of imposter phenomenon observed in young adults: A research study

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Imposter Phenomenon has gained a significant amount of traction in recent times. The idea of the Impostor Phenomenon is the belief that one has success only due to luck and not because of talent, effort or qualifications; it was first identified in 1978 by Clance and Imes. Individuals with imposter syndrome are more likely to experience depression, stress, anxiety, and low self-esteem due to their constant fear of being exposed. Early familial processes, such as sibling comparisons and parental expectations, may eventually contribute to imposter feelings. Nevertheless, in the etiologic context of the impostor phenomenon among children and adults, very few studies deal with features of the family environment, particularly parent-child relationships and parenting styles. Understanding the connection between the imposter phenomenon and parenting styles can help solve the issues related to the imposter phenomenon in a more effective way. Diana Baumrind's Parenting styles theory was used to understand the parenting styles that the participants experienced. The study aims to assess the influence of perceived parenting styles on the tendency of imposter syndrome experienced by young adults. One hundred fifty-five participants took part in this study, from 16 to 24 years. The Clance Impostor Phenomenon Scale by Pauline Rose Clance (1985) and the Scale of Parenting Style questionnaire by Abdul Gafoor K and Abidha Kurukkan (2014) identified parenting styles and the extent of the imposter phenomenon. They were circulated through an online questionnaire using the snowball sampling technique. There was a negative correlation found between the responsiveness domain of parenting styles and imposter phenomenon. There was a negative correlation between the control domain of parenting styles and the impostor phenomenon as well. The average score for the impostor phenomenon in males and females had a difference of less than 0.5. The correlation between the impostor phenomenon and the two genders was not significant to draw any conclusions.

COVID-19 and development: A centralized resource for accessible public information

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There is a need for knowledge translation and further investigation into the psychological effects that SARS-CoV-2 infection along with the COVID-19 pandemic have on development. The effects of this current health crisis on learning, psychosocial, neurocognitive, and mental health outcomes across early childhood, childhood, adolescence, and young adulthood require careful investigation. It is also important to explore the effects of infection and the pandemic on those with neurodevelopmental differences, pregnant individuals, and parents. The overarching aim of this in-progress project is to provide an accessible website for the public, educators, clinicians, and researchers that is used for knowledge translation and asking users about their lived experiences. The best-evidence synthesis model is being utilized to conduct a scoping review of psychological and medical databases containing relevant empirical articles. Surveys will investigate the psychological functioning of children and adolescents post-infection, as well as the effects that SARS- CoV-2 infection, COVID-19 lockdowns, restrictions, and masking requirements have on learning, social relationships, pregnancy, parenting, etc. A mixed-methods approach will be implemented to analyze moderated website comments and survey data, with the goal of analyzing responses from, at minimum, 100 people per survey. Preliminary results of the scoping review suggest that SARS-CoV-2 infection and COVID-19 pandemic restrictions have had noteworthy effects on learning, psychosocial, neurocognitive, and mental health outcomes that have been documented via evidence-based approaches. These findings will be outlined on the website. Future research will investigate trends related to comments and survey responses. The website and associated research from this resource will help inform the public, educators, clinicians, and researchers on the adverse developmental effects associated with this current health crisis. This knowledge translation is key to providing the public with information that may help them make informed health decisions for themselves as well as children and youth in their care.

Anti-vaccine culture on TikTok: A research study

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During the COVID-19 pandemic, social media discussions about vaccines and public health intensified. However, much of the discourse included misinformation. The aim of this study was to analyze video content and comments discussing COVID-19 vaccines on TikTok. TikTok allows users to create and share content through short-form videos. With TikTok gaining popularity during the pandemic, it is highly relevant to understand COVID-19 discourse on the platform. Using netnography, a qualitative research method that examines contexts and cultures in an online environment, COVID-19 and vaccine-related hashtags were searched on TikTok. Observations on the videos and corresponding comments (n=21) were collected. Thematic analysis and inductive coding were then applied to the data. Major themes observed include pro- versus anti-vaccine rhetoric, the use of comedic versus educational content styles, and a rising culture of addressing misinformation. Vaccine hesitancy was evident for both pro-and anti-vaccine users. Pro-vaccine users were concerned about the speed of development or feared unknown long-term side effects of the vaccine, while anti-vaccine users posted their belief in conspiracy theories related to COVID-19 or the vaccine. TikTok was observed to be implementing fact-checks and promoting pro-vaccine content from official organizations to counteract anti-vaccine rhetoric and the spread of misinformation. While TikTok remained a platform for entertainment, this study revealed that TikTok has become a hub of public health information, with many health professionals sharing accurate, reliable, and digestible scientific information about COVID-19 and vaccines. The findings from this study imply that social media can be a potentially useful tool to educate the public and promote positive health behaviours and decisions. Further studies are needed to investigate how using social media can impact users' beliefs and ideas about health and science, with potential implications for health-related decision-making.

Shifting architectures of cognition and brain function in older adulthood

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Understanding how the brain changes with age is crucial for mitigating age-related cognitive decline and developing treatments for neurodegenerative disease. However, we lack effective models that combine changes in cognition across the lifespan, with changes in the associated neural circuitry. This has led to the perception that aging is only associated with cognitive and neural losses, and a failure to appreciate that older adults may approach mentation from a different starting point. The shifting mental mode hypothesis of aging addresses this, positing that changes in cognition, affect, and brain function combine to create an exploitative bias of prior knowledge over exploratory search as the basis for thought and action in older adults. To provide additional support for this hypothesis, we are conducting a combined behavioural and functional magnetic resonance imaging study. The behavioural protocol will be composed of three exploration-exploitation (E&E) tasks which cover foraging, information search, and reinforcement learning. The neuroimaging protocol will include a task-related functional scan during the performance of an E&E task and a structural scan to provide markers of brain health. We will recruit 60 healthy young and 60 cognitively normal older adults who will complete a brief cognitive battery comprising cognitive control and semantic knowledge measures as well as the E&E battery. We predict an age-related exploitation bias across all behavioural tasks and an associated increase in functional connectivity between brain networks implicated in cognitive control and semantic cognition, consistent with the shifting mental mode hypothesis of aging. Our findings will provide insight into the shifting architecture of cognition and brain function in older adulthood and support a more unitary account of mental functions in late-life development.

Oral Presentations in Day 2 Room A

Impact of COVID-19 pandemic on patients with Parkinson's disease: a meta-analysis of 13,878 patients

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The clinical, neuropsychological, and socio-economic factors affecting Parkinson's disease (PD) during COVID-19 pandemic across different populations have not been systematically studied. To address this, we conducted the first meta-analysis of factors that impact the well-being of PD patients during the pandemic. Medline and Embase were searched on 5 March 2022 for articles published between 2020-2022. We conducted random-effects pooling of estimates and meta-regression. Twenty-seven studies involving 13,878 patients from America, Europe, Asia, and Africa were included. There is high prevalence of decreased physical activity and exercise, and worsening motor and neuropsychiatric symptoms (17-56%). Patients in lower-income countries more frequently reported worsening anxiety (aOR 8.94, 95% CI 1.62-49.28, P=0.012), sleep (aOR 5.16, 95% CI 1.15-23.17, P=0.032) and PD symptoms (aOR 3.57, 95% CI 0.96-13.34, P=0.058). Lockdown was associated with decreased exercise levels (aOR 0.13, 95% CI 0.02-0.78, P=0.025) and worsening mood (aOR 0.48, 95% CI 0.24-0.95, P=0.035). Younger age correlated with decreased physical activity (β -0.30, 95% CI -0.53 to -0.07, P=0.012), exercise (β -0.11, 95% CI -0.15 to -0.07, P<0.001), worsening PD symptoms (β -0.08, 95% CI -0.15 to -0.01, P=0.018), and sleep (β -0.14, 95% CI -0.27 to 0, P=0.044). Female PD patients reported a greater decrease in physical activity (β 11.94, 95% CI 2.17-21.71, P=0.017) and worse sleep (β 10.76, 95% CI 2.81-18.70, P=0.008). This large meta-analysis of PD patients in diverse populations identified a high prevalence of physical and mental worsening during the COVID-19 pandemic, with patients in lower-income countries being exceptionally vulnerable.

Usefulness of three-dimensional (3D) anatomical table in pre-surgical phases to minimize the complications rates

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The tumor mass linked to the surrounding tissues represents a considerable obstacle for a complete surgical resection of many types of cancer. Therefore, it is essential for next generations of healthcare professionals to address this issue by high technological tools such as the 3D anatomical table, which allows to virtually analyze the tumor region through tomographic

images. Here, we describe the use of the 3D anatomical table in a patient with a massive retroperitoneal liposarcoma that stretched from the diaphragmatic base to the pelvis and including the right kidney. The 3D reconstruction allowed to highlight every connection of the tumor mass with the right renal vein and the circulatory system. Our experience corroborated the usefulness of high technological tools like the anatomical table in pre-surgical phases to minimize complications. Overall, the digital technologies may be essential along with classical medicine for the doctor of the future.

The disability wiki project: A virtual community for disability advocacy using artificial intelligence

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There is a lack of availability of structured disability data which is a major challenge preventing effective and continuous disability equity monitoring globally. In order to expose and monitor systemic discrimination and social exclusion, developing a platform that enables searching for disability data is crucial. The Disability Wiki project uses the social model of disability and aims to create an accessible multilingual disability website that structures and integrates data regarding people with disabilities while serving national and international disability advocacy communities. The storage of data will be endowed with a document upload function that allows for automated and manual paragraph tagging as well as an intelligent natural language search capability querying function in the supported languages. To enable disability communities to upload and search for disability documents, we designed and implemented a Virtual Community platform that uses Wikibase, Semantic Web, Machine Learning as well as Web Programming Tools. Through the use of Health Informatics and Artificial Intelligence techniques such as Semantic Web, Machine Learning, and Natural Language Processing, we have developed a virtual community that facilitates the upload, sharing, and access to disability data. Once the documents are uploaded to the Virtual Community, they are tagged semi-automatically with meaningful keywords, and verified before being uploaded to the disability Wikibase. Once the documents are uploaded, the public users can perform semantic search using the intelligent and multilingual search engine known as QAnswer. The platform data model was designed based on the United Nations Convention on the Rights of Persons with Disabilities (CRPD), but the platform's ontology can be further expanded to fit international contexts as well as any advocacy reports, disability policy and legislations. Accessible disability data is vital in order to address social inequities including, negative socioeconomic outcomes, discrimination, abuse, and human rights violations within the disability community. The Disability Wiki project uses the social model of disability and aims to use the field of Health Informatics in order to promote Disability Advocacy by providing accessible and structured disability data for multidisciplinary users including but not limited to: Non-Profit Organizations, researchers, and human rights representatives. Providing a platform that gives access to available disability data will allow these users to gather relevant disability-related data allowing for efficient disability equity monitoring globally.

Re-analysis of interdisciplinary approaches and social support on ACLR athletes: Understanding how multiple stakeholders affect female sport injury recovery

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Background: Anterior Cruciate Ligament (ACL) injuries is one of the most common and most expensive sport injuries that requires an immense amount of time, effort, and patience. Many athletes face challenges during the rehabilitation process due to psychological barriers that inhibit the athlete's ability to properly recover and return to sport, which can also be exacerbated in adolescent athletes who experience external pressures outside of their sport. This paper views recovery from a biopsychosociological approach in order to improve rehabilitation of athletes after ACL injury and reconstructive surgery (ACLR). Recent research has discovered that social support (or the lack of it) from multiple stakeholders (i.e., clinicians, parents, peers) plays a significant role in an adolescent athlete's recovery from ACLR. However, the nature of optimal social support and how it may differ across different stakeholder roles is not well understood. The purpose of this re-analysis is to understand the role, nature, and impact of social support from different stakeholders during recovery, from the perspective of adolescent athletes with ACLR. Qualitative thematic re-analysis of raw interview transcripts from multiple previous studies examining athletes' experiences of ACLR, with particular focus on social support. The study conducted in 2020 consisted of 25 participants and the study conducted in 2022 consisted of 10 participants. Analysis is currently underway. Understanding

social support from multiple stakeholders can assist clinicians and help improve treatment and recovery protocols by personalizing the treatment to the athlete's needs. This research can highlight areas where patients lack assistance and where treatments can be improved through the perspectives of the athletes.

Research on the influencing factors of willingness to COVID-19 vaccination based on the theory of planned behavior—taking the college students as an example

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In the beginning of the Boxer Year, the outbreak of the COVID-19 epidemic seriously threatens human health and society. According to previous researches, vaccination can reduce epidemic threat to life and health effectively, yet the prerequisite is the vaccination rate must reach a certain level to form group immunity. Relevant research on COVID-19 vaccination either focus on single factor mechanism which do not cover all the aspects, or apply for quantitative analysis method which fail to escape the logical trap focusing on correlation rather than causal link. In order to make up for the shortcomings of previous research, the study utilize Grounded Theory to conceive a model for the influencing factors of college student's willingness to vaccinate form bottom to the top based on the Theory of Planned Behavior (TPB). It is worth noticing that study adopts the grounded path of Strauss and Cobin instead of classical theory, selecting the TPB as theoretical basis for model construction in order to organize the information emerging from the original data more rigorously. The research suggests that, firstly, the epidemic situation, risk perception, policy arrangement, personal constitution, protection demand and organizational guarantee affect the vaccination willingness by influencing the vaccination attitude. Secondly, the organizational call, surrounding people and social expectation affect the vaccination willingness by influencing the subjective norm. Thirdly, the convenience affects the vaccination willingness by influencing the perceived behavior control. Further, the study analyzes the factors in each dimension of the model, offering suggestions on the design of policy instruments in order to enhance the willingness of college students to vaccine, and to provide a guidance for the vaccination plan in major public health emergencies.

Using thin slicing of client emotions to detect and combat client resistance in psychotherapy

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Combatting client resistance, where the client resists the therapy direction and/or therapist is critical and may result in the (1) Client's loss of confidence in the therapist and helpfulness of therapy (2) Therapist's negative feelings toward the client and belief in their ability to improve during therapy. Further, client resistance is negatively related to important psychotherapy outcomes, including outcome expectations (OE). Therapists have been shown to experience difficulty perceiving resistance during therapy sessions, since awareness of verbal and nonverbal communication are essential. Client emotions, an understudied therapy marker which manifest as nonverbal behaviours, may provide the key to combatting resistance. The aim of the current study is to pilot test the predictive ability of an under-utilized method in therapy research, thin-slice methodology, for detecting resistance and predicting OE. To investigate the study's aims, untrained observers rated client emotions shown in thin slices/short video clips using an online survey consisting of 10 emotions from resistance research. The predictive ability of the thin slice ratings was indicated by the correlation between ratings and (1) Client Outcome Expectations (COE) (2) Therapist Outcome Expectations (TOE). It was hypothesized that less negative ratings of thin slices of resistance would predict lower COE and TOE. Results indicated less negative thin slice ratings predicted higher COE for all client emotions but did not predict TOE for any client emotion. This study (1) Highlights the promise of thin-slice methodology for rapidly detecting important therapy events such as resistance and predicting therapy outcomes such as OE (2) Underscores the need for therapist training in identifying key client emotions/nonverbal behaviour during therapy sessions.

Global citizenship education in the Philippines and Sri Lanka: A collaborative discourse and curriculum analyses for quality education

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Global citizenship education is an educational framework that aims to provide students with opportunities and resources for personal development and local-to-global learning. Objectives include three domains of learning –the cognitive, socio-emotional, and behavioural– along with detailed aims compatible with the United Nations' Sustainable Development Goals (SDG). As part of the SDGs, mainstreaming this framework may provide students with the skill set and tools to become active and responsible citizens, irrespective of geographical borders. The current volunteer research project, organized in three parts, aimed to collate primary and secondary resources into a discourse analysis on global citizenship education in the Philippines and Sri Lanka. Such was to inform and later create a working syllabus that may be used among international organizations to mainstream global citizenship in practice. The first part is to contrast the unique psycho-educational landscapes of both countries to highlight the socio-political climate and impacts of civic and global citizenship education learning. The second part is to use the existing discourse analysis to devise working curricula for organizations and institutional partners. The final stage is to take our research into action in the Philippines and Sri Lankan organizations to demonstrate global citizenship in practice for implementation and contribution to the Sustainable Development Goals. Our preliminary discourse analysis suggests that the theme of active citizenship is prominent in both the Philippines and Sri Lanka. Complementary themes of global citizenship included: multiculturalism, social justice, peace-building, and social cohesion.

Oral Presentations in Day 2 Room B

Exploring the use of metaphor in informal cancer caregivers' experiences supporting hematological cancer patients undergoing allogeneic stem cell transplantation

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In qualitative research of patients' experiences of cancer, the exploration of their use of metaphors has provided insight into the various meanings that motivate patients' behaviours and actions in the context of coping with and managing a cancer diagnosis. For example, common metaphors of the "battle" and "journey" of cancer have been interpreted as tangible linguistic tools for describing the lasting impact of diagnosis not only on the appraisal of the cancer experience, but on one's decisions and life experiences more broadly. In contrast, there is limited research about the use of metaphor by informal cancer caregivers, in their descriptions of their experiences in caring for their loved ones. The aim of this study, currently in progress, is to critically examine the common metaphors in informal cancer caregivers' descriptions of their caregiving role. This analysis draws on a review of current literature of the use of metaphor by caregivers in non-cancer context (e.g., dementia), and a secondary analysis of qualitative interviews collected from our ongoing study of informal caregivers of patients with hematological cancer receiving stem cell transplantation. Based on our analysis, we identify similarities and differences with respect to the use of metaphor among cancer and non-cancer caregivers. In our preliminary analysis, major themes focus on the use of metaphor to communicate the suspension of cancer caregivers' own needs within the context of caregiving, and the ways in which the caregiving role is reframed to sustain motivation. These findings suggest that identifying the common metaphors used by informal cancer caregivers can provide insights into the demands and complexities inherent in providing emotional, physical, and practical support to a loved one with cancer, and guide the development of interventions that are sensitive to these caregivers' appraisal of their role.

The impact of armed conflict on the physical and mental health of affected populations: A perspective from the World Health Organization's institutional responses: A research study

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Global health inequality is a main challenge to the World Health Organization (WHO) in its public agenda. Conflict settings are included, as they raise health and well-being concerns for a large number of populations. Moreover, the performance of WHO has been affected throughout the COVID-19 pandemic by the political and social environment around the globe; geopolitical conflicts, war, social inequity and poverty were highlighted as contributors. Our aim in this review-study is to assess and summarize how armed conflict affects social determinants and adverse health outcomes, focusing on indicated areas hosting humanitarian crises according to the United Nations Office for the Coordination of Human Affairs; to outline prevalent mental health disorders, morbidity indicators, and dislocation of population in the selected countries; anto identify examples of institutional interventions that may help to mitigate the impact of these conflicts, notably by WHO and the International Committee of the Red Cross. Our data analysis shows that the Social Determinants of Health (SDH) in these settings reflect and reinforce existing inequalities, loss of human rights, and the vulnerability of those who are disadvantaged because of poverty or marginalization. Evidence suggests that the accumulation of multiple stressors acutely compromises brain performance, relationships, life satisfaction, and produces detrimental mental health diagnosis, besides high levels of mortality, disability and morbidity, for both adults and children, when compared to health outcomes in non-conflict settings. Conflict countries have weak health systems, leading to malfunctioning of these systems during the SARS-CoV-2 outbreak. This resulted in a decrease in operation of essential services driven by a lack of Healthcare facilities, workers and resources; breaches of medical neutrality were also present. There is a need to further explore WHO's strategies, regional, local and nationally, to provide health care in active conflict zones, with the purpose of avoiding the deterioration of human health caused by conflict, stressors and violence.

CALIPER: Establishing a comprehensive database of paediatric reference intervals for biomarkers of health and disease through community initiatives

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Reference intervals are health-associated benchmarks required to support appropriate clinical evaluation of blood test results. Despite significant physiological change throughout growth and development, there is a paucity of age- and sex-specific reference intervals for biomarkers in paediatrics, which consequently increases the risk of diagnostic error. The Canadian Laboratory Initiative on Pediatric Reference Intervals (CALIPER) has worked to close this gap by establishing paediatric reference intervals for over 200 biomarkers of health and disease (www.caliperdatabase.org). Our aim is was continue recruitment of healthy Canadian children and adolescents as part of the CALIPER project to support planned analyses and expand the utility of the database. A community outreach strategy was applied, and partnerships were formed with community centres and schools across the Greater Toronto Area. From September 2021 to March 2022, 215 (54.4% male, 45.6% female) participants aged 0 to 18 (mean (SD): 15.7 (±2.20)) years were recruited prospectively with informed consent. 111 participants were excluded due to history of chronic illness, acute illness within 7 days, and/or use of prescribed medication. Blood was collected through venipuncture (SST and KEDTA Tubes, BD Vacutainer), centrifuged within 4 hours, and stored at -80°C. Further work is planned to analyze stored samples for biomarkers wherein limited health-associated paediatric data is available (e.g., coagulation factors) and establish age- and sex-specific reference intervals for knowledge translation. Through community outreach and partnerships, CALIPER continues to advance the field of paediatric reference intervals to support paediatric health and clinical decision-making nationally and globally.

Identifying and overcoming barriers to participation in health and physical activity programs among trans, non-binary, and gender non-conforming university students

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It is important to ensure that trans, non-binary, and gender non-conforming students have access to the many benefits of physical activity (PA), which research suggests may include improved confidence, self-esteem, socio-emotional skills, and academic success. Little research has assessed accessibility and other aspects of involvement in PA for the trans, non-binary, and gender non-conforming community. This study aims to identify barriers and promotive factors for participation in PA among gender minority students at Keele Campus, York University, and build knowledge intended to make facilities and programs at York and other Canadian university campuses more inclusive and beneficial. Participants will be aged 18+, able to speak and read in English, registered as student at York University and identifying with one or more of the following: trans, non-binary, gender non-conforming. The study uses a mixed-methods design consisting of an online survey and focus group interview. Using a quality participation framework, the survey will collect demographic information and ask participants questions regarding their PA experiences–in general, at York University broadly, and across particular programs and facilities at the university–including barriers and facilitators to participation. Additionally, focus groups will allow participants to expand on their PA experiences and suggest strategies to facilitate high-quality and inclusive PA experiences. The results of this research will contribute to the literature on inclusive PA experiences for trans, non-binary, and gender non-conforming University students, and will inform strategies for creating a safe, comfortable, and engaging environment.

The relationships between lifestyles, perceived stress, health locus of control, and health motivation of higher education students in Malaysia

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Young adults in Malaysia were found to display poor lifestyle practices, reported by several recent studies. It can negatively affect one's health in ways such as increasing the onset of non-communicable diseases (e.g. diabetes and heart disease). However, successful changes in habitual behaviours are usually difficult to achieve as behaviour emerges in a complex interplay of various factors; for instance, personal and cultural factors. In view of this, what other factors can be used in urging changes in lifestyle behaviours? Based on Self-Determination Theory (SDT), this study set forth to compare health locus of control, health motivation, and perceived stress of tertiary students vary in lifestyles in Malaysia, and determine if these variables serve as predicting factors of lifestyle. 256 students (183 females) with the average age of 22 were recruited through convenience sampling to answer an online survey consisting of validated scales relevant to perceived stress, locus of control, health motivation, and lifestyle. One-way ANOVA and standard multiple regression were conducted to analyse the data. Results showed that perceived stress, self- and other-focused motivation were significantly associated with lifestyle while locus of control and introjected motivation were not. Besides, perceived stress, locus of control, self-, and other-focused motivation were also found to predict lifestyle, with perceived stress being the strongest predictor. These results were only partially explained by SDT, suggesting that intrinsic and extrinsic motivation can influence our lifestyle choices whereby introjected motivation and personal control over health are not able to. The findings imply that perceived stress, personal control, self- and other-focused motivation can affect and predict lifestyle. The outcome of this research can be used in refining the strategies used to encourage healthy lifestyle practices by focusing on enhancing the emotional and motivational aspects of higher education students in Malaysia.

Relation of serum levels of trimethylamine N-oxide (TMAO) and CVD and all-cause mortality: A systematic review and dose-response meta-analysis of prospective cohort studies

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Cardiovascular disease (CVD) is the leading cause of death globally. Raised serum levels of Trimethylamine N-Oxide (TMAO) is associated with CVD. However, it is unclear whether a dose-response relationship exists. We therefore conducted a systematic review and meta-analysis to assess the relation between TMAO levels and total CVD, CVD mortality, and all-cause mortality. MEDLINE, EMBASE, and Cochrane were searched through October 2020. Prospective cohort studies of ≥1 year duration investigating the association between TMAO levels and total CVD, CVD mortality, and all-cause mortality were included. Full article review, data extraction and risk of bias assessment were conducted by two independent investigators. Risk estimates of extreme comparisons were pooled using the random effects model and expressed as relative risk (RR) and 95% confidence interval (CI). Inter-study heterogeneity was assessed and quantified. Dose-response was assessed using one-stage linear mixed model. Certainty of evidence was assessed using GRADE. 17 studies (n=28,748) with total CVD (2404 cases), CVD mortality (183 cases) and all-cause mortality (2414 cases) were included. TMAO was associated with higher risk of total CVD (RR=1.46 [95% CI, 1.20-1.79]; low certainty) and all-cause mortality (RR=1.30 [1.13-1.50]; moderate certainty) and not for TMAO with CVD mortality (RR=1.53 [0.87-2.69]; very low certainty). There were significant positive linear dose-responses for 1µmol/L increases in TMAO levels for both CVD (RR=1.03 [1.02-1.05]) and all-cause mortality (RR=1.03 [1.01-1.04]). Downgrades were applied for inconsistency (total CVD and CVD mortality) and imprecision (CVD mortality) and upgrades for a dose-response (CVD and all-cause mortality).We demonstrated that high TMAO levels were associated with higher risk of CVD and all-cause mortality. Additionally, the association was linear with each 1µmol/L increase in TMAO associated with 3% RR increase in both CVD and all-cause mortality. Further studies of TMAO with CVD disease and mortality are needed.

Oral Presentations in Day 2 Room C

How did Nunavummiut youth cope during the COVID-19 pandemic? A qualitative exploration of the resilience of Inuit youth leaders involved in the I-Sparx project

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This study investigated how COVID-19 has affected the wellness of a group of Inuit youth leaders in Nunavut in the context of their involvement with an ongoing mental health research initiative, the *Making I-SPARX Fly in Nunavut* [*I-SPARX*] project. The study had three goals: (1) to understand how the pandemic has affected *I-SPARX* youth leaders' perceived involvement in the *I-SPARX Project*; (2) to build knowledge around how the pandemic has impacted the daily life and wellbeing of youth in Nunavummiut communities; and (3) to acquire a culturally-specific understanding of their coping mechanisms and resilience strategies through the lens of *Inuit Qaujimajatuqangit* (IQ). Nine Inuit youth were interviewed virtually. They were asked ten questions surrounding their participation in *I-SPARX*, their life and mental health during the pandemic, and their coping strategies. Their comments were analysed using inductive thematic analysis. Pandemic challenges, the utility of *I-SPARX* teachings and participation, and culturally- and community-embedded pathways to resilience were discussed. The implications of COVID-19 on Inuit youth in remote communities are not fully understood. The current study illuminates their experiences of the pandemic as well as their coping strategies to inform future research with respect to ways in which Inuit youth might be supported in situations, such as a global pandemic, that restrict their traditional resilience-enhancing activities and create social isolation.

The influence of family factors on juvenile delinquency: A review paper

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Juvenile delinquency is widespread throughout the world. It is a major issue and there may be several factors that shape a child into a delinquent. This paper aimed to examine the influence of familial variables in the development of a delinquent adolescent. The study looked at psychological and social dimensions of the family to determine how it influenced individual development. It included 54 studies that covered a wide range of topics related to family and its impact on juvenile delinquency. The domains studied were: Punitive Parenting, Parental Monitoring, Family Conflict, Economic Status, Parental Morality, Parental Religion, Child Abuse, Domestic Violence, Family Criminality, Family Environment, Family Structure, Family Social Capital, Parental Control, Family Size, Parental Education, and Family Attachment. After doing a systematic review we found that the parents who were - Punitive, Abusive, inadequately watched their children, had Family Disputes, had a positive Criminal Family History, had low Economic Position, and were less attached to their children - were more likely to raise juvenile delinquents. By offering a condensed report, this study will give a common subject for academics who seek to perform future research in juvenile delinquency and family. This research will aid psychologists in learning more about the elements that contribute to juvenile delinquency in order to develop therapies that address the source of the problem.

Evaluating the impact of student demographics on lecture capture viewing habits of second-year undergraduate students

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The use of technology in higher education has become increasingly commonplace in recent years. Lecture recordings, also known as lecture capture, is often made available to students as a supplementary resource to in-person lecture attendance. The impact of lecture capture use on student learning remains up for debate in the literature. Previous studies have predominantly evaluated the impact of lecture capture use on entire classes. However, it is possible that different demographic groups within one class may use and/or benefit from lecture capture differently. The purpose of this study was to examine the relationship between student demographic factors and lecture capture viewing habits of students in a second-year core kinesiology course. Students were invited to complete an online questionnaire containing questions relating to demographics and lecture capture use. Relationships between student demographics and lecture capture viewing behaviour were examined. Results revealed that most students (77%) worked a job during the semester and commuted between 30 min to two hours to campus (78%); however, these factors did not correlate with lecture attendance or lecture capture use. Age and year of study were positively associated with re-watching lectures attended in-person ($p<0.05$). Students also appear to value lecture capture when preparing for exams. Lastly, they perceived that their work in other courses and commitments outside of school were important factors in their decision to miss in-person lectures. These results have implications for lecture capture provision in higher-education teaching.

Adolescent gender-based violence amidst the novel coronavirus: A scoping review

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There is a widespread belief that the COVID-19 pandemic has affected gender-based violence. Gender-based violence (GBV) can be defined broadly as violence that is inflicted upon someone on the sole basis of their gender. This scoping review questions how gender-based violence towards the adolescent population has been conceptualized and studied during the COVID-19 pandemic. A comprehensive literature search was conducted across multiple electronic databases, and gray literature was searched via references of included articles and manual searching. Inclusion criteria was set for any full-text, English article discussing GBV or GBV-related topics during the pandemic in adolescents and any article which collected data after January 01, 2020. Articles were screened for eligibility via inclusion and exclusion criteria, assessed for bias using the ROBINS-I tool, and the findings were manually extracted. 12 peer-reviewed articles and 5 gray literature sources were determined eligible for use in the review ($n = 17$). Results showed that there is a wide variety of published literature that speaks to gender-based violence in adolescents during COVID-19, including empirical studies, opinion papers, and reports from agencies. Additionally, there is a unanimous agreement that the COVID-19 pandemic has increased rates of gender-based violence, although little empirical studies have been conducted to concretely determine this to be true. However, the available literature provides socio-ecological factors that may contribute to this increase at personal, relationship, community, and

societal levels. This review brings attention to the presence, and lack of, available literature concerning this topic, and may assist researchers and medical professionals to better understand how adolescents have been affected by gender-based violence during the COVID-19 pandemic.

The effect of social media food images on the well-being of young women as a function of eating disorder risk

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Social media use has skyrocketed over the past decade, with ever-younger, more easily influenced audiences using these platforms. A link has been clearly established between the use of social media and disordered eating as well as negative mood, one seen most often among female users. The current study examined the relationship between exposure to social media food images, mood, and women at risk of, and not at risk of, an eating disorder, as no previous research has investigated this interaction. Female undergraduate students (N = 99) were recruited using the Undergraduate Research Participant Pool through York University and were randomly assigned to one of three conditions, viewing 1) healthy food images, 2) control (nature) images, and 3) unhealthy food images. Each participant filled out demographic information and the Eating Disorder Examination Questionnaire for Part 1 of the study. All participants filled out pre- and post-exposure measures of the State-Trait Anxiety Inventory and a Visual Analogue Scale for mood for Part 2 of the study. The results demonstrated that exposure to social media food images had no significant impact on the mood of women at risk for an eating disorder. Further, the results showed that women without any signs of an eating disorder felt less happy after viewing unhealthy food images, which was important, yet not expected. The important implication of this research is that it appears social media use is harmful to users in general, regardless of their risk of an eating disorder, and using social media frequently can be harmful. Future studies should investigate this relationship with a larger sample size.

Developing pandemic prevention legislation: The impact of the international wildlife trade

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In response to the governance failures which have resulted in the rapid emergence of zoonotically derived outbreaks in the 21st century, the World Health Organization (WHO) has approved the creation of an internationally ratified pandemic prevention treaty known as *The World Health Organization Accord on Pandemic Preparedness and Response*. Due to the devastating impacts and risks of zoonotic transmission, it is imperative that policymakers devise strategies which are focused on the eventual eradication of zoonoses (deep prevention) rather than just limiting their recurrence and severity. An established driver of zoonoses is the poorly regulated International Wildlife Trade. Within this sector, changing relationships, fragmented policies, and sophisticated crime have fundamentally changed how humans interact with nature. The goal of this study is to provide data from select grey-literature sources in order to support a scoping review which analyzes the different trade standards, regulations, and incentives that [1] govern wild animal markets and the importation of wild animals across international borders and [2] determine the roles of local, national, and global-level institutions in the prevention of zoonotic spillover within this sector. Grey literature sources describing illegal activities conducted within the International Wildlife Trade sector which exacerbates the risk of zoonoses were selected for review. The results indicated that political corruption, black market commerce, poverty, and policy fragmentation were identified as strong areas to consider when developing a pandemic treaty focusing on the deep prevention of zoonoses. Future research and recommendations for the development of a deep prevention focused treaty should be directed towards: [1] establishing new priority principles for emerging and novel diseases, [2] the centralization of existing zoonotic data, [3] ensuring equitable policy development via the utilization of interdisciplinary collaboration coupled with a multidisciplinary approach (i.e., One Health) and [4] standardizing the methodology and tools utilized for accurate data driven zoonotic disease surveillance systems.

Oral Presentations in Day 2 Room D

Aetiology of severe adult bacterial community-acquired pneumonia requiring intensive care unit admission at the University of Malaya Medical Centre, Kuala Lumpur, Malaysia: A 4-year retrospective observational study (2017–2020)

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Severe bacterial community-acquired pneumonia (CAP) is a major cause of morbidity and mortality in adults globally. Our aim in this study is to determine the most common aetiological agents of this infection and their antibiotic susceptibility patterns. A retrospective observational study was conducted on all adult patients aged ≥ 18 years old with bacterial CAP requiring admission to the intensive care unit at the University of Malaya Medical Centre, the largest tertiary teaching hospital in Malaysia, from 1 January 2017 to 31 December 2020. Patients were identified from the microbiology laboratory database and electronic medical records. Only patients with microbiologically confirmed and monomicrobial bacterial CAP were included. Data were collected using a standardised data collection form. A total of 97 patients were identified, the majority of whom were males (n = 76; 78.4%). Slightly more than half of the patients were < 65 years of age (n = 51; 52.6%). Seventy five percent (n = 73) of the patients had underlying comorbidities and 40.2% (n = 39) were immunocompromised. Diabetes mellitus was the most common comorbidity (n = 42; 57.5%). Gram-negative bacilli bacteria accounted for a significant proportion of the cases (n = 70; 72.2%). The most common aetiological agent was *Klebsiella pneumoniae* (n = 27; 27.8%), out of which 26.0% (n = 7) were extended-spectrum beta-lactamase (ESBL)-producers. None of the *K. pneumoniae* isolates were resistant to carbapenems. The second most common aetiological agent was *Staphylococcus aureus* (n = 22; 22.7%), of which 31.8% (n = 7) were resistant to methicillin. None of the *S. aureus* isolates were resistant to vancomycin. It is important that empirical antibiotics that have coverage for both *K. pneumoniae* and *S. aureus* are given to adult patients who present with suspected bacterial CAP requiring ICU admission before culture results are available.

Genetically modified bacteria for targeted elimination of adherent-invasive *Escherichia coli* in inflammatory bowel disease

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Inflammatory bowel disease (IBD) is a group of chronic inflammatory conditions that predominantly affect the lower gastrointestinal tract. Current treatment strategies focus on mitigating inflammatory symptoms and promoting remission by targeting immune pathways but have side effects from prolonged use. In this project, we performed a comprehensive literature review of recent advancements in the field to identify gaps in therapeutic strategies. We propose the use of bacteriocin to target adherent-invasive Escherichia coli (AIEC), a bacteria that has been implicated in the development of IBD. We constructed a genetic circuit that can simultaneously detect the inflammation marker nitric oxide, and the AIEC-associated quorum sensing factor autoinducer-3. Upon activation, the genetic circuit expresses colicin E1 and E9, two bacteriocins that can selectively eliminate the AIEC. We designed detailed experimental workflows for circuit construction through Gibson assembly and for functional verification. A mathematical model was also established to predict the outcomes of our design. This work signifies a novel therapeutic approach that is able to target bacteria that have been implicated as key drivers in IBD pathogenesis.

Mitochondrial phenotypes caused by HUWE1 deletion in oocytes

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Since oocyte maturation has high energy requirements, functional mitochondria are crucial for its normal progression. The protein product of the *Huwe1* gene, located on the X chromosome, is an E3 ubiquitin ligase that regulates the stability and activity of numerous proteins involved in mitochondrial activity. Mutations in the *Huwe1* gene in both mouse models and humans have resulted in infertility and various other detrimental effects. Despite its key role, the functions of HUWE1 remain elusive. In order to gain a better understanding of the role of HUWE1 in proper oocyte development, we looked at how the conditional knockout in mouse oocytes affected mitochondrial function. Our results have shown that there were significant differences in total mitochondria, active mitochondria, mitochondrial membrane potential, and heat production between knockout and wildtype oocytes and at different stages of maturation, namely the germinal vesicle stage and metaphase II stage. We identified three potential molecular players that could be responsible for these differences, Mitofusin-2, Opa1, and Creatine Kinase, based on their involvement in mitochondrial dynamics. Future experiments should focus on identifying the cellular roles of these molecules and identifying other HUWE1 targets.

Epithelial ovarian cancer induces diaphragmatic fibrosis in murine mice

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Cancer cachexia is characterized by muscle wasting due to tumour burden, that is often accompanied by wasting adipose tissue and cannot be reversed with nutritional support. Ovarian cancer (OC) cachexia is associated with increased mortality, poor response to treatment and the inability to accomplish activities of daily living. Although OC cachexia negatively affects prognosis, the condition is under-studied due to limited animal models. This study aims to remedy this gap by quantifying the degree of fibrosis, a hallmark of cachexia, in muscles during epithelial ovarian cancer (EOC) progression in a mouse model. Transformed murine ovarian surface epithelial cells from C57BL/6 mice were injected under the ovarian bursa of murine mice, and the diaphragm, soleus, and extensor digitorum longus (EDL) muscles were collected and frozen 45-, 75- and 90-days post-injection. Control mice were similarly injected with PBS, and muscles were collected 75 days post-injection. Muscles were sectioned, stained with picrosirius red, and analyzed using the software ImageJ to identify collagen content. The average collagen content of the soleus muscle remained relatively constant with levels of 0.81, 1.36, 1.54 and 1.85% being observed for control, 45 days, 75 days and 90 days groups, respectively. Collagen content of the EDL muscle also did not change, with the average level being 2.27, 2.36, 2.38 and 2.70% for the control, 45 days, 75 days and 90 days groups. In contrast, fibrosis was evident at 90 days in the diaphragm with the average collagen content being significantly higher at 90 days (3.16%) compared to control (0.42%), 45 days (0.81%), and 75 days (0.80%). Ongoing studies into the relationship between fibrosis and OC progression will elucidate the mechanism by which OC causes diaphragmatic fibrosis.

Developing an *ex-vivo* mouse uterus culture system for studying embryo development

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Significant barriers hinder the study of embryo implantation events and later stage development *in vivo* due to the inaccessible nature of embryos. Current high-resolution imaging methods require removing the embryo from the uterus, halting any development. Isolation and growth of post-implantation embryos *ex-utero* have also proven to be difficult, and this culture negates studying fetal-placenta-uterus interactions. An *ex-vivo* culture method that can maintain a mouse uterus for an extended timeline would greatly aid in studying embryonic development by providing easier access to the embryos for imaging whilst maintaining them in a more physiologic environment. This project involves developing an *ex-vivo* perfusion system that can maintain the growth of a mouse uterus for three weeks. Additionally, it involves determining the ideal culture medium and growth conditions for a mouse uterus. For this, the uterus is isolated, and the abdominal aorta is cannulated and connected to a bioreactor previously developed by the Rogers Lab for the kidneys, pancreas, and lung. The culture media will be STEEN solution which has been successfully used in other organ cultures. To meet the metabolic needs of the uterus, essential amino acids, hemoglobin, and nutritional supplements will be added to aid with organ survival. The performance of *ex-vivo* cultured uterus will be studied by measuring oxygen consumption using Presens™ oxygen sensors at the aorta and vena cava. Preliminary results have shown that utilizing the aorta as a cannulation point leads to successful uterine and ovaries perfusion. Attempts to fully isolate the uterus, ovaries, and associated vasculature and transfer them to the growth chamber have been successful. Longest successful culture time to date is 3 days and experiments are underway to extend this period. This *ex-vivo* uterus system will allow for the growth of the whole uterus, enabling the observation of fetal-placenta-uterus interactions and development in real-time which are currently inaccessible both *in situ* and *in vitro*.

Conflicts of Interest

The authors ME, AG, DS, and PRM declare that they have no conflict of interests.

Authors' Contributions

ME: contributed equally to the founding of the 1st CUHR, served as planning committee for the conference, drafted the conference abstract booklet, and gave final approval to the version to be published.
AG: contributed equally to the founding of the 1st CUHR, served as planning committee for the conference, drafted the conference abstract booklet, and gave final approval to the version to be published.
DS: contributed equally to the founding of the 1st CUHR, served as planning committee for the conference, drafted the conference abstract booklet, and gave final approval to the version to be published.
PRM: contributed equally to the founding of the 1st CUHR, served as planning committee for the conference, drafted the conference abstract booklet, and gave final approval to the version to be published.

Acknowledgements

We would like to thank our community partners, Dr. Mazen Hamadeh, Dr. Angelo Belcastro, Dr. Harvey Skinner and Julie Hard for their support and mentorship throughout the planning and execution of this conference. We would also like to thank the Agents of Change program for providing support in the planning of this conference.

Funding

CUHR 2022 was partially funded by the Faculty of Health, School of Kinesiology and Health Science, and the Agents of Change Program at York University. The funding was partially used for three awards for top presenters.

Article Information
Managing Editor: Jeremy Y. Ng
Article Dates: Received Sep 03 22; Published Sep 29 22

Citation
Please cite this article as follows:
Elghobashy ME, Goli AN, Shakeri D, Rahimpoor-Marnani P. The 1st Annual Undergraduate Research Conference: Innovations in Science. URNCST Journal. 2022 Sep 29: 6(9). https://urncst.com/index.php/urncst/article/view/435
DOI Link: https://doi.org/10.26685/urncst.435