



A Health
Research
Agenda
for Patients,
People and
Prosperity

 **Healthier
Wealthier
Smarter**

ONTARIO'S RESEARCH HOSPITALS



Imagine a world where...

A virus is used to cure cancer

Surgery no longer means cutting through skin

Genetic testing is used to determine the response to a medication

This doesn't have to be the world of imagination. These breakthroughs are already underway, right here in Ontario. But just imagine how much better and faster this could happen if governments, researchers, industry, funders, universities, hospitals, patients, caregivers and other visionaries came together in an intentional way to invest in and support top health research talent, and big, bold ideas on how to treat our patients better and cure them faster.

What would bring all of these groups together? A shared vision to build the best health care system in the world, finding and applying tomorrow's cures today, and at the same time contributing to the growth of Ontario's economy.

Ontario's 24 research hospitals believe in this vision. We are engines of invention and discovery, making a profound difference to individuals and populations. Our members are distinguished by the integrated missions of teaching the majority of tomorrow's health care professionals; providing highly

specialized patient care; and conducting leading-edge health research. Our members invest \$1.4 billion in health research in Ontario and are home to 16,400 researchers and research staff. This investment generates \$3.8 billion in economic output and supports 41,000 total jobs across Ontario – collectively, our members form the R&D arm of Ontario's health care system.¹

What benefits does this bring to Ontario?

First, research hospitals make Ontario **Healthier**, through discovery of better care, cures and treatments for the most pressing challenges – discovered here, tested here, and delivered here.

Second, research hospitals make Ontario **Wealthier**, by contributing to jobs, productivity and economic growth, creating economic value by positioning Ontario as a global centre of health research and innovation, and through providing better care at lower cost by finding new methods of services, improving procedures and creating entirely new ones.

Lastly, research hospitals make Ontario **Smarter**, attracting and supporting the brightest and the best researchers and clinicians to enquire and discover. Skills are the lifeblood of a knowledge-based economy that will lead to new economic opportunities across Ontario.

Successful industry leaders in any sector know that in order to provide high-quality services at the best price, generate customer satisfaction and operate at optimal levels of productivity, investment in R&D is critical. And in fact, those are exactly the challenges facing Ontario's health care system today.

Everyone in health care is committed to providing the best care for patients. Research hospitals have the additional responsibility of inventing tomorrow's care and applying it today. And when we do that, we help to make Ontario **Healthier, Wealthier and Smarter**.

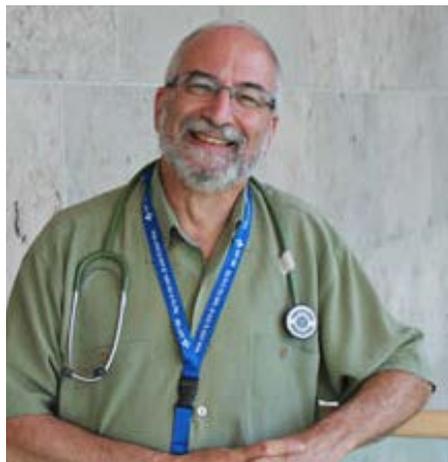
Healthier

“It’s really hard to describe what it feels like to have my life given back to me. It’s remarkable in every sense of the word. I am incredibly grateful for what Dr. Atkins and The Ottawa Hospital have done for me.”

– Patient Tina Ceroni

Ontarians want their families and the people we love to live long and healthy lives. Health research makes Ontario healthier, through discovery of better care, cures and treatments for the most pressing challenges – discovered here, tested here, and delivered here.

Dr. Harold Atkins, Medical Director and Scientist at the Ottawa Hospital Research Institute (OHRI) applied a stem cell treatment, used for autoimmune diseases, to a rare brain disease characterized by debilitating muscle stiffness and spasms: Stiff Person Syndrome. It has stopped the disease, and improved the patients’ quality of life beyond measure.²



Dr. Harold Atkins, Medical Director and Scientist, Ottawa Hospital Research Institute (OHRI)

Dr. Giuseppe Papia, of Sunnybrook Health Sciences Centre, has applied angioplasty to restore blood flow in the legs of patients with advanced diabetes. This saves patients from amputation, and possible death, and saves health care dollars.³

“This procedure really helped. It’s just like night and day. Dr. Papia is an expert. The quality of care at Sunnybrook was great.”

– Patient Charles Hykawy



Charles Hykawy, Patient

Wealthier

JOBS, PRODUCTIVITY AND ECONOMIC GROWTH

Ontarians want a more robust, sustainable economy. Investment in health research creates economic value by positioning Ontario as a global centre of health research and innovation. For example, Ontario's research hospitals create jobs through their research enterprises and commercialization of health research, and health research innovation clusters contribute to local economies.

ONTARIO'S HEALTH RESEARCH ENTERPRISE BY THE NUMBERS⁴

\$1.4 BILLION

TOTAL INVESTMENT IN HEALTH RESEARCH



vs. \$1.3B

R&D investment by research-based pharmaceutical companies across Canada



70%

of the total health care research spend by Canadian hospitals

16,400

RESEARCHERS AND RESEARCH STAFF IN ONTARIO'S 24 RESEARCH HOSPITALS

MORE THAN DOUBLE...
EMPLOYED AT RESEARCH-BASED PHARMACEUTICAL COMPANIES IN ONTARIO



HALF...

EMPLOYED AT ASSEMBLY PLANTS OF 5 LARGEST AUTOMOTIVE COMPANIES IN ONTARIO

41,000

number of total jobs supported across Ontario by R&D investment in Ontario's research hospitals



3:1
Return on Investment

14%

RESEARCH INVESTMENT IN CAHO HOSPITALS

PRIVATE INDUSTRY

2X

the OECD average for business investment in higher education R&D.

937

Intellectual Property (IP) disclosures made by Ontario's research hospitals over three years

216

Health research commercializations over last three years by Ontario's research hospitals

JOBS THROUGH THE COMMERCIALIZATION OF HEALTH RESEARCH⁷

Sunnybrook Research Institute: Real-time and 3-D Viewing of the Heart Colibri Technologies' ICE catheter	Health Sciences North and Laurentian University: Tracking Patient Response to Chemotherapy RNA Diagnostics' Disruption Assay	Toronto Rehabilitation Institute (UHN): Stimulating Stroke & Spinal Cord Injury Paralysis MyndTec Inc.'s MyndMove device
20 JOBS	10 JOBS	12 JOBS
ONTARIO'S INVESTMENT \$523,100	ONTARIO'S INVESTMENT \$150,000	ONTARIO'S INVESTMENT \$2,000,000

BETTER CARE AT LESS COST

Ontarians want more value for their health care dollar. They expect government to deliver the same or better care at the same or lower cost. Efficiency and reduced costs can come from research and discovery, by finding new methods of providing services, improving procedures and creating entirely new ones – all with the goal of reducing costs while improving patient care.

For example, research from St. Michael's Hospital on the merits of blood glucose test strips has led to a new government policy to reduce their routine use in certain cases of Type 2 diabetes. This could save Ontario's health care system almost \$100 million over five years.⁵

The Ottawa Hospital Research Institute has introduced a new clinical decision tool that assists ED physicians in better identifying at-risk patients with chronic obstructive pulmonary disease (COPD). An economic assessment has shown that this could save the health care system \$116 million over three years.⁶

HEALTH RESEARCH INNOVATION CLUSTERS

KINGSTON: Creating A Virtual, Collaborative Health Research Institute ⁸	HAMILTON: Building a Life Sciences Cluster
A joint venture research institute between Queen's University and Kingston's 3 affiliated research hospitals	Population Health Research Institute: 250 highly skilled people ⁹
Anticipated \$85 million in annual research revenues. Evolving centre of excellence in population health	Global centre of excellence: St. Joseph's Healthcare Hamilton, Hamilton Health Sciences, Chamber of Commerce and others – make Hamilton Canada's "health care capital"
LONDON: Developing London's Medical Innovation and Commercialization Network ¹⁰	SUDBURY: Towards a Health Science Hub of Excellence: Advanced Medical Research Institute of Canada (AMRIC) ¹¹
\$10 million investment by the City of London	100 full time, highly skill jobs and expects to grow to 160
Expected to attract 3 companies and 130 jobs to London. The network is also expanding its research facilities, adding 550 jobs in total	Supports another 100 jobs
Collaboration between London Health Sciences Centre, St. Joseph's Health Care London and the University of Western Ontario	Spin-off companies being created
	Close collaboration with Laurentian University and the Northern Ontario School of Medicine

“The use of this tool is expected to reduce the number of unnecessary hospitalizations from 49% (in current practice) to 10% (using the decision tool). Most importantly, this tool can lead to safe admission decisions and improve patient care.”

– An economic assessment by the Centre for excellence in Economic Analysis Research (CLEAR)¹²

Smarter

RECRUITING THE BRIGHTEST AND BEST TO WORK IN ONTARIO

Research also makes Ontario and its communities smarter by retaining our exceptional home-grown talent while also attracting the brightest international researchers. Skills are the life blood of a knowledge-based economy that will lead to new economic opportunities across Ontario.

For example, Mount Sinai Hospital and UHN recruited Dr. Samir Sinha in 2010 – an expert from Johns Hopkins University who quickly assumed a leadership role in elder care provincially, and now nationally. Two years later, he was appointed by the Honourable Deb Matthews to lead the development of a Seniors Strategy for Ontario which included recommendations that have been seen as key to ensuring the sustainability of our health care system.

Rhodes Scholar Dr. Naana Jumah returned to her hometown to further her clinical research in OB/GYN and advance the leading

edge High-Intensity Focused Ultrasound (HIFU) program at Thunder Bay Regional Health Sciences Centre.

THE ADOPTING RESEARCH TO IMPROVE CARE (ARTIC) PROGRAM

The ARTIC Program was developed by CAHO to deliver care in a smarter fashion by moving research evidence from the bench to the bedside quickly. It was designed so that when one hospital discovered a new way to provide better care for patients, all CAHO hospitals used that knowledge as applicable.



Dr. Samir Sinha, Director of Geriatrics, Mount Sinai and the University Health Network Hospitals

Over the past 5 years:

- ✓ 6 research discoveries have been implemented
- ✓ In 26 hospitals
- ✓ Across 79 sites
- ✓ Improving the quality of care for over 18,000 patients
- ✓ Built capacity in implementation with 245 change champions

The ARTIC Program's model of supporting and accelerating the use of new evidence means we're able to implement change a lot faster – within two years, instead of 17. A generation is clearly too long for change.



Dr. Naana Jumah (left), Clinician Researcher, Thunder Bay Regional Research Institute and Obstetrician Gynaecologist, Thunder Bay Regional Health Sciences Centre

Moving Forward Together

The return on investment in health research is real and measurable. However, to be competitive, we need to be more productive. To be more productive, we need to increase our capacity for innovation. This starts with stabilizing and increasing health R&D investment in both the private and public sectors. As individuals, as a population and as a province, it is in our best interests for the health research enterprise to thrive.

To ensure sustainability, the full costs of research need to be funded, including direct and indirect costs and scientists' salaries. Conducting research requires funding for the materials used in research such as equipment and lab materials, which are considered the direct costs. It also requires that the base expenses such as scientists' salaries, and rent, heat and electricity, be funded.

CAHO estimates that only 20% to 25% of base expenses (scientists' salaries and indirect costs) are currently being recovered from external indirect cost recovery programs.¹³ This means that our hospitals are increasingly reliant on their own internal hospital resources to fund research. For example, hospital foundations and income from investments are increasingly filling the gap. Yet these sources of funding are unsustainable; markets are volatile and foundations have a variety of priorities to support.

The sustainability challenge becomes more pressing in light of two developments: first, many granting agencies and health charities that fund health research are reducing their overall levels of investment. Second, many granting agencies are concurrently implementing research models that require cash matches for the direct research costs.

Putting this together, Ontario's research hospitals are increasingly required to contribute more while recouping less, and receiving less funding overall.

In any business, this is not a sustainable model.

Leading international companies in health care and IT, for example, recognize the value of investing in R&D to drive innovation. Companies like Samsung, Intel, Novartis and Roche invest between 6% and 20% of annual revenues in R&D every year.¹⁴ We can learn from this and apply the lesson to a sustained commitment to health research. The opportunity exists for us to be strategically ambitious in our approach to investment. Together, we need to continue to drive discovery, be strategic in our approach to health research, and translate these discoveries into real value to ensure that our health research enterprise is sustainable.

► CONTINUE TO DRIVE DISCOVERY – STRENGTHEN THE PROVINCIAL AND FEDERAL BUDGETS THAT ARE VITAL TO HEALTH RESEARCH

The Ontario Research Fund (ORF) is Ontario’s flagship R&D investment program for infrastructure and research excellence. The ORF contributes 1/3 of the project research costs, while the other 2/3 is leveraged from sources including private sector and institutional contributions.¹⁵ The provincial government’s 2014 decision to commit to multi-year infrastructure investment in the ORF is essential to enabling excellence in large-scale transformative research in the province. It is a bold investment in Ontario’s future economy and competitive advantage for Ontario. Maintenance of the ORF for infrastructure and research excellence is of paramount importance. Together, we should encourage the provincial government to maintain Budget 2014’s commitment to reinvest

\$250 million in the ORF for infrastructure over three years while also requesting additional, sustained funding for transformative research excellence.¹⁶

The federal government plays a crucial leadership role in investing in discovery science through the Canadian Institute of Health Research (CIHR), whose programs are undergoing significant reforms. Together, we need to encourage the federal government to provide funding at levels that will allow Canada to continue to be globally competitive in health research.

► BE STRATEGIC IN APPROACHING HEALTH RESEARCH

Ontario has a strong history of success in health research. As a community, we can and will be stronger when governments, researchers, industry, funders, universities, hospitals, patients, caregivers and other visionaries share a common vision for health

research in the province. To optimize the assets that exist, we need to work together on a Health Research Strategy for the province, to make strategic investments that result in direct returns while preserving space and resources for curiosity-driven research. Ontario’s continued success depends on all of us – we need to work together to deliver an end-to-end research strategy – from molecule, to medicine, to market – a strategy that bridges health research silos and stakeholders.

We need to come together in an intentional way to invest in and support top health research talent, work collaboratively across the health research enterprise, and create a culture change to frame Ontario’s health research enterprise as an integrated system – one that stretches from idea creation through development and evaluation, to adoption and implementation in care, post-implementation assessment, and spread of evidence-based practices.

▶ TRANSLATE RESEARCH DISCOVERIES INTO VALUE

To realize value from discovery and innovation, we need to implement it. CAHO's Adopting Research to Improve Care Program (ARTIC) was created to help ensure we use these discoveries right across Ontario. An external evaluation has found that the program made implementation and sustainment of evidence-based interventions more likely, faster and more consistent with the research evidence - it is designed so that when one hospital discovers a new way to provide better care for patients, all CAHO use that knowledge. The Ontario government has invested in this implementation model to address key system challenges across the CAHO hospitals.¹⁷

Now is the time to deliver ARTIC across the health care system beyond hospitals – and two opportunities already exist. CAHO and

Health Quality Ontario have entered into a partnership to move ARTIC into a provincial platform. And, the December 2014 Report put forth by the Ontario Health Innovation Council (OHIC) referenced ARTIC as a model for consideration to enable and accelerate the adoption of health technology innovation at scale across the entire health care system.¹⁸ The Ontario government has committed in Budget 2015 to adopting all of the OHIC recommendations.

CAHO is pleased to offer ARTIC as a provincial resource and key component of Ontario's evidence implementation pathway. Research and discovery is just the start; in order to truly derive value from our research engine, we need to implement what we know. And implementation at scale across the health care system takes resources and accountability structures. Together, we need to find a

way to sustain ARTIC's impact, through ongoing funding, partnership and accountability to use what we know.

Conclusion

This is all possible. We can make it happen together.

The investments in the health research enterprise have produced widespread and important discoveries that have led to a **Healthier, Wealthier and Smarter** province. With the support of the provincial and federal governments, health charities, industry and patients, Ontario's 24 research hospitals are integral to the province's success, investing \$1.4 billion in health research, and home to 16,400 researchers and research staff. This investment generates \$3.8 billion in economic output

and supports 41,000 total jobs across Ontario.

Ontario's research hospitals also retain home-grown talent and attract new talent from outside of the province. Collaborations between the researchers and research staff allow for great "meetings of the minds," generating ideas and knowledge that could only be created by building on each other's research and expertise.

It is clear: investment in health research delivers a return on

investment. Together, we need to drive discovery while also being strategic in our health research investments, and translating discoveries into value. If we're going to promote investment in health research as a collective, then it needs to continue to deliver real and measurable results. And it does, leading to a **Healthier, Wealthier, and Smarter** Ontario. Continued success depends on all of us. Thank you for your partnership.

Endnotes

- 1 Figures are for the 2013-14 fiscal year and are gathered by CAHO from its 24 members as part of an annual exercise to determine the size, investments, and impacts of Ontario's health research enterprise.
- 2 For the full story, please visit: <http://caho-hospitals.com/stem-cell-transplant-brings-promise-of-remission-for-those-with-rare-stiff-person-syndrome/>.
- 3 For the full story, please visit: <http://caho-hospitals.com/literal-breakthrough-angioplasty-restores-circulation-in-legs-of-patients-with-diabetes-spared-amputation/>.
- 4 Figures are for the 2013-14 fiscal year and are gathered by CAHO from its 24 members as part of an annual exercise to determine the size, investments, and impacts of Ontario's health research enterprise.
- 5 For the full story, please visit: <http://caho-hospitals.com/research-drives-new-policy-on-blood-glucose-test-strips-could-save-system-100-million/>.
- 6 For the full story, please visit: <http://caho-hospitals.com/new-decision-tool-for-copd-better-identifies-at-risk-patients-could-save-system-115-million/>. The \$116 million in savings over 3 years is an updated, 2014 CPI inflated figure.
- 7 All figures confirmed in personal communications with staff at Sunnybrook Research Institute, Health Sciences North, and Toronto Rehabilitation Institute (UHN), January 2015.
- 8 Kingston General Hospital Research Hospital, *The First 3 Years...2010-13*, Annual Report, 2014.
- 9 Population Health Research Institute, "People," accessed 9 January 2015, <http://www.phri.ca/people/>.
- 10 DeBono, N., "Proposed centre attracting jobs, businesses," *London Free Press*, 17 July 2014.
- 11 Mulligan, C., "AMRIC gets \$5 million for research lab," *Sudbury Star*, 21 Mar 2015.
- 12 Centre for excellence in Economic Analysis Research (CLEAR), "Chronic Obstructive Pulmonary Disease Clinical Decision Tool for Identifying At-Risk Patients," Economic Impact Analysis for the CAHO Research Impact Story, December 2014.
- 13 Analysis based on CAHO's annual exercise to determine the size, investments, and impacts of Ontario's health research enterprise.
- 14 Casey, M. & Hackett, R., "The 10 biggest R&D spenders worldwide," *Fortune*, 14 Nov 2014.
- 15 Ontario Ministry of Research and Innovation, "Ontario Research Fund: Research Infrastructure," last updated October 9, 2014, accessed April 29, 2015, <http://www.ontario.ca/business-and-economy/ontario-research-fund-research-infrastructure>.
- 16 Ontario Ministry of Finance, *Building Opportunity, Securing Our Future*, Ontario Budget 2014, Chapter I, p. 97.
- 17 For more information about the ARTIC program, please visit: <http://caho-hospitals.com/partnerships/adopting-research-to-improve-care-artic/>.
- 18 Ontario Health Innovation Council, *The Catalyst: Towards an Ontario Health Innovation Strategy: A Report to the Government of Ontario*, December 2014, p. 16.



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MEMBER HOSPITALS

Grid of member hospital logos including Baycrest, Bruyère, CAMH, CHEO, Hotel Dieu, Hamilton Health Sciences, Holland Bloorview, Health Sciences North, KGH, London Health Sciences Centre, Hôpital Montfort, Mount Sinai Hospital, North York General, The Ottawa Hospital, Providence Care, The Le Royal, Sunnybrook, SickKids, St. Michael's, St. Joseph's Healthcare Hamilton, St. Joseph's Health Care London, Thunder Bay Regional Health Sciences Centre, UHN, and Women's College Hospital.