NORTHERN ONTARIO SCHOOL OF MEDICINE

APRIL 2018

NORTHERN HEALTH RESEARCH

THE SCOPE

The Heart of the Matter

A Spoke in the Wheel

NODIP@NOSM

A Foot Up

Northern Ontario School of Medicine

École de médecine du Nord de l'Ontario

WELCOME TO *THE SCOPE*

Scope **can be defined as: the range of one's perceptions, thoughts, or actions; the geographical or perceived area covered by a given activity; or, a viewing instrument such as a microscope or telescope. In most modern usages of the word scope, there is a unifying theme of examination or investigation.**

In this case, *Scope* includes all of these ideas. Research at the Northern Ontario School of Medicine (NOSM) is reflective of the School's mandate to be socially accountable to the diversity of Northern Ontario. As such, studies are being undertaken in a range of subjects including culturally appropriate care for Indigenous peoples, new drug technologies, cancer screening methods, patient rehabilitation, lakewater quality, and so much more. Subjects being studied are as varied as the geographic area of NOSM's wider campus of Northern Ontario and as diverse as the researchers themselves: faculty members in the School's Human, Medical, and Clinical Sciences Divisions, residents, medical students, a broad range of health-professional learners, and collaborators.

Although this publication cannot provide the full scope of exciting research happening across Northern Ontario, we hope it provides a glimpse into some of the work being done with a view of improving the health of Northern Ontarians and beyond.

The Scope Research Newsletter of the Northern Ontario School of Medicine

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The Scope is published bi-annually.

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WELCOME TO *THE SCOPE*

A Message from Dr. Penny Moody-Corbett Associate Dean of Research


Dr. Penny Moody-Corbett

Spring has arrived, and it's a busy time of year for the Research Office. We are currently planning the 13th annual Northern Health Research Conference (NHRC) which—for the first time ever—will be held in Kenora, approximately 500 kilometres from Thunder Bay.

As some of you may know, I'm an avid runner. In the months, weeks, and days leading up to NHRC 2018, I will be tracking my runs to virtually "Run the Distance to Kenora" from Thunder Bay. If you would like to join me on this virtual quest, we have set up a NOSM running group at Strava. Regardless of where you're located across NOSM's wider campus of Northern Ontario, you can join us in the virtual run from Thunder Bay to Kenora! Of course, I will be running, but you may choose other forms of exercise (swim, bike, kayak, canoe, etc.) to go the distance.

Anyone who has completed a marathon will tell you that the physicality of a long-distance run can be an enormous challenge. But it's addictive and can keep you running the distance over and over again to improve your times.

Not unlike running, research is a culmination of great efforts that requires us to set a goal and find a pace. While runners prepare for a race by eating healthy meals, stretching, practicing, mentally preparing, and resting, researchers refine the art of gathering and evaluating data, sourcing the right information, creating and drafting papers, evaluating, and presenting their research. Adequate preparation enables the researcher or the runner (or in my case, both) to finish both successfully.

I am thrilled to be bringing together and showcasing my parallel passions at this year's NHRC through the virtual run initiative.

If you are interested in joining, please visit strava.com to create an account and track distances at the NOSM Strava Club (search Northern Ontario School of Medicine). As you "Run the Distance to Kenora," we also invite you to share photos on social media @thenosm on Instagram, Facebook or Twitter using the hashtags #beactivewithNOSM and #NHRC2018.

It's a wonderful time of year to be outside and enjoying the fresh air!

A SPOKE IN THE WHEEL

PSI Visiting Scholar Researching the Impacts of Virtual Community Practice on Provider Capacity and Patient Outcomes in Northern Ontario


Dr. Alison Crawford

For years, health outreach programs in Ontario centred on flying physicians to the North to provide specialized services.

Through a project called Extension for Community Health Outcomes (ECHO), the Centre for Addiction and Mental Health is improving access to specialist care in psychiatry and mental health, and contributing to health equity in the North, according to Dr. Allison Crawford, NOSM's Physicians' Services Incorporated (PSI) Visiting Scholar.

Crawford is the Director of the Northern Psychiatric Outreach Program and Telepsychiatry at the University of Toronto and the Centre for Addiction and Mental Health (CAMH), and is one of the co-Chairs of ECHO Ontario Mental Health.

Developed at the University of New Mexico School of Medicine, the ECHO model aims to bridge academic health science centres and the frontline of community care to improve and expand clinical skills and capacity.

"ECHO started as a solution to the fact that there was limited access to specialized services outside of major centres," says Crawford. "ECHO takes providers in primary care settings, which can include physicians, nurses, nurse practitioners and social workers, and has that group meet virtually on a weekly basis to form a community practice."

"ECHO uses a 'hub and spoke' model," explains Crawford. "The ECHO Ontario Mental Health virtual community connects primary care sites in rural and underserved areas, or the 'spokes,' to the mental health and addiction specialists at the University of Toronto and CAMH, or the 'hub,' via teleconferencing."

The ECHO Ontario Mental Health program is also adding specific community practices to address high-needs areas including gender identity, OCD, cognitive behavioural therapy and dialectical behavioural therapy, community addictions as well as First Nations, Inuit, and Métis wellness.

PSI FOUNDATION

Crawford's research focuses on the impacts of ECHO on provider capacity in Northern Ontario, and the subsequent impacts on patient and community health outcomes.

"We're exploring how best to improve access to specialist and psychiatric services in these communities, specifically whether the ECHO program is the best means of doing so," she says.

As this year's PSI visiting scholar, Crawford will be travelling to the North to give a workshop and participate in a fireside chat during NOSM's faculty development conference, Northern Constellations.

For more information on ECHO, visit camh.echoontario.ca.

THE HEART OF THE MATTER

NOSM Scientist Exploring the Role of Vitamin A in Heart Development and Repair

Every cell in an early embryo has the same potential to develop into different parts of the body. But cells eventually have to commit to their fate, and in a process called cellular differentiation, they are programmed to perform different functions, determining whether they become brain, skin, heart, or another type of cell.

Dr. Alex Moise, NOSM Associate Professor, studies the role of vitamins and other micronutrients in health and disease.

"DNA in every cell in one's body is generally the same, and DNA is like a book," says Dr. Alex Moise. "But different cells in our body have to read different chapters of that book. If you're a heart cell you're not going to read the chapter on the brain. You only have to read the chapter you're going to be tested on."

According to Moise, an Associate Professor at NOSM who studies the role of vitamins and other micronutrients in health and disease, vitamin A, though, best known for its role in vision, also plays crucial roles in cellular differentiation.

"One of the instructive mechanisms that allows the cells of our body to know what DNA chapter to read, and, thus, acquire different developmental fates, is this metabolite that comes from vitamin A called retinoic acid," explains Moise. "It's a hormone, and it has to be made precisely in the right amount, at the right time and in the right place. If it's not, it leads to severe congenital malformations, including heart, skeletal and neural tube defects."

Moise's research focuses specifically on the role of vitamin A in congenital heart disease. Recent work from his lab just published in the FASEB Journal and Developmental Cell has revealed the critical role of vitamin A in the formation of the embryonic heart and the coronary vasculature.

"In our current studies, we looked at mice and found that deregulation of vitamin A metabolism results in alterations in the developmental processes controlled by the epicardium, a thin layer of cells that covers the heart," he says. "The embryonic epicardium controls the growth of heart muscle and the formation of the coronary vasculature."

"When an embryonic heart is really tiny, the muscle is thin enough that it does not require its own blood supply. But as the heart grows, the capacity for the muscle to receive oxygen directly from the chambers of the heart is limited, so then it begins to develop its own coronary vascular system," says Moise.

By understanding the role of vitamin A in heart development, Moise says his work is relevant for the role of diet in the prevention and treatment of congenital heart disorders. "Alcohol consumption, as well as several drugs commonly prescribed to women of child-bearing age interfere with vitamin A metabolism and signaling" he says. He also hopes his research could be relevant later in life in the prevention and treatment of heart disease.

"Heart disease is the leading cause of death worldwide and the second leading cause of death among Canadians. A recent study showed that people from Northern Ontario face twice as many cardiovascular issues as those in southern Ontario," says Moise.

"Heart failure is tied to the fact that the heart has a poor inherent ability to regenerate itself which is insufficient to replace the billions of cardiomyocytes lost during an acute event," says Moise. "In animals, there's a great variety in terms of capacity for regeneration, and even in humans some organs are very good at regenerating: for example, our liver can regenerate quite efficiently. But others, like our nervous system and our heart, are very poor at regenerating. However, there is hope—some evidence suggests that epicardial signaling may be a therapeutic target in heart repair, so there's a lot to learn in this area."

A FOOT UP

NOSM Faculty Member Finds Fiberglass Total Contact Casting And Irremovable Cast Walkers Reduce the Need for Amputations in Diabetics

According to Health Quality Ontario, about 1 in 10 people in the province—approximately 1.5 million people—have diabetes. Of those with diabetes, about two to three per cent will develop a foot ulcer, putting them at risk lower leg amputation.

Dr. John Lanthier, NOSM Assistant Professor, is a member of the School's Academic Council and Library Committee, as well as an American Board of Foot and Ankle Surgery Certified Podiatric Surgeon.

Importantly, five-year mortality rates after new-onset diabetic ulceration have been reported between 43 and 55 per cent and up to 74 per cent for patients with lower-extremity amputation. These rates are higher than those for several types of cancer including prostate, breast, colon, and Hodgkin's disease.

Diabetes can cause a loss of sensation and circulation in the feet, which leads to the development of wounds, or ulcers. When the wounds on the foot become infected, that infection can spread to the bone, which often results in an amputation.

"When a patient develops a foot wound, the goal is to heal the wounds as fast as possible to avoid infection in the bone," says Dr. John Lanthier, an Assistant Professor in Clinical Science Department and a member of the Academic Council and Library Committee at NOSM, as well as a Fellow of the American Board of Foot and Ankle Surgery, and a Board Certified Podiatric Surgeon.

One of the modalities used to heal certain types of these wounds is to "off-weight" the ulcer, according to Lanthier. He recently worked with Health Quality Ontario on a Health Technology Assessment evaluating the effectiveness and costs of pressure offloading devices in treating diabetic foot ulcers compared to other treatments (both offloading and non-offloading).

Pressure offloading devices are used to treat neuropathic foot ulcers in diabetic patients by removing the pressure points in the feet that lead to and exacerbate the wounds. Devices include fibreglass total contact casting, removable cast walkers and irremovable cast walkers.

The assessment, a systematic review that included data from 13 randomized controlled trials. Lanthier's daughter, Hannah Lanthier, who is a third-year student in the Bachelor of Science program at Laurentian University, assisted with the literature review.

The researchers found that healing with a fibreglass total contact cast or an irremovable cast walker, was between 70 and 90 per cent, and the healing rate one month after the cast was removed was 50 per cent. The healing rates with other treatments were 50 and 20 per cent, respectively.

Currently, fibreglass total contact casting, removable cast walkers and irremovable case walkers are not fully covered by OHIP. In their assessment, the researchers also found that the total cost of fully funding these treatments would be between $17 and $20 million per year.

But by fully funding these treatments, the health system would actually save money, says Lanthier.

"Total contact casting and irremovable cast walkers showed better healing than removable cast walkers, and they were also more cost effective," he says. "If more people used these devices, the government would actually save money, because fewer people would require amputations, which although initially relatively quick and inexpensive, have much greater social and economic costs in the long run."

Diabetes is a significant problem in Northern Ontario. Diabetes disproportionately affects Indigenous populations: Diabetes Canada reported that in 2016, the rate of diabetes was three to five times higher among Indigenous populations than non-Indigenous populations in Ontario. The amputation rate among diabetes patients in Northern Ontario is also three times that of York region in Toronto, according to Lanthier.

In addition to the cost to the health system, there is a social cost to amputation, he says.

"Once you get the amputation done, there's a cost to not having your legs or your mobility," says Lanthier. "That's in addition to the fact that the five-year survival rate following amputation is lower than that of breast or prostate cancer. When you consider this in combination the amputation rate in Northern Ontario, it's clear there is a massive problem. So this work is critically important to making sure people in the North get the treatment they need," he says.

STANDING ON THE SHOULDERS OF GIANTS

NOSM Scholar Brings Vision for Medical Education Research in Northern Ontario

When most people think of research, they imagine scientists with white coats working in a lab with test tubes. What they don't imagine is medical education research—but a new faculty member at NOSM hopes to change this.

"Medical education research is any investigation related to the teaching and learning of medical professionals," explains Dr. Erin Cameron, an Assistant Professor of Medical Education and Curriculum Development at the Northern Ontario School of Medicine. "Topics can range from exploring contemporary issues and questions in medical education, to designing and evaluating curricular innovations."

Since joining NOSM, Cameron has been actively engaging with communities, students, faculty, clinicians, NOSM staff, and health care organizations to learn about the diverse educational needs and approaches at NOSM and within Northern Ontario.

"So much incredible educational research has and is currently being conducted at NOSM—I feel that I am standing on the shoulders of giants," exclaims Cameron. "To build on past successes, I have come to see my role as bringing voices together to share ideas, knowledge, and skills in order to continue NOSM's innovation into the future."

One of the ways Cameron hopes to bring voices together is through the newly established Medical Education Research Lab in the North (MERLIN). The goal of MERLIN is to facilitate the sharing of resources and tools to support community-engaged, socially accountable medical education research at NOSM. Cameron's vision is that MERLIN will create a place and space for medical education research, where researchers can work together, share ideas and concepts and build capacity for medical education scholarship.

"Ultimately, through my role and through MERLIN, I want to support NOSM in addressing contemporary educational issues and questions that arise in programming at the undergraduate, postgraduate and continuing professional development levels" says Cameron. "I am particularly interested in NOSM's social accountability mandate and how different aspects of the school are or could be contributing to this mandate."

At NOSM, Cameron is in the early stages of establishing various collaborative research projects. For example, she is partnering with the Thunder Bay Regional Health Sciences Center to explore the impact of an educational intervention aimed at using high-fidelity simulation to support compassionate and patient-centered care. She is also working with medical learners in both undergraduate and postgraduate programs to understand students' perceptions of social accountability. Lastly, together with the Curriculum Instructional Designers at NOSM, she is creating a "community of practice" for medical education scholarship at NOSM. The goal of this community is discuss recent advances in medical education, while also identifying ways to support, promote, and initiate medical education scholarship at NOSM.

Prior to joining NOSM, Cameron held a faculty appointment at Memorial University in St. John's, Newfoundland and Labrador. As an educational scholar, Cameron's research to date has focused on transformative pedagogies that enhance teaching for diversity and social justice. From studying patient-centered models of care to developing and evaluating educational interventions to support compassionate care, Cameron's work has attracted the attention of scholars in the field of social justice education. In addition to her research, she has served as a curriculum consultant, contributed educational perspectives to diverse healthcare research groups, and has established various collaborative networks for bringing together research and practice.

"With my broad research interests, NOSM fits really well with the work that I've done and the work that I want to do," Cameron says. "I'm really excited about being at NOSM and supporting medical education scholarship at NOSM."

Cameron will be at various local and national medical education conferences this year to present her current projects and to promote her vision for a collaborative approach to medical education scholarship at NOSM and in Northern Ontario.

Dr. Erin Cameron is an Assistant Professor of Medical Education and Curriculum Development at the Northern Ontario School of Medicine.

NODIP@NOSM

Advancements in Indigenous Health Research

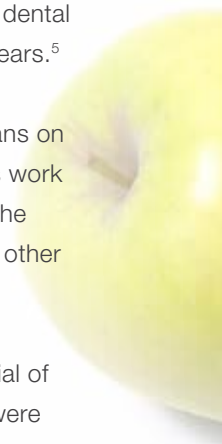
Evidence-based practice is integral to the professional obligations and regulation of registered dietitians (RDs).[1] The Northern Ontario Dietetic Internship Program (NODIP) at NOSM is leading evidence-based dietetics practice by asking important research questions, systematically finding evidence, assessing the validity, applicability and importance of that evidence, and combining the information with RD expertise and judgment, as well as community values and circumstances to guide decision-making in dietetics.[2]

NODIP at NOSM includes practice-based projects with RD advisors across a variety of practice settings, as well as diverse client and patient groups. Since 2007, NODIP has coordinated 70 projects with the support over 65 unique advisors and their organizations. As one of NOSM's academic programs with a social accountability mandate, improving the health of Indigenous communities, particularly among children and youth, has been a strong focus.

To date, nine related projects have been completed with eight conference abstracts accepted as well as three publications in peer reviewed journals. These projects include:

- Participation in a multi-phase study to develop and validate a nutrition screening tool for toddlers (Toddler NutriSTEP®) with the University of Guelph. As part of a provincial sample, NODIP interns and RD advisors from the Thunder Bay District Health, Public Health Sudbury & Districts, Noojmowin Teg Health Centre and NODIP, along with Indigenous partners from Aboriginal Early Years programs and Indian Friendship Centres, recruited parents of toddlers and conducted key informant interviews.[3]
- Secondary data analysis of the Toddler NutriSTEP® validation study; one analysis relating to nutrition concerns in a sample of toddlers in Greater Sudbury, and a second exploring the knowledge gaps of Sudbury parents regarding their preschooler or toddler.
- An environmental scan of school nutrition programs in First Nations schools on Manitoulin Island, and the development and cognitive testing of a school food survey to inform current strengths and further opportunities to improve the school nutrition environment.
- A grey literature search and collection of food-related themes and experiences at the Spanish Residential School with the guidance of an archivist from the Algoma University Shingwauk Residential Schools Centre.
- A program evaluation of a food literacy component of a youth empowerment program for Indigenous girls
- A partnership with the University of Waterloo and Western University in which a NODIP intern and RD advisor conducted a literature review of effective healthy weight interventions in Aboriginal children and youth as part of a larger federally funded project.[4]
- The development of a knowledge pathway on caregiver feeding practices, nutrition knowledge and early dental carries risk in young Aboriginal children, 0 to 6 years.[5]
- A national survey of Canadian Registered Dietitians on Aboriginal cultural competency in dietetics.[6] This work in particular has generated national attention in the dietetic field with requests for consultations with other academic and internship programs in Canada.

Knowing the first recorded clinical trial, first clinical trial of the modern era, and the first Cochrane-related trial were all nutrition trials,[7] we look forward to continuing the legacy of nutrition research and scholarship through our work in NODIP@NOSM.



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