Thursday, October 21st

Abstract Presentations

MicroResearch: Building Healthier Communities through Research Capacity

Dr. Noni MacDonald, MD PhD IWK | Dr. Bob Bortolussi, MD PhD IWK, Dal| Kelly Hunter

Abstract: Nova Scotia has one of the highest rates of poor health behaviors and poor health of any province. There is widespread agreement that improvements in the health of Nova Scotian's will require changes that go beyond the health care system. We need innovative solutions that are developed and implemented with sensitivity to local circumstances and are driven by research evidence. The creation of Drs. Noni MacDonald and Bob Bortolussi, MicroResearch originated in Africa and was later brought to Nova Scotia in 2016, with the goal of building research capacity to find local solutions to community health problems that fits the local needs, resources, and culture. Working in interdisciplinary teams, MicroResearch Nova Scotia (MR-NS) participants take part in an educational workshop run by local researchers, where they learn the basics of research development, design, and implementation. In their teams, they are told to choose a question they see as being relevant to their community, which they will develop into a research proposal. This hands-on learning experience, combined with ongoing mentoring post-workshop, allows teams to go on to apply for small grants to conduct their studies. A focus on knowledge translation encourages teams to bring their findings back into the community and to key stakeholders to ultimately improve community health outcomes. MR-NS highlights the importance of community-based research, where research questions and projects are developed and driven by the community. A total of 111 participants have taken part in nine workshops across the province, including one in Cape Breton. This presentation will describe the goals and vision of MR-NS and will highlight a selection of projects currently being conducted in the province. Using data collected from post-workshop evaluations and a qualitative study on participant's experiences, we will also discuss how the program has impacted MR-NS graduates' everyday lives, beyond their involvement in research.

Walking Through an Uncertain Landscape: Fostering relationally engaged and ethically grounded community-based research

Dr. Lacie White, PhD CBU

Abstract: Kwe'! As a novice nurse researcher arriving with settler rootstoUnama'ki, The Land of the Fog, my intention is to step lightly and with care into research collaborations that benefit the health and well-being of individuals and communities. Yet, within a landscape richly layered with histories and cultures, the way forward is uncertain. In this presentation, new and seasoned researchers, across community and university settings, are invited into dialogue to discuss ways of fostering relationally engaged and ethically grounded community-based research inquiries. Initial learnings from my own journey navigating relational dis-connections in this foreign land, alongside relevant literature by those who have traversed uncharted territories and community-engaged research processes ,are offered as potential ways forward. In addition, we will pause at crossroads that can be encountered along community-based research trajectories to consider how we can collectively chart our course(s) of action with skillfulness and shared power in decision-making processes. Questions at these crossroads include: How can we address competing interests and needs for stakeholders in the research process? What are the impacts on collaboration as a result of divergent infrastructures in academic-community partnerships (for instance, what are the impacts of time and funding allocation for research across academic and community settings)? And how do we expand methodological approaches, as well as collaborations across Indigenous and non-Indigenous partnerships, toward decolonizing aims? Relationally engaged approaches suggest being curious, listening compassionately, observing, and seeking to understand positionalities to incorporate the needs and concerns of all involved in the research process.

Effects of nature soundscape on the autonomic nervous system and attentional capacity

Dr. Geoff Carre, PhD CBU | Michael Wall, PhD (c) UofT

Abstract: In order to advance the discussion regarding the connection between nature and health, the present study explored the acute effects of environmental soundscapes on measures of autonomic nervous system activity and cognitive performance. Past studies have found a strong connection between natural environments and improved health, mood, cognition, and overall wellbeing. These studies have often used photographs or audio-visual representations of nature, such as videos. However, the effects of environmental soundscapes have not been explored in such detail. The current study presented 33 participants with five minute sounds of nature and urban environments (presentation order randomized) while high-frequency heart rate variability (hfHRV), as a measure of parasympathetic activity, and electrodermal activity, as a measure of sympathetic activity, were being recorded. After each sound, participants completed the backwards digit span task (BDS) to evaluate how different sounds influenced memory capacity. It was found that nature sounds improved both hfHRV and cognitive performance when compared to both the baseline measurement and the urban soundscapes. Consistent with the literature, nature soundscapes were restorative only, as they were effective only after the first BDS presentation, a task high in cognitive load.

Healthy and Happy Aging in Cape Breton and Nova Scotia: What We Can Learn from a Review of Programs Across the Country

Dr. Bishakha Mazumdar, PhD CBU | Dr. Kevin McKague, PhD CBU | Maya Giorbelidze, CBU

Abstract: Population aging—an increasingly growing share of older people in total population composition—is a growing concern worldwide. Population aging calls not only for new economic and social priorities, but also for targeted programs to maintain the health and well-being of older individuals. Canada recognizes that maintaining a physically and socially active lifestyle and finding opportunities to engage in meaningful activities are core-foundations to healthy aging(Government of Canada —Action for Seniors Report, 2016b). Consequently, Government of Canada (both at federal and provincial/territorial level) is investing considerable resources to this cause(Federal/Provincial/Territorial Ministers Responsible for Seniors Forum, 2016a). Our research-in-progress is aimed at creating a curated database of initiatives taken by various governments and non-government organizations in Canada towards this goal. Our preliminary findings show that programs offered for seniors across Canada are mostly targeted at physical and emotional health outcomes, bridging seniors to activities and resources in the local community and prevention of loneliness and isolation. At this point, our research indicates that the programs offered by the Nova Scotia government can be categorized into four major themes: programs aimed at healthy daily living, mental wellbeing, social engagement and economic engagement. However, some programs (e.g. economic and social engagement) may need to be rejuvenated and remodeled to mitigate the hardships brought on by the pandemic. The findings of the research will be capitalized on to develop a taxonomy of these programs to increase awareness, enhance accessibility, and promote knowledge sharing among different program providers.

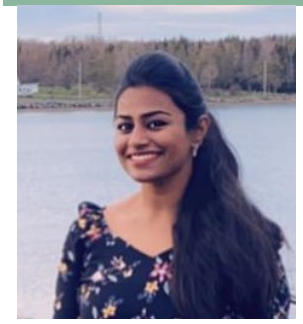
Clinical Trials at the Cape Breton Regional Hospital

Michele Chappel, RN NSH

Abstract: Clinical trials are research studies performed in people that are aimed at evaluating a medical, surgical, or behavioral intervention. They are the primary way that researchers find out if a treatment –like a drug, diet, or medical device –is safe and effective in people. Often a clinical trial is used to learn if a new treatment is more effective and/or has less harmful side effects than the current standard treatment. Other clinical trials test ways to find a disease early, sometimes before there are symptoms. Still others test ways to prevent a health problem. A clinical trial may also look at how to make life better for people living with a life-threatening disease or a chronic health problem. Nova Scotia Health's Research and Innovation team at the Cape Breton Regional Hospital (CBRH) supports clinical trials in several clinical disciplines, primarily oncology, nephrology, and cardiology. To be successful, these trials typically require coordination across multiple health professions (e.g. medicine, nursing, pharmacy) and multiple Nova Scotia Health portfolios (e.g. Laboratory Services, Diagnostic Imaging, Finance, Procurement). This presentation will provide an overview of how clinical trials are conducted at CBRH, with examples from ongoing and completed trials.

The Role of Simulation in Improving Health Care Systems

Dr. Vrinda Krishna, PhD CBU | Dr. Hamid Afshari, PhD CBU



Abstract: Simulation is a powerful approach to create a real-time virtual modelling (digital twin) of a system, which helps us study the impact of internal and external changes on a system, thereby creating a resilient process. Changes could be as unprecedented as COVID-19 and its consequences, or as usual as the shortage of personnel in a hospital ward. For example, COVID-19 has imposed restrictions on several appointments in the health care sector including cancer treatment and surgery. Simulation acts as an excellent tool to investigate the limitations surrounding a process, utilization of resources, and identifying bottlenecks to name a few, and investigate the efficiency of improvement scenarios on that system without interrupting the health care operations. A structured literature review is undertaken to identify the role of simulation software in health care, which provided an insight on different methodologies used to analyze diverse problems of health care management. The most common methodology aligned with using simulation is mathematical optimization and case study whereas, statistical measures to analyze data and lean methodologies are also extensively implemented. The paper searched the most efficient solutions within each of these methods (by improving the efficiency up to 90%) to identify the areas that simulation created a huge impact on health care systems (e.g., patient wait time reduction, optimum resource utilization etc.). This paper enables academics, practitioners, and policy-makers with practical solutions to improve health care systems using a simulation approach.

Toward High Quality GAN-Synthesized Computed Tomography Images Using Quantitative Metrics

Dr. Tynan Stevens, MD NSH
Finlay Korol, McMaster University

Abstract:

Background

Generative adversarial network (GAN) based artificial intelligence (AI) have recently become popular due to their capability to learn and synthesize diverse image sets. For that reason, GANs are currently being used in the domain of medical imaging, and CT image synthesis specifically sees diverse uses in cancer treatment applications. However, quantitative metrics have not been validated for medical images, making their potential utility unclear.

Purpose

This study follows the performance improvement of a CT image-synthesizing GAN over many training cycles. This process will be guided largely using quantitative metrics; thus these authors aim to evaluate some popular metrics based upon observed correlation with image quality and failure detection. In addition, metrics that were particularly helpful in the medical imaging context will be identified.

Methods

GAN models using Wasserstein loss with and without gradient penalty were selected for this study due to their reputation for training stability. Ideal hyperparameters were chosen empirically as informed by metrics and by inspection of generated image sets.

Results

Synthetic image quality and realism improved continuously over the duration of the study. Having been developed on non-medical images, Inception Score (IS) and Fréchet Inception Distance (FID) were unideal metrics for this study. Contrarily, training was largely guided by sampled Fréchet distance (SFD), whose data inputs are the GAN training data and GAN synthesized images.

Conclusions

SFD appears to be more sensitive to medical image quality than IS and FID, rendering it suitable to guide researchers in developing high-quality GANs for future medical imaging studies.