

Evidence with Impact

Discover how our work with scientists, partners, and communities is having an impact and creating better health and healthcare for everyone.

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01 Online calculators improve awareness of individual health risks



Background

Dementia and chronic kidney disease (CKD) are both chronic conditions with known modifiable risk factors. Lifestyle changes can prevent or delay these diseases, but many people do not know their risk. Online risk calculators that can be completed at home using self-reported lifestyle behaviour and health information serve as a practical solution to improve awareness of dementia and CKD and their risk factors. These tools may encourage people to reflect on their lifestyle habits and make changes to reduce their risk of disease. Additionally, tools that use information collected at the population-level may also be used to estimate the population risk of disease and inform population-level prevention strategies and planning.

ICES Research Highlights

Researchers at ICES, including [Dr. Douglas Manuel](#) and [Dr. Peter Tanuseputro](#), have developed two new risk algorithms to estimate the risk of developing dementia and CKD using data from the Canadian Community Health Survey linked to ICES administrative data. Both tools have been added to the catalogue of calculators at [Project Big Life](#), which provides Canadians with an accessible avenue to understanding how their lifestyle habits influence their health.

The [Dementia Calculator](#) empowers people to better understand the health of their brain and how they can reduce their risk of being diagnosed with dementia. The underlying algorithm, the [Dementia Population Risk Tool \(DemPoRT\)](#), led by Dr. Stacey Fisher, predicts the risk of being diagnosed with dementia in the next five years for those aged 55 years and older using self-reported information about age, ethnicity, immigration status, health conditions and lifestyle behaviours. Completing the online calculator provides the user with a report that recommends how they can modify their lifestyle to improve their brain health and reduce their risk of dementia.

Dr. Manish Sood led a similar project to develop the [Chronic Kidney Disease Calculator](#) to improve awareness of CKD and to empower and personalize care for patients. The underlying algorithm, the [CKD population tool \(CKD pop-T\)](#), predicts risk of early eGFR decline (an indicator of kidney function), which is associated with early-stage CKD. Self-reported information about your age, lifestyle factors (smoking, alcohol, physical activity), illnesses (diabetes, hypertension, cancer) and, optionally, your baseline eGFR level, are used. This tool stands out from existing health predictive models by not requiring lab values or blood pressure, making it easy for the general public to complete on their own.

How this work is having an impact:

- The Dementia Calculator saw over 250,000 unique users from 201 countries in the first five days following launch and had a total media reach of over 300 million.
- The DemPoRT algorithm has been integrated into Statistic Canada's population health microsimulation model and is being used by the Public Health Agency of Canada to assess dementia prevention strategies and support Canada's national dementia strategy.
- The CKD Pop-T is a "first of its kind" calculator designed to assess the likelihood of early CKD development through an evaluation of lifestyle factors. This innovative tool has garnered attention from more than 30 prominent media outlets.

Ground-breaking clinical trials have positive impact on patient health



“ Our team intends to expand the use of these methods to conduct more large-scale, high-quality, pragmatic trials. With the support of CIHR, we recently launched a national training program, the HDRN Pragmatic Trials Training Program, which will coach researchers through the complicated art of conducting such trials.

- Dr. Amit Garg

Background

Pragmatic trials are large-scale randomized clinical trials that test interventions by embedding them directly into routine care in the same manner they would be implemented after the trial is complete. To be efficient, many of these trials make use of administrative healthcare data, such as the data housed at ICES. Two trials completed in 2022 demonstrate the real-world impact of clinical trial advancement for patient health.

ICES Research Highlights

The ICES Kidney, Dialysis & Transplantation team, led by the program lead, [Dr. Amit Garg](#), conducted MyTEMP, a ground-breaking pragmatic trial to determine whether providing dialysis with cooler fluid reduces the risk of cardiovascular-related hospital admission or death compared with using standard temperature dialysis fluid.

The MyTEMP team found that adopting a centre-wide policy of personalised cooler dialysis fluid did not reduce the risk of major adverse cardiovascular events or death and increased the likelihood of patient discomfort. The trial

resulted in [five publications](#), and recommended that cooler dialysis fluid should not be adopted as a centre-wide policy.

The COACH trial, led by [Dr. Douglas Lee](#), program leader of the ICES Cardiovascular Program, involved 10 hospitals in Ontario, and 5,452 patients presenting to the emergency department with heart failure. Hospitals were randomly assigned to crossover from usual care to a decision support tool intervention that discharged low-risk heart failure patients from hospital, with rapid follow-up in an outpatient clinic. High risk patients were recommended for admission to hospital.

The use of the tool was associated with a 12 per cent reduction in the rate of all-cause death or cardiovascular hospitalization over 30 days, and a continual decrease over the 20-month follow-up. The trial was presented as a late-breaking trial at the American Heart Association and was published simultaneously in the [New England Journal of Medicine](#). It has led to new models of acute heart failure care, which is a leading reason for hospitalizations and readmissions globally.



“ The ability to conduct randomized trials using the hybrid of clinical or registry data combined with administrative databases at ICES is a highly efficient way to test interventions, while maximizing participant inclusiveness. We will continue to utilize this innovative approach to generating high quality evidence in the future.

- Dr. Douglas Lee

The MyTEMP and COACH teams used several innovative methods, including:

- Use of routinely collected data housed at ICES to reliably assess baseline characteristics and/or outcomes.
- Linkage of routinely collected data with multiple administrative healthcare databases, to help determine patients' trajectory throughout the system of care.
- Integration of the intervention into routine care with minimal healthcare disruption.
- Inclusion of all patients receiving care at 84 dialysis centres across Ontario (MyTEMP) and all patients with heart failure who presented to the emergency department (COACH Trial), answering whether the interventions improve outcomes for the populations without participation bias.

How this work is having an impact

- After the publication of the MyTEMP results, dialysis centres which had switched to cooler dialysis fluids reverted back to standard-temperature dialysis fluid to make treatments more comfortable.
- The MyTEMP trial is the largest trial of patients receiving maintenance hemodialysis published to date; it included over 95% of maintenance hemodialysis patients in Ontario during the trial period, totaling more than 15,000 patients who had more than 4.3 million dialysis treatments. It shows it is possible to efficiently conduct large-scale trials with innovative methods to generate high-quality evidence and optimize the delivery of hemodialysis care.
- The COACH trial is one of the few successful health system intervention trials for acute heart failure, and the approach is being adopted at hospitals in Ontario to improve efficiency and safety of care for patients with heart failure.
- The COACH trial also provides evidence that predictive models and clinical decision rules may have a substantial impact that benefits patients, hospitals and the healthcare system; it also demonstrates the feasibility of testing predictive models using a randomized trial design.

Prenatal Opioid Exposure and Neonatal Abstinence Syndrome: A Research Project with 13 First Nations Communities in Ontario



Background

Canada has been significantly impacted by the global opioid crisis and has some of the highest rates of opioid use in pregnancy worldwide. Prenatal opioid exposure can result in infants being born in withdrawal (called neonatal abstinence or neonatal opioid withdrawal syndrome) and is associated in some cases with several poor longer-term health and developmental outcomes. First Nations communities have voiced significant concerns regarding opioid-related harm and deaths, including those affecting pregnant women. For these communities, opioid addiction is often the result of individual, collective, and intergenerational trauma, and those same communities hold the knowledge and solutions to support intergenerational healing.

[This research project](#) was initiated in response to concerns raised by several First Nations communities in the lower half of Ontario about the health of school-age children exposed to opioids prenatally. To address the issue, 13 First Nations participated in this project. By working in partnership with the project team led by ICES scientists [Astrid Guttmann](#), Serene Kerpan and [Jennifer Walker](#), communities aimed to learn more about the impact of prenatal opioid exposure on children, mothers, families and caregivers, service providers and educators, and their communities as a whole. The project encompassed both health record data analyses at ICES and, for 11 communities, qualitative research with community members with lived experience. We recognize the Chiefs

of Ontario for their leadership and foundational data governance work that enabled this research, and the CHILD-BRIGHT Network, which funded the work.

ICES Research Highlights

Prenatal opioid exposure has far-reaching impacts on First Nations communities. In the focus groups and interviews, participants spoke about the relationship between addiction, individual trauma, and the impacts of intergenerational trauma related to the residential school experience. Issues of stigma, judgement, anti-Indigenous racism, and access to services were identified as major barriers for mothers to receive care and support. The health record data showed that 10.2% of babies born in the 13 participating First Nations between 2013 and 2019 had prenatal opioid exposure (compared to 1.7% of all babies born in Ontario) but rates have decreased since 2015. Most prenatal opioid use in the 13 communities was for mothers being treated for opioid use disorder.

Despite the challenges, the findings underscore the many strengths and programs that already exist in these First Nations communities. Participants recognized the gifts and strengths of children with prenatal opioid exposure and the community of people working to make positive changes. Community members discussed potential innovative and evidence-based strategies, including treatment centres

which could accommodate children, trauma-informed treatment and care, enhanced training for educators and service providers, respite for families and caregivers, and changes to the child protection system. Addressing intergenerational trauma and continuing integration of culture into community life were seen to be critical to prevention.

How this work is having an impact:

- Each of the 13 First Nations communities worked with ICES to define which data were included in their community-specific report. These findings are now with each community and being presented to both their leadership and wider membership.
- In some communities these reports have already led to greater awareness of the problem.
- One First Nation used the data to obtain funding to expand their community-based healing, treatment, and recovery programs and services.
- All of the communities are collaborating to develop knowledge translation tools and come together to share ideas on solutions.

04 WAHA Partnership with ICES: a success story in data report development and much more...



Weeneebayko Area Health Authority
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Background

The health of a population can be evaluated by tracking disease trends, patterns of health services use, and assessing barriers to healthcare. The ability to access health data is vital, especially for remote communities.

The James and Hudson Bay Region in northeast Ontario includes the communities of Peawanuck, Attawapiskat, Kashechewan, Fort Albany, Moosonee (municipality) and Moose Factory (with Moose Cree First Nation and MoCreebec Eeyoud). [The Weeneebayko Area Health Authority \(WAHA\)](#) serves a population of approximately 12,000 people, of which the majority are Mushkegowuk Cree.

To improve access to regional health data, WAHA's [Minomathasowin-Healthy Living Public Health Department](#) explored options for developing partnerships with health research organizations like ICES. WAHA's goal was to co-create enhanced Indigenous data stewardship for the region while providing community health leaders with the necessary information they need to address ongoing health challenges.

In 2018, WAHA and ICES formalized their partnership, supporting local health initiatives and ensuring access to data for the region. Minomathasowin continues to identify public health priorities, engages with local health leaders, responds to community-driven health questions and leverages multiple data sources including population-level ICES data.

ICES Research Highlights

Through a community-driven strengths-based approach, local knowledge and Indigenous data governance principles guide the direction of the Minomathasowin research initiatives, and local data ownership is supported.

Population-level data housed at ICES has been used in several projects, including a one-time report of the region's pandemic experience, with an overview of COVID-19 cases, hospitalizations, mortality, and vaccine progress up to December 2022 and ongoing quarterly updates beginning January 2023. Regular access to timely COVID-19 data helped keep people safe and helped WAHA and community leaders develop effective interventions.



Other projects include:

1. Health surveillance of 19 common chronic diseases, to better understand how people with these diseases use and access health services.
2. An ongoing project with the University Health Network in Toronto to create a profile of individuals living with or at risk of congestive heart failure, supporting increased access to cardiovascular care and screening.
3. Exploring the main reasons for visits to WAHA's emergency departments.
4. Analyzing regional and local medical transportation data, to understand the key reasons why individuals travel outside their communities for healthcare.
5. Research questions from community organizations, including tuberculosis data analysis, appointment no-shows, lupus, and other autoimmune diseases.

How this work is having an impact:

- Access to health information including data housed at ICES improved Minomathasowin's ability to analyze regional demographics and health trends to produce health status reports. The information enables communities to work towards improving the quality of life for community members.
- By reducing barriers to data access, Indigenous data stewardship is strengthened. This can empower sustainable self-determination and effective self-governance in Indigenous communities.
- The results are shared with communities for health planning, decision making and to develop funding applications. For example, a mental health and addictions report helped augment services across the region.
- WAHA has become a regional health data hub, with a growing number of projects supported by ICES data analysts and a staff scientist.

05 Making older women count



Background

The [Women's Age Lab](#) is a space for exploration and collaboration on science-driven health and social change that will improve the lives of older women. Born out of a need to bring sharp focus to this critical topic, the lab is committed to advancing science, putting research into action, and raising awareness about, and advocating for, the unique needs of older women. To achieve this, all data should be disaggregated by sex and age to generate knowledge about older women in all areas of research.

The research is centered around four key areas of action that are aligned with international initiatives:

1. Addressing gendered ageism;
2. Reimagining aging in place and congregate care;
3. Optimizing therapies and prescribing; and
4. Promoting social connectedness.

ICES Research Highlights

ICES data has been used to perform high-quality research that has raised awareness about polypharmacy among older women. Prescribing cascades happen when the side effect of a medication is treated with a potentially unnecessary and harmful second drug, and these cascades are a significant contributor to polypharmacy.

In 2019 the project iKASCADE (Identifying Key Prescribing CASCADEs in the Elderly: A Transnational Initiative on Drug Safety; funded by GenderNET) was launched by ICES scientist [Dr. Paula Rochon](#) with colleagues from Women's College Hospital (WCH) and international partners. The aim is to explore how older individuals are affected differently by prescribing cascades and how prescribers treat their patients based on sex and gender. Along with ICES population-based data, five other databases (containing data from 14 countries) [were analyzed](#) to compare sex, age, and gender-related socio-cultural factors included in these data and to explore their association with polypharmacy.

As the number of potential prescribing cascades grows, there is also an urgent need for simple, context-specific tools so that healthcare providers can identify relevant prescribing cascades to make better deprescribing decisions. With funding from a CIHR project grant, the research team applied novel techniques to create a prioritized list of prescribing cascades based on how frequently a drug that initiates the cascade is prescribed and the likelihood that the cascade occurs. Symmetry analyses are methods being used to document the prescription sequence and have been applied to ICES population-level drug prescribing data on older adults.

Studies are also underway using ICES data to explore serious adverse events (emergency room visits, hospitalization, and death) due to prescribing cascades, as well as retirement home data on differences between older women and men among different settings of care along with socio-demographics, health status, and healthcare system utilization.

How is this work having an impact

- The iKASCADE GenderNET work has been presented Internationally at the European Geriatric Medicine Society Conference (EuGMS) in London and GenderNET Conferences in Paris and Brussels. The research team will head back to Europe to do a symposium for EUGMS in the fall of 2023 in Brussels.
- In 2022, a self-paced, interactive module was created by WCH scientist Robin Mason as part of the WCH Health Researcher's Toolkit. It shows why disaggregating data by sex and age is crucial to advancing health and socioeconomic equities, potential problems that can occur when they are not considered, and how some conditions and treatments differ by sex and age.
- Women's Age Lab is raising the profile of older women, which is often overlooked in medical literature and the media. In particular, ICES adjunct scientist [Dr. Rachel Savage](#) has explored the issue of loneliness among older people and has found female sex is an independent risk factor for polypharmacy and that older immigrant females experience greater levels of loneliness.

