

LAWSON

HEALTH RESEARCH INSTITUTE

STRATEGIC PLAN
2014-2018

Building a **Strong**
Foundation

2015 Progress Report





Celebrating Our Progress

In March 2014, Lawson Health Research Institute approved the *Lawson Strategic Plan 2014-2018*. The five year plan was created by Lawson's scientific leaders, with input from all Lawson investigators, and is aligned with the strategic priorities of our university partner, Western University, and our two sponsoring hospitals, London Health Sciences Centre (LHSC) and St. Joseph's Health Care London (St. Joseph's).

The plan outlines an overall institute focus of "research that creates health solutions for the individual". Two research sub-themes were identified which collectively cover all the projects set forth in the plan:

- 1. Origins of Disease, Optimization of Health and Quality of Life;** and
- 2. Tissue Survival and Repair.**

To achieve this vision, a number of ambitious goals have been set for our research programs, which can be viewed in the online version of the *Lawson Strategic Plan 2014-2018*. These goals were developed to be attainable within a five-year window. Six administrative strategic goals were also developed; their implementation will improve the ability of Lawson to react quickly to external opportunities, to better serve investigator needs and to maximize the ability of investigators to attain their scientific strategic goals.

This report gives examples of the progress that has been made two years into the plan, as well as projects with ongoing momentum. We have made good progress on a number of items and I am excited to continue on this path of success.

The *Lawson Strategic Plan 2014-2018* has provided us with a strong vision for our institute. As we continue to follow this vision, we will assess our progress and consider our next steps.

Dr. David Hill
Scientific Director,
Lawson Health Research Institute

*Integrated Vice President of Research,
London Health Sciences Centre and
St. Joseph's Health Care London*





The **Lawson Strategic Plan 2014-2018** includes a number of ambitious goals for our research programs. Over the past two years, we have made considerable progress and continue to work toward our overall focus of “research that creates health solutions for the individual”. The following illustrates some milestones achieved for the goals in each of our two research subthemes.

Origins of Disease, Optimization of Health & Quality of Life

Environment and Health

Sponsoring Research Groups

Children’s Health Research Institute, Imaging and Cancer

Two Year Outcomes

Completed

- ***Generation of novel biomarkers for concussion severity***

Scientists from Lawson’s Children’s Health Research Institute have developed a new blood test that uses a form of blood profiling known as metabolomics to identify with 90 per cent certainty whether or not an individual has suffered a serious concussion. Diagnosis of clinically significant concussion can be difficult and currently relies on a combination of patient symptom assessment and clinical judgement. Dr. Doug Fraser and colleagues have developed this relatively inexpensive test, where they measure a panel of metabolites in the blood in search of distinct patterns that indicate a concussion has occurred. Concussion is a major public health concern, often resulting in significant acute symptoms in some patients. With further research, the scientists anticipate their blood test will also aid clinicians in predicting concussion outcome, as well as aid concussion rehabilitation.

In Progress

- ***AVATAR Program for personalized cancer therapy***

AVATAR is a collaborative research program formed to provide information of epigenetic characteristics of human tumours and develop treatments using a new generation of drugs that target epigenetic events. This new Lawson/Western research team includes the Cancer Epigenetics Group which has been formed to spearhead the development of Positron Emission Tomography (PET) tracer molecules to non-invasively detect, measure and monitor changes in epigenetic events. The AVATAR team is currently crafting multiple submissions for infrastructure support, which includes the successful development of industrial partnerships.





Innovations in Mental Health Care

Sponsoring Research Group

Mental Health

Two Year Outcomes

Completed

- ***ARTIC-funded Transitional Discharge Model multi-centre trial across nine Ontario hospitals***

The transition from hospital to community is complex and can be challenging for people who have been diagnosed with a mental illness. The Transitional Discharge Model (TDM) is designed to provide seamless support as clients make this transition.

The TDM essentially creates a safety net, ensuring hospital inpatient staff continue to provide care until the client is connected with a community care provider. It also partners discharged clients with a peer who has successfully integrated into the community. After prior studies established the TDM as a best practice, the model was deployed in nine hospitals across Ontario in April 2013. Over 580 clients participated in the two-year implementation project. Results of the project show benefits to all stakeholders, as well as the health system itself.

- ***New research facilities opened at Parkwood Institute***

New research facilities were opened as Parkwood Institute Research in late 2014, a program of Lawson Health Research Institute. Cognitive Vitality and Brain Health, Mobility and Activity and Mental Health form the three major research programs at Parkwood Institute, with considerable overlap and synergies existing among the groups. This interdisciplinary research provides unique opportunities for synergies resulting in the incorporation of new knowledge into patient care.

In Progress

- ***Membership and participation in Canadian Depression Research and Intervention Network***

The Canadian Depression Research and Intervention Network (CDRIN) promotes collaborative, patient-focused research and intervention that will lead to better care and understanding of depression and Post-Traumatic Stress Disorder (PTSD), and the prevention of suicide. The network brings together the leading clinical and research minds, and persons with lived experience from across Canada. Eight regional hubs were established to work collectively, share new discoveries and identify intervention models with the greatest potential impact. The Central Canada Depression Hub (CCD Hub) is a partnership between the Royal's Institute of Mental Health Research, the Centre for Addiction and Mental Health, Western University and Lawson.

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Microbiome Discoveries and Therapeutic Translation

Sponsoring Research Group

Microbiome and Probiotics

Two Year Outcomes

Completed

- **Michael Silverman recruitment and research program development**

Dr. Michael Silverman is a pioneer in the field of fecal microbial transplantation for treatment of *Clostridium difficile*. He has joined Lawson as an Associate Scientist as part of the human microbiome group. In addition to fecal microbial transplantation, Dr. Silverman's research interests include the prevention of mother-to-child transmission of HIV in developing countries, and the prevention of inappropriate antibiotic use in community outpatient practice. Dr. Silverman was recently awarded a grant by AMOSO for "Fecal Microbial Transplantation in the Metabolic Syndrome" and holds ICES grants for "Prevention of Antibiotic Overprescribing in Community Practice". He is a site Principle Investigator (PI) on several multinational randomized controlled trials (RCTs), including in HIV care and community acquired influenza. He is also a sub-study PI on a 2014 Canadian Foundation for AIDS Research (CANFAR) sponsored study of progesterone supplementation in pregnant HIV-infected mothers and holds a Canadian Institutes of Health Research (CIHR) grant for the study of sex hormone drug levels induced by antiretroviral drugs.

In Progress

- **IDRC funding for the provision of probiotics in East Africa**

Dr. Gregor Reid has been approved for \$1.5 million dollars through the Fermented Food for Life Project by the International Development Research Centre (IDRC). The funding will be used to provide probiotics to a potential pool of one million people in Uganda, Kenya and Tanzania. Dr. Reid's application was one of eight approved out of a total 184 applications.





Quantitative Hybrid Molecular Imaging and PET Probes

Sponsoring Research Group Imaging

Two Year Outcomes

Completed

- **Two new PET biomarkers manufactured to GMP standard for dementia and acquired brain injury diagnostics**

Through an agreement with Eli Lilly, Lawson's Cyclotron & Positron Emission Tomography (PET) Radiochemistry Facility is currently the only facility in Canada producing two promising compounds for the early detection of dementias and acquired brain injury diagnostics. The compounds seem to work by latching on and slowing the progression of amyloid, a protein that forms sticky masses in the brains of people with Alzheimer's. This partnership with Eli Lilly benefits patients by giving them access to novel and promising interventions via clinical trials. For example, patients with a strong family history of Alzheimer's disease (AD) can participate in a new study, led by Dr. Michael Borrie at Parkwood Institute, designed to prevent memory loss by identifying individuals who have the earliest changes of AD in their brain but don't yet show symptoms.

- **Purchase of small animal PET/MRI coil**

Lawson has signed an agreement with Cubresa, a company based in Winnipeg, to help develop a small animal Positron Emission Tomography (PET) imaging system that can be combined with a small animal Magnetic Resonance Imaging (MRI) system. This combined PET/MRI system will be an important addition to Lawson's existing large animal and human combined PET/MRI system. Once developed, it will be a city-wide resource for the London imaging community. Dr. Jonathan Thiessen, Lawson PET/MRI medical physicist, will lead the Lawson development. Cubresa has already provided funding for a Post-Doctoral Fellow to start in early 2016 to assist Dr. Thiessen in this development.

- **Successful ORF award in cardiology/NCF Network**

Lawson's Dr. Frank Prato, with collaborators at the Ottawa Heart Institute and Sunnybrook Research Institute in Toronto, was awarded \$3.6 million to improve methods for early diagnosis and preventive care for heart disease. Based on 10 years of collaborative research, their consortium of world-leading heart imaging specialists will advance new heart imaging methods using Magnetic Resonance Imaging (MRI) and Positron Emission Tomography (PET). These tools make it possible to measure, with a sensitivity that has never been possible before, heart tissue disturbances that lead to heart failure. These include cardiac imaging of innervation, blood flow, metabolism, inflammation, cell death and hemorrhage. These novel imaging techniques are being developed in collaboration with companies with proven track records to apply their technologies in patients. Significant translation of these new imaging methods will be achieved for the benefit of Ontario patients within two to three years. Other imaging methods being studied, which are more innovative and expected to revolutionize how we can manage molecular processes within heart tissue, will take longer but have enormous commercial and health potential.





Tissue Survival and Repair

Personalized Cancer Treatment

Sponsoring Research Group

Cancer

Two Year Outcomes

Completed

- ***Creation of a biobank for breast cancer samples at St. Joseph's Hospital***

In order to fast-track discoveries in breast cancer research from bench to bedside, Lawson has created a breast tumour biobank. At the time of biopsy, patients can donate their sample. Information about any cancer diagnosis is then stored to provide scientists with valuable clinical data. By having access to a variety of breast cancer types that all behave differently, scientists are quickly able to determine which patients could potentially benefit from new and evolving tests and/or treatments. Additionally, clinical trials are moving rapidly to the pre-operative setting, where patients are given treatments for their breast cancer prior to surgery. Most of these trials require samples to be taken before being able to participate and the biobank provides a platform where patient samples can be banked for later use. This ensures the patient has access to any clinical trial that could be of benefit to them while avoiding a possible delay or second biopsy procedure.

- ***Recruitment and establishment of young investigator***

In 2015, clinician-scientist Dr. Samuel Asfaha was recruited to Lawson. Dr. Asfaha practices general gastroenterology and has a special interest in chronic inflammatory bowel disease and colon cancer, and the stem cell populations linked to these diseases. Colon cancer is the second leading cause of cancer death in Canada. It is estimated that this year alone, more than 25,000 Canadians will be diagnosed with colon cancer, representing 13% of all new cancer cases. The recruitment of Dr. Asfaha not only brings new expertise to Lawson's Cancer Research Laboratory Program (CRLP), but will help stimulate a new fundraising effort in the area of colon cancer.

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Prevention and Treatment of Pathogen-Induced Sepsis and Associated Organ Failure, and Maximizing Quality of Life for Survivors

Sponsoring Research Group

Critical Illness

Two Year Outcomes

Completed

- ***New PhD scientist recruited to strengthen intra-vital microscopy skills***

Dr. Barry Janssen, PhD, has joined the Centre for Critical Illness Research (CCIR) at Lawson. Dr. Janssen's work is based on protecting the microvasculature to improve sepsis survival. By using intra-vital video microscopy (the microscopic observation of small vessels in living tissue), Dr. Janssen is examining how sepsis affects blood flow and how perfusion responds to any experimental treatments.

Ex vivo Organ Protection and Repair, and Transition to Cell-based Therapies

Sponsoring Research Group

Transplantation

Two Year Outcomes

Completed

- ***Appointment of Director for Microvascular Surgery program***

Dr. Hongji Yang, previously of the Sichuan Academy of Medical Sciences in Chengdu, China, has been appointed as Director for the Microvascular Surgery program at Lawson's Matthew Mailing Centre for Translational Transplant Studies. In addition, Dr. Yang has been appointed as Director of Lawson's NHP Transplant program. In these roles, Dr. Yang will establish a training program in transplantation microsurgery and develop novel transplant models, including the use of organs that are refurbished or created ex vivo and the application of novel therapeutic strategies in pre-clinical testing.

In Progress

- ***Pancreas Alone Transplant program***

Currently, LHSC has a combined kidney transplant program for patients with diabetes and renal failure. The Pancreas Alone Transplant program will provide the capacity for patients with life-threatening diabetes mellitus (without renal failure) to obtain a pancreas transplant in order to cure the disease. As well, it allows patients with a living donor to have a living kidney transplant first (within months) followed by a pancreas transplant. This frees up a deceased donor kidney for someone else in the province.



Image Guided Cardiac Interventions

Sponsoring Research Group

Cardiology & Vascular Diseases

Two Year Outcomes

Completed

- **5-year city-wide CT imaging plan with Schulich with a new research CT scanner at St. Joseph's Hospital**

Through funding from the Canada Foundation for Innovation (CFI), Lawson's Imaging program received a new research computed tomography (CT) scanner in December 2014. This GE scanner is the most advanced scanner in Canada and one of only three in the world. This technology enables our researchers to noninvasively visualize the heart more clearly than ever before and diagnose more patients with erratic or high heartbeats. The scanner clearly pictures specific areas of the heart that were previously compromised either by a patient's movement, high heart rate or a child's inability to hold his or her breath. A number of important research studies will access the scanner, including Dr. Ting-Yim Lee, who is using the scanner to develop perfusion CT of the heart.

Over the past year the functional CT (fCT) program has developed a close collaboration with the team in Cancer Epigenetics (CEpi). CEpi is a group of chemists/radiochemists and basic and clinical cancer researchers working together to generate theranostic agents (molecules and methods to link in vivo detection and measurement of critical events in human tumours with treatment).



“This GE scanner is the most advanced scanner in Canada and **one of only 3** in the world.”





Patient-specific Orthopaedic Implants and Devices

Sponsoring Research Group

Orthopaedics

Two Year Outcomes

Completed

- **Approval as a Western Cluster and Institute with associated funding**
City-wide research collaborations in musculoskeletal health were strengthened in the past year through recognition as a “Cluster of Research Excellence in Musculoskeletal Health” and senate approval of a “Bone and Joint Institute” at Western University. Western will provide up to \$12.5 million over the next ten years to support collaborative research in bone and joint health, with a goal of maintaining lifelong mobility.

Bone and joint researchers in London also received a major award from the Ministry of Research and Innovation in 2015. A research proposal to the Ontario Research Fund (Research Excellence) for the “Development of Novel Therapies for Bone and Joint Diseases” was funded for \$3.3 million over the next five years, with matching support from private-sector partners and institutions. This project, led by Dr. David Holdsworth (and involving 11 co-investigators and 7 private-sector partners), will investigate the development of novel diagnostic techniques and therapies, including patient-specific devices for joint replacement and “smart implants” with wireless telemetry.

In Progress

- **Orthopaedic mechatronics laboratory at Victoria Hospital as part of the London Medical Innovation & Commercialization Network**
Dr. Emil Schemitsch has been appointed as the new Chair of the Department of Surgery, Schulich School of Medicine & Dentistry and Chief of Surgery, LHSC and St. Joseph’s. With Dr. Schemitsch’s arrival in January 2016, planning is underway to support his multi-faceted research across the city. His research interests include biomechanics, gene therapy, clinical trials, polytrauma, fracture healing and implant design. Expansion of the Trauma/Orthopedics Research Program at Victoria Hospital will include set up of a mechatronics lab for his research, in conjunction with Dr. Chris Bailey’s work.

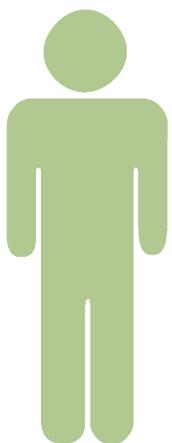




Enabling Strategic Goals

As part of the *Strategic Plan 2014-2018*, six administrative goals were also developed to help Lawson react quickly to external opportunities and better serve our investigators' needs. The Lawson administrative team continues to strive towards these goals:

- 1. Improve representation of the research mission** before both hospitals' Board of Directors
- 2. Create a simplified model of core financial support** that is sustainable and responsive to the strategic plan.
- 3. Strengthen core support for grants development, contract negotiation and project management** to ensure grants submitted by Lawson investigators are of the highest standard and contracts are negotiated swiftly and meet required standards.
- 4. Increase number of investigator-led clinical studies, and sustain and grow industry-sponsored clinical trial volumes** by increasing support for investigators using Lawson's core clinical trial facilities.
- 5. Improve investigator career security and succession planning** by creating career advancement milestones for investigators, creating additional research Chair positions for research group leaders, and term Chairs for mid-career scientists.
- 6. Strengthen the Lawson brand** through improved communications internally and externally.



LAWSON

is home to over 1,500 scientists, students, post-doctorate fellows, administrative professionals and support staff.

EACH MEMBER

contributes daily to the achievement of our strategic goals.



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As the research institute of London Health Sciences Centre and St. Joseph's Health Care London, and working in partnership with Western University, Lawson Health Research Institute is committed to furthering scientific knowledge to advance health care around the world.

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