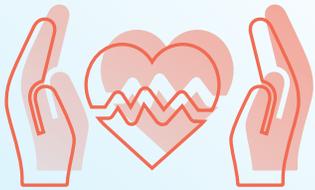


Research with Impact

A selection of recent projects that illustrate the combination of clinical insight and scientific rigour driving ICES research.



Assessing the appropriateness of cardiovascular screening and care



Innovating algorithms for high-impact research on brain disorders



Evaluating emergency department wait times and quality of care



Supporting Indigenous-led population health research in Ontario



Enabling planners and providers to track mental health care and outcomes over time

Stronger Health System

ICES research has improved the quality of Ontario cardiovascular screening and care, leading to better care at a lower cost.

The Problem

Cardiovascular illnesses drive some of Ontario's highest health system costs, with heart disease and stroke being among the leading causes of death. As more people age with risk factors that call for early detection and treatment, the practice of screening for cardiovascular diseases has become more widespread and costly. ICES research has shown that in 2009 Ontario spent \$130 million on echocardiograms alone. But are Ontarians getting better care for these higher costs?

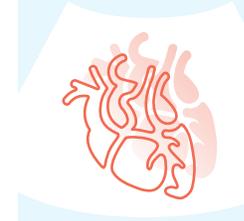
The Research

Key to the work of ICES' Cardiovascular Research Program is the population-level evaluation of access, outcomes and costs associated with cardiovascular and stroke care, including testing. By linking large data sets that include claims data and outcomes, ICES scientists are able to assess population-level appropriateness of diagnostic testing, thereby helping to identify targets for savings in one of the most costly domains of health care delivery.

Recent Impact

- A 2013 ICES study showed an 82% rise in the use of echocardiography in Ontario between 2001 and 2009, with a quarter of these tests done as repeat procedures. The findings helped to shape new echocardiography standards and billing requirements made mandatory by the Ontario government in 2016.
- A 2015 ICES study revealed a 30-fold variation in cardiac testing before low-risk surgeries. This finding contributed to the introduction of new guidelines by the Canadian Cardiovascular Society, the Canadian Society of Internal Medicine and the Canadian Anesthesiologists' Society and to updated Choosing Wisely recommendations.
- A 2017 ICES study showed that the implementation of appropriate use criteria for cardiac imaging in 2009 was associated with a reduction in the use of myocardial perfusion imaging, with almost 90,000 fewer scans performed at a cost savings of \$72 million over seven years. The study team will next look at whether this reduction in imaging has affected patient outcomes.

Impact Highlights



Helped to shape new Ontario billing requirements and standards for the **more appropriate use of echocardiography**.



Contributed to **new guidelines and recommendations** on cardiac testing before low-risk surgeries.



Showed that appropriate use criteria for cardiac imaging resulted in **large health system cost savings**.

"Cardiovascular illnesses represent a heavy burden in Ontario, both in terms of years of life lost and costs to the health care system. The robust data we hold and analyze at ICES shows where we get good value for our money, where we are underperforming, and where we have opportunities to reduce the use of unnecessary or inappropriate procedures."

Douglas Lee

Senior Scientist and Lead, Cardiovascular Research Program

REFERENCES

- Blecker et al. *ACC Cardiovasc Imaging* (2013).
- Duceppe et al. *Can J Cardiol* (2017).
- Kirkham et al. *CMAJ* (2015).
- Roifman et al. *JAHA* (2018).

Better Policy

A novel ICES-developed methodology provides the foundation to support Ontario's dementia strategy and local health system planning.

The Problem

Brain disorders are an important public health concern in Canada, affecting one in three people in our lifetimes. Given the advancing age of the Ontario population, health planners have more need than ever for reliable data on the prevalence of brain disorders, particularly Alzheimer's and related dementias.

The Research

To improve health care planning with reliable province-specific data, ICES partnered with the Ontario Brain Institute in 2014 to identify the prevalence, incidence and health system costs of several types of brain disorders.

The research was conducted by scientists in ICES' Health System Planning and Evaluation Research Program. The team applied custom algorithms to filter the records of more than 20 million patients to reliably identify people with brain disorders and track them into the future.

Recent Impact

- This work, which was foundational to Ontario's dementia capacity planning project, was undertaken in partnership with Cancer Care Ontario and the Ontario Brain Institute. It used ICES data and algorithms for a system capacity model developed for the Ministry of Health and Long-Term Care.
- The team's work continues to support the provincial dementia strategy through requests for additional data related to service use and costs, and through regional reports for local health planners.
- The algorithms continue to be adapted by ICES scientists and others for peer-reviewed Canadian and international research, including a much-cited paper in *The Lancet* exploring the impact of pollution on the incidence of dementia and other diseases.

Impact Highlights



First real-world data on the prevalence of brain disorders in Ontario.



Ongoing supply of data and analysis for Ontario's dementia strategy and regional service planning.



Algorithms continue to be **adapted for high-impact research** on brain disorders.

"This project is a good example of the way ICES shares our novel methodologies broadly through our networks, teaching external researchers and planners to use linked administrative data to answer important health policy questions."

Susan Bronskill

Senior Scientist and Lead, Health System Planning and Evaluation Research Program

REFERENCES

Bronskill et al. *Brain Disorders in Ontario: Prevalence, Incidence and Costs from Health Administrative Data* (2015).
Chen et al. *Lancet* (2017).

Stronger Health System

ICES is helping to improve wait times, lengths of stay and quality of care in Ontario's emergency departments.

The Problem

Patients in emergency departments (EDs) in Ontario, as in many jurisdictions, often experience long wait times. Long waits in EDs and hallways not only create discomfort and distress for the patients and their families, but they can be dangerous. A 2011 ICES study showed that each additional hour a patient spent waiting in the ED was associated with an increased risk of hospitalization or death. In response, Ontario introduced a multifaceted strategy to reduce wait times, and ICES scientists were asked to evaluate its effectiveness.

The Research

ICES research has been influential, both in Canada and internationally, in pioneering new methodologies for emergency services quality improvement research, including evidence on wait times, quality of care, outcomes, and care following ED discharge. ICES research also provides evidence to answer specific questions from the Ontario Ministry of Health and Long-Term Care and other stakeholders about the Ontario Wait Times Strategy.

Recent Impact

ICES research is guiding policy and efforts in the field to improve the quality of emergency health services. A series of peer-reviewed ICES papers published in 2014–2016 demonstrate that:

- Achievement of wait time targets is associated with lower risk of death or hospitalization, supporting Ontario's specific wait time targets;
- A hospital pay-for-performance program led to modest ED wait time improvements, providing evidence for an ongoing policy incentive;
- A hospital lean intervention was not associated with improved ED waits, providing evidence to end this program; and
- Other ED care quality measures did not improve with shorter wait times, supporting efforts by hospitals and organizations such as Health Quality Ontario to implement other quality improvement programs in addition to tackling wait times.

Impact Highlights



Real-world evaluation of Ontario's Wait Times Strategy to assess effects of programs as they are implemented, with findings including:



Positive effect of specific wait time targets on reducing risk.



Moderate effect of pay-for-performance on reducing wait times.



No effect of lean intervention on reducing wait times.



No effect of reduced wait times on other measures of ED care quality.

"Timely, high-quality emergency care is a fundamental expectation of our health system. This requires policies that are informed by evidence, including actionable targets so we can measure progress and identify where there is none. The powerful linked data and sophisticated methodology at ICES are vital to the province's ongoing effort to improve care for Ontarians."

Michael Schull

CEO and Senior Scientist, Health System Planning and Evaluation Research Program

REFERENCES

Guttman et al. *BMJ* (2011).
Schull et al. *CJEM* (2015).
Vermeulen et al. *Ann Emerg Med* (2014).
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Vermeulen et al. *BMJ Qual Saf* (2016).

Better Policy

ICES is working with First Nations, Inuit and Métis partners across Ontario to apply principles of Indigenous data sovereignty and forge a path to Indigenous-led population health research.

The Problem

Data about the health of Indigenous (First Nations, Inuit and Métis) people in Canada have historically been produced, stored and used without regard for the sovereignty of those data within Indigenous populations. The recognition of Indigenous data sovereignty is in accordance with the rights set out in the UN Declaration on the Rights of Indigenous Peoples, necessary to the calls to action from the Truth and Reconciliation Commission of Canada, and fundamental to the OCAP® Principles for First Nations research. But until now, data about health services use have not been accessible to Ontario's Indigenous peoples.

The Research

ICES has worked closely for several years with diverse Indigenous partners to develop unique data governance and data sharing agreements for Indigenous-driven analyses using administrative health data. In October 2017, ICES formalized an Indigenous Portfolio with dedicated staff, a scientific lead and a network of scientists.

The portfolio works with Indigenous partners, including the Chiefs of Ontario and the Métis Nation of Ontario, and

with other research institutes. Applying a decolonized lens and using Indigenous models of well-being, the team works with communities to build internal research capacity by training Indigenous researchers. It also collaborates with international researchers to advance the emerging field of Indigenous data sovereignty.

Recent Impact

- Creation of unique data governance agreements guided by principles of Indigenous sovereignty, using novel methods for data linkage. These advances make possible, for the first time, Indigenous-driven population health research using linked administrative health data. The data now include the largest First Nations cohort in Canada, at 200,000 people.
- Publication of an internationally collaborative paper in *The Lancet* in 2017 detailing the conditions of Indigenous data sovereignty in Canada, Australia and New Zealand.
- Partnering with First Nations groups on two CIHR grants, and continuing to respond to the data needs of First Nations communities, health units and the Chiefs of Ontario.

"Indigenous data governance and engagement are nuanced and complex. Consistently underpinning our work are our key guiding principles and supporting processes, which include ethical relationships, formalized data governance agreements, appropriate methodology and approaches guided by Indigenous perspectives, and models of well-being."

Jennifer Walker

Scientist and Lead, Indigenous Portfolio

Impact Highlights



Novel data governance agreements guided by Indigenous data sovereignty principles, **enabling data linkage for Indigenous-led population health research.**



Work with national and international partners to **advance the emerging field of Indigenous data sovereignty.**



Multiple grants, studies, and **partner-led analyses underway** within a year of launching the Indigenous Portfolio.

REFERENCE
Walker et al. *Lancet* (2017).

Healthier People

ICES has produced the first Ontario-wide mental health and addictions scorecards on services for children, youth and adults, enabling planners and providers to measure and respond to the growing need for care.

The Problem

Mental health and addictions services in Ontario have long been known to be fragmented and lacking coordination and accountability. But the full extent of the problem has been impossible to quantify, much less fix, without system-wide, cross-sector measurement.

The Research

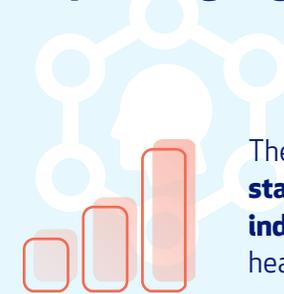
In addition to publishing dozens of peer-reviewed papers each year, ICES' Mental Health and Addictions Research Program produces its keystone Mental Health and Addictions Scorecard and Evaluation Framework (MHASEF) report every two years.

Partnerships underway in 2017/18 include a collaborative report with the Toronto Central Local Health Integration Network that looked at the needs of and care trajectories for the clients of over 100 community providers. The program is also consulting on the development of a provincial sector-wide scorecard and a mental health and addictions sector data strategy that is now underway.

Recent Impact

- The MHASEF reports provide system-wide standardized performance mental health and addictions indicators for all child/youth and adult populations across Ontario, a first in Canada.
- These ICES-developed indicators have been adopted for similar measurement in other Canadian jurisdictions, with ICES leading a five-province performance measurement indicator project and consulting on work at the Canadian Institute for Health Information to further define indicators and diagnostic groups.
- The program continues to work with multiple Ontario ministries and service agencies to produce data and analyses that make it possible to benchmark and target performance improvements, whether locally or across sectors, as part of Ontario's mental health and addictions strategy.

Impact Highlights



The first system-wide, **standardized performance indicators** for the mental health sector in Canada.



An ICES-led **five-province collaboration** that is defining indicators for national comparisons.



Ongoing scorecards that enable planners and providers across the mental health sector to **track care and outcomes over time**.

"Largely due to stigma, we've never before been able to meaningfully evaluate or plan for mental health and addictions services in Ontario. With this new capacity to collect and analyze data across sectors, we can finally move past unaccountable service siloes into a future that holds the promise of a coherent and efficient system available to all people who need care."

Paul Kurdyak

Senior Scientist and Lead, Mental Health and Addictions Research Program

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MHASEF Research Team. *The Mental Health of Children and Youth in Ontario: 2017 Scorecard* (2017).
MHASEF Research Team. *Mental Health and Addictions System Performance in Ontario: A Baseline Scorecard* (2018).