Hamilton’s Collaborative Provides Results in Life Sciences & Health Innovation

Discover Canada’s leading research & education cluster combining life sciences and commerce

synapse
Life Science Consortium
Hamilton, Ontario, Canada
Putting Evidence into Practice

The Global Impact of Hamilton’s Health Research

It begins with research

Hamilton, Canada is an urban hotbed for life sciences research and development. Renowned for its nimbleness and deep collaboration between its life sciences institutions and business sector, it transforms the lives of people around the world.

The life sciences focus in Hamilton ranges from award-winning laboratory science and clinical trials to health policy development and product development – delivering a truly global impact.

Research in Hamilton is enriched by a comprehensive network – the Synapse Consortium, brings together a network of world-class research institutions and life sciences-related business organizations all based in Hamilton.

McMaster University, its academic health science centre partners Hamilton Health Sciences and St. Joseph’s Healthcare Hamilton, and Mohawk College together form an integrated and nimble engine for research that has placed Hamilton at the forefront of life sciences developments for more than 50 years.

Collaboration between these organizations unifies a diverse range of expertise – creating a unique platform for life sciences development unlike any other in Canada. McMaster University is ranked within the top 50 universities in the world for medical and health research and education by several international ranking systems. Hamilton Health Sciences is the second largest research hospital in Canada. St. Joseph’s Healthcare Hamilton is leading in innovative health research ranging from minimally-invasive surgery to the latest developments in mental health.
The City of Hamilton is the home of an intellectual and physical environment that fosters a thriving life sciences cluster connecting researchers, business, healthcare providers and education.

Mohawk College, a premiere learning centre for applied arts and technology, conducts ground-breaking research in digital health. Established in 2002, Bay Area Health Trust collaborates with the Hamilton life sciences ecosystem as part of the Synapse Consortium to develop profitable private sector business opportunities and partnerships in support of health, education, and research for local and global markets. Hamilton is Canada’s leading edge in life sciences research.

Ground-breaking laboratory science

Preventing the spread of infectious disease is an integral part of saving the lives of thousands of people in the event of a global pandemic. McMaster’s Michael G. DeGroote Institute for Infectious Disease Research is at the forefront of developing innovative diagnostic practices as well as novel antimicrobial and antibiotic agents – working to detect and address these threats – such as tuberculosis, SARS and other respiratory diseases.

The McMaster Stem Cell and Cancer Research Institute, which investigates the underlying cellular and molecular origins of human cancer, has developed a drug screening program that uses reprogrammed pluripotent stem cells to identify novel therapies for conditions from malignancy to neuropathies including pain.

Across Hamilton, researchers are also working on identifying the role of gut bacteria or microbiota in the maintenance of health, including the brain. The Farncombe Family Institute for Digestive Health Research at McMaster University is finding the links between intestinal conditions and both chronic functional and inflammatory intestinal disorders including gluten sensitivity and psychiatric disorders such as depression and anxiety. Research teams at Hamilton Health Sciences and St. Joseph’s Healthcare Hamilton are also studying the connection between probiotics and the brain.

Through the development of novel diagnostics and treatments on the leading edge of science, the work of Hamilton life sciences researchers begins at the lab bench and ends with saving the lives of people most in need of care around the world.

Leading clinical studies around the world

Improving the nature and function of health care around the world is often the result of research that integrates both laboratory and clinical findings across a large population.

Hamilton Health Sciences, a leading research hospital, is ranked #2 in Canada among healthcare research institutions. A leader in evidence-based healthcare delivery and translational research, HHS has a strong research expertise in a broad range of areas including cardiovascular, thrombosis, cancer, and child mental health. It is clear that collaboration among the researchers, academics, funders, as well as the start-up community across Hamilton, can lead to innovations and advances. With an integrated approach that embraces the entire research continuum, Hamilton accelerates and enhances life sciences research, from basic discovery to improved patient care.
The Population Health Research Institute (PHRI) is a joint initiative between Hamilton Health Sciences and McMaster University. Over the years, the PHRI has developed unparalleled expertise in epidemiology, population health and clinical trials. To date, PHRI studies have enrolled more than 1,000,000 participants worldwide.

The work of Hamilton researchers at the Population Health Research Institute is some of the most globally impactful work in medicine. Studies led by PHRI Executive Director Dr. Salim Yusuf – the second most cited researcher in the world (2011) – have produced substantial changes in global guidelines for the prevention and treatment of heart disease. His epidemiological work involving more than 85 countries has uncovered that most heart attacks result from similar risk factors, regardless of region or country.

Hamilton is globally recognized for biotechnology strengths in the health sector

“Hamilton is steeped in a strong tradition of life sciences research that not only integrates its academic institutions, its hospitals and the community, but also has a global reach, informing and improving health care throughout the world,” states Dr. Stephen Collins, Associate Dean, Research for the Faculty of Health Sciences at McMaster University.

In this past year alone, Hamilton Health Sciences and McMaster University researchers from the Population Health Research Institute have captured the interest of international media with a global study demonstrating that a weak hand grip is linked with a greater risk of having a heart attack or stroke. Building upon this study with further research could determine whether concerted efforts to improve an individual’s muscle strength could reduce the risk of illness or disease.

The world’s largest trial of autoimmune renal disease also has a home in Hamilton, and is made possible through a close partnership between McMaster University, Hamilton Health Sciences and St. Joseph’s Healthcare Hamilton. The PEXIVAS trial focuses on ANCA-associated vasculitis, a disease that causes blood vessels to become inflamed – resulting in organ and tissue damage from restricted blood flow. The study seeks to determine whether a new plasma exchange-based treatment can serve as an improved treatment for the disease.

Serving as the hub for clinical trials and epidemiological studies on a worldwide scale, Hamilton life sciences researchers are leading the way in cutting-edge health care research.

Continued from page 3

The Population Health Research Institute (PHRI) is a joint initiative between Hamilton Health Sciences and McMaster University. Over the years, the PHRI has developed unparalleled expertise in epidemiology, population health and clinical trials. To date, PHRI studies have enrolled more than 1,000,000 participants worldwide.

The work of Hamilton researchers at the Population Health Research Institute is some of the most globally impactful work in medicine. Studies led by PHRI Executive Director Dr. Salim Yusuf – the second most cited researcher in the world (2011) – have produced substantial changes in global guidelines for the prevention and treatment of heart disease. His epidemiological work involving more than 85 countries has uncovered that most heart attacks result from similar risk factors, regardless of region or country.

Hamilton is globally recognized for biotechnology strengths in the health sector

“Hamilton is steeped in a strong tradition of life sciences research that not only integrates its academic institutions, its hospitals and the community, but also has a global reach, informing and improving health care throughout the world,” states Dr. Stephen Collins, Associate Dean, Research for the Faculty of Health Sciences at McMaster University.

In this past year alone, Hamilton Health Sciences and McMaster University researchers from the Population Health Research Institute have captured the interest of international media with a global study demonstrating that a weak hand grip is linked with a greater risk of having a heart attack or stroke. Building upon this study with further research could determine whether concerted efforts to improve an individual’s muscle strength could reduce the risk of illness or disease.

The world’s largest trial of autoimmune renal disease also has a home in Hamilton, and is made possible through a close partnership between McMaster University, Hamilton Health Sciences and St. Joseph’s Healthcare Hamilton. The PEXIVAS trial focuses on ANCA-associated vasculitis, a disease that causes blood vessels to become inflamed – resulting in organ and tissue damage from restricted blood flow. The study seeks to determine whether a new plasma exchange-based treatment can serve as an improved treatment for the disease.

Serving as the hub for clinical trials and epidemiological studies on a worldwide scale, Hamilton life sciences researchers are leading the way in cutting-edge health care research.
Transforming care delivery

While life sciences researchers in Hamilton are improving patients’ quality of life by creating new diagnostics, medications and treatments, Hamilton is also leading the way in transforming how health care is delivered to patients.

One example is the collaborative Hamilton-wide effort converging around the design of a technological intervention that will assist patients following cardiac and vascular surgery via in-home remote monitoring and communication. Mohawk College, a premier College of Applied Arts and Technology, is home to the mHealth and eHealth Development and Innovation Centre (MEDIC). MEDIC, which has partnered with McMaster University, academic hospitals in Hamilton and provincial organizations such as eHealth Ontario, provides tooling, testing, teaming and training services in a wide range of digital health topics that are of interest both globally and within Canada.

Known as SmartView, this partnership between Hamilton Health Sciences, McMaster University, Mohawk College, and the Population Health Research Institute blends cutting-edge eHealth technologies with world-renowned clinical trials.

Through a multinational study, SmartView is testing state-of-the-art mobile technology and related digital devices to allow patients to monitor their clinical progress from their homes. The new system allows patients to take automated in-home measurements and provides them with direct electronic access to their post-surgical care team. The SmartView system will be the first comprehensive solution of its kind in Canada.
Whereas SmartView strives to bring technology into the homes of patients, the St. Joseph’s Health System has succeeded in bringing a new, integrated model of patient care that bridges hospital and home together with community service centres. The pioneering Integrated Comprehensive Care project offers a bundled model of care that was successfully tested in St. Joseph’s Healthcare Hamilton and has won a Canadian leadership award for innovation in improving outcomes.

The program focuses on providing patients with a continuity of care that stretches across each step in the patients’ journey. The same care team accompanies the patient at each point of care.

“The structure of patient care is truly evolving,” said Dr. Kevin Smith, CEO, St. Joseph’s Health System.

“This will eradicate silos and ensure that the system can wrap holistic care around the patients as well as the providers, building confidence in care along the way.”

As the Province of Ontario moves to adopt the Integrated Comprehensive Care project across the province, this new system of care breaks the boundaries of traditional health care to deliver a reimagined patient experience for the 21st century.

Setting the stage with ground-breaking laboratory studies and reinventing medicine with international clinical trials and care delivery initiatives, Hamilton life sciences researchers are consistently pushing the envelope of science, medicine and health care in their community, across Canada and around the world.
The creation of a new collaboration centre marks the next stage in the city’s growing partnership between Hamilton’s life sciences organizations and industry. Developed by IBM and Hamilton Health Sciences (HHS), the initiative features both a virtual and physical location to bring innovation, health care and technology together.

The two organizations are joining forces to help area hospital clinicians, researchers, academics and entrepreneurs accelerate the development and commercialization of new healthcare innovations. IBM is contributing access to an array of its Watson cognitive and analytics software, expertise in cloud computing and high-performance computing infrastructure, and a network of global collaborators. HHS, with its cadre of more than 1,500 principal investigators and research staff, is providing practical industry expertise and a “real-world” test environment.

These advanced technology tools and industry expertise will improve healthcare outcomes, put Hamilton on the map as a hub for healthcare innovation in Canada and serve as a platform to transform entrepreneurial ideas into tools that integrate seamlessly into existing health care systems.

Combining Hamilton’s excellence in the life sciences with IBM’s leadership in information technology, this collaboration assists the innovative life sciences solutions from development to market. The initiative supports clients from the Hamilton region and beyond to collaborate with IBM and HHS professionals to meet the needs of patients and health care facilities on a global level.

Redefine what’s possible

The creation of a new collaboration centre marks the next stage in the city’s growing partnership between Hamilton’s life sciences organizations and industry. Developed by IBM and Hamilton Health Sciences (HHS), the initiative features both a virtual and physical location to bring innovation, health care and technology together.

The two organizations are joining forces to help area hospital clinicians, researchers, academics and entrepreneurs accelerate the development and commercialization of new healthcare innovations. IBM is contributing access to an array of its Watson cognitive and analytics software, expertise in cloud computing and high-performance computing infrastructure, and a network of global collaborators. HHS, with its cadre of more than 1,500 principal investigators and research staff, is providing practical industry expertise and a “real-world” test environment.

These advanced technology tools and industry expertise will improve healthcare outcomes, put Hamilton on the map as a hub for healthcare innovation in Canada and serve as a platform to transform entrepreneurial ideas into tools that integrate seamlessly into existing health care systems.

Combining Hamilton’s excellence in the life sciences with IBM’s leadership in information technology, this collaboration assists the innovative life sciences solutions from development to market. The initiative supports clients from the Hamilton region and beyond to collaborate with IBM and HHS professionals to meet the needs of patients and health care facilities on a global level.

Hamilton Health Sciences and IBM have created a new centre for health technology innovation in downtown Hamilton. The facility will give area healthcare providers, researchers, innovators and entrepreneurs access to advanced technology tools and expertise to improve patient outcomes, and help accelerate the development and commercialization of new healthcare solutions.
The equivalent of 205.5 soccer fields

Site Selection Magazine named Hamilton the 'Top Investment City in Canada'

Within a 30 minute commute, Hamilton has easy access to a highly skilled, well-educated and productive labour force of over 1 million people.

Total Combined Number of...

- employees: 25,330
- student work placements: 5,549
- researchers: 1,496

Facility Building Footprint: 11,829,880 sq.ft.

did you know:

- McMaster University
- Mohawk College
- Hamilton Health Sciences Corporation
- St. Joseph’s Healthcare Hamilton

employee statistics, 2015
Hamilton has a robust supply of top-notch facilities for researchers.

- **Lab Space**: 687,467 square feet

- **Number of discoveries in 2010-2016 with commercial potential**: 133

- **Number of ideas that have been commercialized or licenced**: 48

- **Total number of research projects**: 3,771

- **Annual research budget**: $458,555,911 CDN
Hamilton's state-of-the-art life sciences facilities...

As one of the top cities for life sciences research in the world, Hamilton also offers top-of-the-line life sciences facilities that help to foster research, innovation and entrepreneurship.

Similar to the world-class research carried out within the city, life sciences facilities representing the Synapse Consortium act as shared spaces between higher education institutions and health sciences organizations that thrive in the unique, collaborative environment offered within Hamilton.

The recent development of the 37-acre McMaster Innovation Park (MIP) positions Hamilton to develop new commercial partnerships in the life sciences field. Centrally located close to McMaster University, Hamilton Health Sciences, St. Joseph’s Healthcare Hamilton and Mohawk College, MIP offers laboratory incubator space to meet the demand of health sciences activity within the city.

A recent example of a successful international partnership involves health sciences, engineering and science researchers from McMaster University and Germany’s Fraunhofer Institute for Cell Therapy and Immunology. Together, they are working to develop novel technologies for cell therapy and point-of-care diagnostics.

Mohawk College’s MEDIC facility includes state-of-the-art infrastructure to support digital health software development.
McMaster University is renowned worldwide for its innovation in both learning and discovery. Several international ranking systems consistently put McMaster among the top 100 universities in the world and specifically among the top 50 globally and top four in Canada for medicine and health. McMaster, the birthplace of evidence-based medicine in Canada, has a student population of 26,000, and more than 170,000 alumni in 140 countries.

In addition to McMaster’s campus facilities, Hamilton Health Sciences and St. Joseph’s Healthcare Hamilton provide a combined 51,040 square feet of research laboratory space, facilitating laboratory research in a variety of life sciences disciplines. Both hospital systems also feature a strong capacity to support clinical trials, with a total of 2,069 beds used to care for patients diagnosed with a wide range of illnesses. From cardiology and respirology to cancer care and mental health, Hamilton Health Sciences and St. Joseph’s Healthcare Hamilton serve as regional centres of care for a large proportion of medical specialties.

With an integrated infrastructure network that supports scientists, clinicians and life sciences entrepreneurs from beginning to end, Hamilton serves an ideal location for investment, research and innovation in the life sciences.

McMaster University’s Michael G. DeGroote Centre for Learning and Discovery is the home of major Institutes on infectious disease, stem cell and cancer research as well as its Michael G. DeGroote School of Medicine.
A collaborative ecosystem between life sciences & business

The value of Hamilton as a hub for life sciences and innovations rests upon the synthesis of ground-breaking discoveries within an ecosystem that supports commercialization and entrepreneurship.

After an idea is validated in the labs and successfully tested through clinical trials, it can be commercialized through strong, prosperous partnerships with the private sector.

Working as a cohesive whole, members of Hamilton’s Synapse Consortium provide substantial support to those seeking commercialization of life sciences research and innovation.

**Bridging industry and life sciences**

At the intersection of health, life sciences and business, Bay Area Health Trust (BAHT), part of the Synapse Consortium group of organizations, is an example of the successful partnership between life sciences institutions and the ‘for profit’ private sector. Leveraging its unique partnership with Hamilton Health Sciences and McMaster University, BAHT promotes entrepreneurship and invests in growth-oriented business opportunities related to the education, healthcare and life sciences domains. Within these markets, BAHT maintains a diverse portfolio of independent commercial business interests as well as an active asset management and international consulting business.

In one portfolio, BAHT specializes in clinical trial logistics with a focus on serving research organizations and commercial bio-tech businesses locally in Hamilton and throughout North America. These organizations conduct pharmaceutical clinical trials and BAHT expedites their trial medications to the right people at the right time and in the right dose, on an international scale.

Bay Area Health Trust has managed trials with up to 15,000 patients over multiple years and in
over 25 countries with extreme precision, while emphasizing flexible custom solutions.

BAHT is also a leader in privacy and the digitization of critical records in Canada for a variety of clients within the life sciences and healthcare domains. In conjunction with these activities, it also provides secure storage, transport and destruction, document and records management plans, as well as data management consulting.

As part of its asset management portfolio, BAHT is responsible for a network of approximately 650,000 square feet of commercial real estate in and around Hamilton as well as a significant portfolio of land for development. With a focus on servicing the life sciences sector, activities include property management, project management, and contract management.

BAHT’s energy services line of business also collaborated with Hamilton Health Sciences to develop the largest energy cogeneration project supporting health care facilities in all of Canada, an endeavor that generates millions in annual savings.

This office helps researchers to negotiate agreements with industry, obtain industry and commercialization funding, and protect intellectual property. At other times, commercialization services are the focus of Synapse Consortium organizations themselves. The Innovation Factory is a not-for-profit Regional Innovation Centre, funded by the Ontario Network of Entrepreneurs, that helps startups to commercialize their ideas. With a strong focus in the life sciences field and experts on hand with years of moving innovations from the lab to the market, clients have access to industry-leading support as they create and grow into thriving businesses.

Supporting life sciences entrepreneurship

At times, these services are ingrained within Hamilton life sciences institutions themselves. For example, the McMaster Industry Liaison Office serves McMaster University, Hamilton Health Sciences and St. Joseph’s Healthcare Hamilton to help move research into society through commercialization.

In 2014, Innovation Factory developed the Synapse Life Science Competition – focused entirely on helping talented researchers and innovators to commercialize their health-related ideas. A selected group of participants in this program gain access to mentorship and highly sought-after market intelligence reports, as well as targeted training on developing business documents, navigating regulatory challenges, and implementing commercialization strategies.

“Starting a company is tough, especially in the life sciences, and it can be tricky for individuals to navigate the supports available,” says David Carter, Executive Director at Innovation Factory. “In Hamilton, we’re lucky to have a welcoming community of world-class institutions that continue to open their doors for entrepreneurship. Part of our job at Innovation Factory is to connect entrepreneurs to those supports to help them grow. Together, we’re strengthening Hamilton’s next generation of job and wealth creation by helping these life science entrepreneurs bring their ideas and research to market.”

Hamilton has become a hub for the health and life sciences, so there are more and more life science ideas coming through Innovation Factory’s doors. These ideas are – of course – sprouting from the immense clinical and research-based talent we have in our city, but they’re also migrating here from other parts of the province. This is because our globally recognized researchers, state-of-the-art institutions, and thriving life science ecosystem are unmatched. Innovation Factory offers access to these exceptional resources, as well as to our roster of seasoned life science business mentors and tailored life science programming.
A Hamilton success story

Dr. Jim Mahony, Hamilton life sciences researcher and CEO of Advanced Theranostics Inc. (ATI), connected with Innovation Factory in 2013 to commercialize a point-of-care diagnostic device for infectious diseases that his company developed. The device is highly affordable, portable and does not need any other laboratory equipment to provide effective diagnostics. ATI’s technology allows the device to diagnose the presence of infectious diseases in 20 minutes anywhere they receive care – including patients’ homes. This removes the risk of widespread transmission of infectious diseases created when patients travel to and congregate in clinics.

ATI entered and won the inaugural Synapse Life Science Competition in 2014, taking home $30,000 in cash and in-kind resources to advance the development of this device. Over the last 18 months, Innovation Factory has incubated and supported ATI’s development of the device. Early this year, ATI secured $2 million in funding from investors outside of Canada to further the development of its device, and to prepare for preclinical and clinical testing in advance of a product launch in early 2019.

ATI’s success is expected to yield a company based in Canada with revenues in excess of $50 million and over 100 employees over the next 5 years. By ensuring that life sciences experts in Hamilton can translate their world-class research and innovations successfully across Canada and around the world, Innovation Factory works with experts from across the Synapse Consortium to bring ideas, concepts and processes to fruition.

Through an environment of partnership and collaboration combined with a strong relationship to industry, life sciences in Hamilton thrives through commercialization – bringing novel products, services and technologies to the people who need them most.
Message from the Mayor
Fred Eisenberger

Known as Ontario’s fastest growing economy, Hamilton is a shining example of revitalization and growth. Home to some of Canada’s leading experts in health and medicine, Hamilton’s reputation as the “Ambitious City” draws in part from its leadership in the life sciences.

Driven by the need to solve health care issues that affect millions of patients around the globe, the world-class research of Hamilton’s life sciences experts directly leads to new treatments, medications and care practices. And staying at the cutting-edge of scientific discovery allows our city to continually make impacts internationally. Discovery that is a community effort.

Hamilton’s collaborative life sciences environment features strong partnerships between research institutions, facilities and support services, as well as industry and entrepreneurship, which allow for the commercialization and widespread dissemination of our life sciences discoveries.

This publication has highlighted Hamilton’s life sciences work and in particular the Synapse Consortium—a spectrum of Hamilton-based organizations that work together in order to innovate, reinvent and transform the field of life sciences on a global scale.

On behalf of the City of Hamilton, I welcome you to join us in our journey of research and entrepreneurship.

Sincerely,
Fred Eisenberger
Mayor, City of Hamilton

---

Affinity Biologicals Inc.

“Affinity Biologicals Inc. is a manufacturer of laboratory products and medical devices and we export most of what we make. Since our time in Hamilton we have grown from 300 sq. ft. of lab space to our current 28,000 sq. ft. manufacturing facility.

We stay in Hamilton because of the relationships we have with the research community at the Thrombosis and Atherosclerosis Research Institute and McMaster University, ease of access to the US border, a well trained workforce and local trades and service providers who understand our unique needs.

Research and development is an important part of our success and Hamilton is a world class centre for research in thrombosis and blood clotting disorders.

“The relationships we have with researchers in Hamilton allows us to keep current with advances in the science of blood clotting disorders, changes in therapies, and best practices in the clinical laboratory. The city of Hamilton actively encourages and facilitates cooperation and communication between academia and industry to foster growth and success.”

- Hugh and Patty Hoogendoorn
Affinity Biologicals Inc.

---

Stryker Canada

“Stryker Canada has been a strong and consistent supporter of the life sciences industry in Hamilton, and believes that the burgeoning ecosystem in this city will be of long-term benefit for health care advancements on a global scale.”

- David Murphy, Stryker

---

Testimonials