
We are
Explorers
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Hamilton
Health
Sciences

Hamilton-based, world-spanning research

Ranked one of Canada's
Top 5
Research Hospitals
(Research Infosource, 2017)

450+
researchers

over
1,000
research staff

Leading research at
1,500 in **101**
centres countries

1 million+
participants enrolled worldwide

4 million
samples in Canada's largest research biobank

Contents

In pursuit of a healthier world

Improving health and avoiding disease is one goal around which the whole world can unite. During the last century, people all over the world are healthier and living longer than ever before. This is due to a transformation of health care and disease prevention resulting from advances in health research. At Hamilton Health Sciences, in partnership with McMaster University, our researchers have led some of the great health discoveries of this time. Together, they lead a team of researchers – from across Canada, and in another hundred countries across the six inhabited continents – who are working together to make life better for people around the globe.

Our goals for the future are simple, but ambitious: to reduce premature deaths and disability from heart attacks, strokes, and during surgery by 50 per cent in the next 50 years. We're well on our way. Our work over the last 35 years in preventing clots in the brain and the heart have led to fewer and better treatment for heart attacks and strokes. Our efforts to prevent the complications of common surgeries have the potential to transform outcomes for the millions of people who undergo major procedures each year. We're also finding ways help our aging population age better by looking closely at the factors that contribute to good health later in life.

At Hamilton Health Sciences and McMaster University we have a long legacy of exploration that's changed the course of global health. But the pursuit of knowledge is perpetual, and so we continue to search for new and better ways to prevent, treat, and manage disease. In pursuit of a healthier Hamilton, Canada, and globe, we will continue to explore.

Dr. Salim Yusuf, DPhil, FRCPC, FRSC, O.C.

Chief Scientist, Hamilton Health Sciences
Distinguished University Professor of Medicine, McMaster University
Executive Director, Population Health Research Institute (HHS & McMaster University)
Heart and Stroke Foundation/Marion W. Burke Chair in Cardiovascular Disease
Past President, World Heart Federation

Making surgery safer

The last one hundred years have seen life-saving advancements in surgery. Still, it's not without its risks. Our researchers are leading a new wave of exploration aimed at making surgery safer for people around the globe.

As simple as a blood test

Surgery is stressful on our body. The heart is susceptible to strain from surgery and can suffer damage as a result. This damage can give way to bigger problems like stroke, heart attack, blood clots, and even death. Dr. P.J. Devereaux and his team at Hamilton Health Sciences' and McMaster University's Population Health Research Institute (PHRI) have found that many of these complications are symptomless and go undetected by patients and doctors alike. But, they can surface down the line as serious health issues.

In a groundbreaking study, the team discovered that a simple, quick and inexpensive blood test can detect damage to the heart caused by surgery, triggering doctors to take action to prevent bigger problems. They were also the first to find that a blood thinner can help to prevent some of these problems, a discovery that could benefit millions of people each year.

Bridging the gap between hospital and home

Can technology help patients recover better after surgery? Dr. Mike McGillion and his team at PHRI and the McMaster University School of Nursing are testing a novel technology by Phillips Healthcare that wirelessly monitors a patient's vital signs after an operation, and for one month after they leave hospital. If an abnormality is detected, the hospital team is alerted to check in on the patient. It's a leading-edge example of a not so far-off future where technology bridges the gap between the hospital and home.

Treating hip fractures like heart attacks

What do broken hips and heart attacks have in common? Like a heart attack, a hip fracture is a medical emergency but has not been considered as one until now. A hip fracture puts a lot of stress on the body, creating the potential for a number of life-threatening issues. Yet, these patients aren't treated with the same level of urgency as other emergencies and often have to wait several days for surgery.

Dr. Mohit Bhandari and his team at PHRI are testing the theory that hip fracture patients who receive surgery quickly - within 24 hours of their fracture - have a better recovery and experience fewer issues. It also means patients spend less time in hospital, reducing health care costs and making room for more patients to receive the care they need, sooner.

Hamilton Health Sciences

Preventing disease, everywhere

One third of all global deaths are caused by heart attacks and strokes, and most of them in lower income countries. We're finding solutions to prevent these deadly diseases – solutions that are available to people in every corner of the globe.

Discovery without boundaries

Cardiovascular disease knows no bounds. Despite common belief, heart attacks and strokes aren't issues specific to the Western world. In fact, they claim the most lives from low and middle income countries. Our teams are focused on finding solutions to heart attack and stroke that can benefit people everywhere — people who are rich or are poor, people of different ethnic backgrounds and cultures, and people in all parts of the world.

Our research over the last two decades has included over one million people in 101 countries. By studying how diets, activity, genetics, social and environmental factors interact with each other to influence the development of cardiovascular disease, diabetes, and other chronic diseases, we've identified new ways to prevent heart attacks and strokes. Trials of innovative treatments have also discovered new ways to prevent deaths, recurrent heart attacks, or strokes once people have cardiovascular disease. Our discoveries have improved the way people with heart disease and stroke are cared for worldwide. The health of people in Canada matters, but so does the health of people around the globe. Disease knows no bounds, and neither does our research.

Canada's largest biobank

Hamilton Health Sciences is home to Canada's largest research biobank, a literal vault of human DNA housing more than three million samples collected from patients around the globe. The facility provides an information-rich, cellular and molecular database that supports our researchers in solving some of the world's greatest health challenges, including heart disease and stroke.

With more than 100 international studies being led by Hamilton Health Sciences and McMaster University researchers at any given time, the biobank – developed over 20 years – has become an invaluable knowledge repository. It can provide our researchers with key information on half a million patients, at their fingertips. These samples are used for analysis of genetic biomarkers that predict the development of various diseases and provide new insight in to the causes of heart attacks, strokes, heart failure, cancer, diabetes and dementia. Samples are stored in liquid nitrogen so that they can be used for decades to come.

Our growing legacy of discovery

2000 | HOPE

Ramipril reduces stroke, heart attack and death by 25 per cent in patients at risk

2001 | CURE

Two drugs (aspirin and clopidogrel) together are more effective than either drug alone in reducing heart attack.

2004 | INTERHEART

Nine risk factors can predict 90 per cent of heart attacks.

2009 | RELY

Novel oral anticoagulants are safer and more effective than warfarin in preventing strokes.

2015 | PURE

A weak hand grip is linked to shorter life span and a greater risk of heart attack and stroke.

2016 | HOPE-3

Cholesterol-lowering drugs are effective in preventing cardiovascular disease in patients who are at an average risk.

McMaster University | Hamilton Health Sciences

2016 | INTERSTROKE

Ten common risk factors are responsible for 9 out of 10 strokes globally.

2017 | VISION

A simple blood test can be used to predict heart complications and death after major surgery.

2017 | PURE

A high-fat, low-carb diet is linked to a lower risk of death, challenging global nutritional guidelines.

2017 | COMPASS

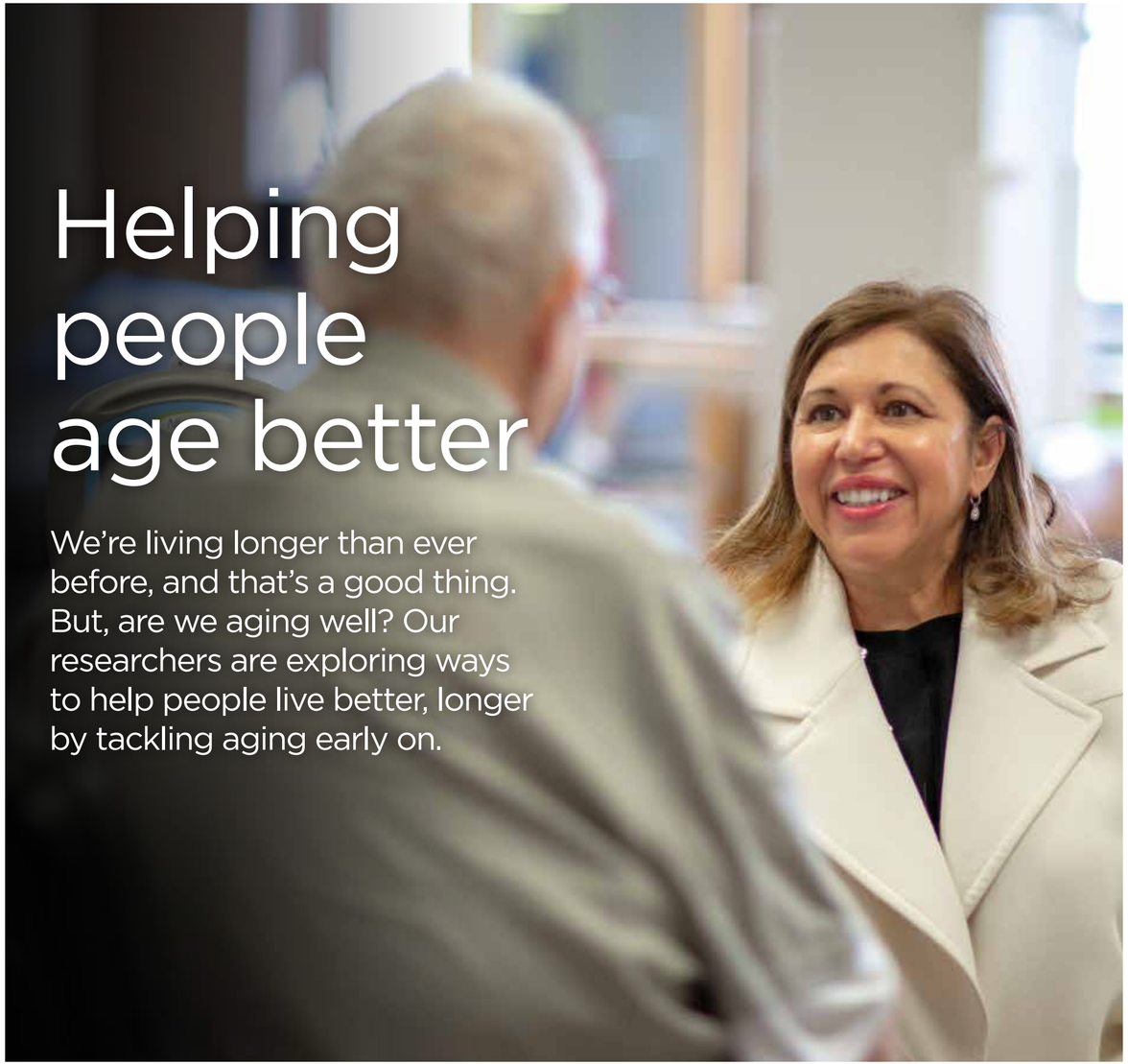
A new anticoagulant combined with aspirin is 25 per cent more effective at preventing complications in people with heart disease than aspirin alone.

2018 | DECODE

A genetic test is five times better than the standard method at predicting early heart disease in young people.

2018 | MANAGE

A blood-thinning drug can help prevent heart attack, stroke, death, and other issues after major surgery.



Helping people age better

We're living longer than ever before, and that's a good thing. But, are we aging well? Our researchers are exploring ways to help people live better, longer by tackling aging early on.

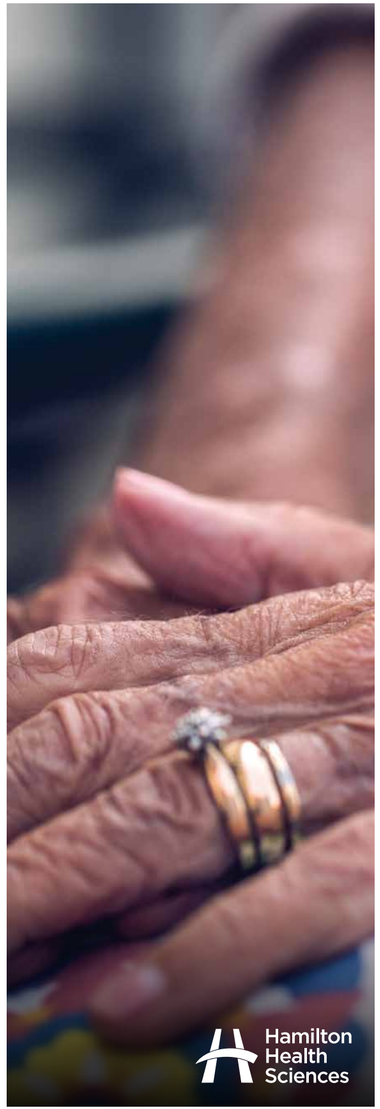
Getting a grip on frailty and aging

Can the strength of your grip reveal how well you'll age? According to Dr. Darryl Leong and his colleagues at the Hamilton Health Sciences and McMaster University Population Health Research Institute, it can. They're using data from 200,000 people in 25 countries around the world to better understand what factors affect longevity, but also how frailty can be avoided through early intervention. Hamilton is also home to the Canadian Longitudinal Study on Aging (CLSA) at McMaster University, where Parminder Raina and his team have established a robust data platform to better understand the biological, clinical, social, psychological, economic and environmental aspects of aging. The CLSA will follow over 50,000 Canadians between the ages of 45 and 85 for the next 20 years to gain insight in to why some people age well, and some others don't.

By identifying how a young person's eating and exercise habits, as well as their genes, affects their muscle strength and physical functioning down the line, we can learn how to delay, and even prevent, disease and frailty before they take hold.

Patient-driven aging research: A living lab

Despite their best efforts, frailty will remain a reality for some people as they grow older. In their "living laboratory", Dr. Alexandra Papaioannou and her colleagues at the Geriatric Education and Research in Aging Sciences (GERAS) Centre at Hamilton Health Sciences' St. Peter's Hospital combine patient care with research to create innovative healthcare solutions based on the needs and lived experiences of their patients. Current projects include a new mobile app that will allow clinicians to quickly identify patients at risk for frailty; a wireless bed that uses artificial intelligence will anticipate patients' needs; and a dance program for seniors to promote mobility and mental ability.



Leading thrombosis care

Hamilton Health Sciences and McMaster University are the epicenter of thrombosis research in Canada and the world. Through their ground breaking discoveries, our experts have set the global standards for the prevention and treatment of thrombosis, a common threat that causes one in six deaths worldwide.

Setting the standard for treatment

Thrombosis – or the "bad" kind of blood clotting – causes heart attack and stroke. Our scientists lead many important global projects that have set the standard on how and which drugs are most effective in preventing thrombosis-related issues in those at risk.

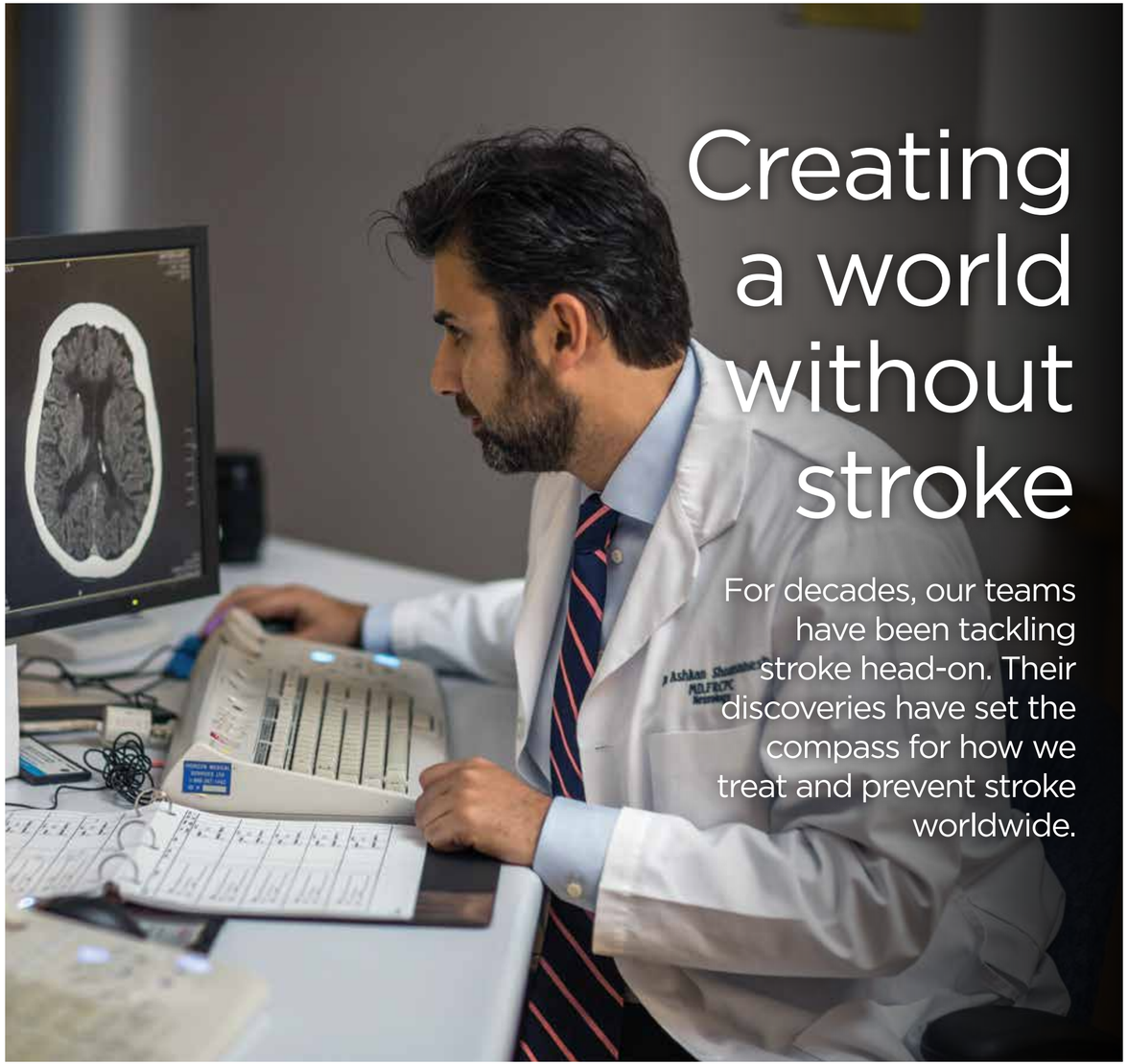
People with atrial fibrillation (AF), a common heart rhythm disorder, are especially susceptible to blood clotting and often live with the fear of stroke looming over their heads. In the past, a drug called warfarin was used to reduce the risk of blood clots and stroke in people with AF. But, Dr. Stuart Connolly and his colleagues have proven that the new, blood-thinning drugs are safer and far more effective, meaning those with AF can live with a lower risk of stroke and greater peace of mind.

People who have had a heart attack, stroke or arterial disease share the concern of blood clotting and the complications it brings. Dr. Salim Yusuf (pictured, p. 3), Dr. John Eikelboom and their colleagues have led the charge on a series of studies that have proven that combinations of certain drugs with aspirin, commonly used to prevent blood clotting, are more effective in preventing clotting-related issues than aspirin alone. Their findings can change how we treat these patients in Canada as well as in other parts of the world. Ultimately, fewer lives lost to the very real threat of thrombosis-related disease.

Safer treatment, at home

Our scientists have pioneered discoveries that have made thrombosis care safer and more effective. So effective, that many patients can now benefit from receiving treatment from home instead of a hospital bed.

Previously, those with venous thromboembolism (VTE) – a blood clotting disease affecting the veins – required specialized treatment in hospital to help keep potential problems like stroke and heart attack at bay. But, Dr. Jeffrey Weitz and his team have focused on advancing treatment of VTE so that, in most cases, the disease can be safely managed at home using medication. For hospitals, it means more room to care for the patients who really need it, and for those with VTE, it means a better quality of life.



Creating a world without stroke

For decades, our teams have been tackling stroke head-on. Their discoveries have set the compass for how we treat and prevent stroke worldwide.

Cutting stroke in half

Can you imagine a world without stroke? Dr. Jackie Bosch can, and she's leading a mission to make that vision a reality.

While research has made great strides in finding new and better ways to treat stroke, prevention is even more important. Dr. Bosch has led worldwide studies showing that certain safe, inexpensive, easily accessible medications (e.g. blood pressure-lowering and cholesterol-lowering drugs) are better at reducing the risk of stroke than previously believed. Together, these medications have the potential to prevent 50 per cent of all strokes, which equates to tens of thousands of lives saved each year.

Stopping stroke in its tracks, sooner

When a stroke happens, millions of brain cells die with each minute that passes. In other words, the quicker a person receives emergency treatment, the less likely they are to suffer severe, potentially disabling brain damage. In recent years, the discovery of clot-busting drugs and special clot removal procedures have benefited countless patients by limiting the effects of stroke once it happens, but their effectiveness depends on how quickly the person receives treatment. Dr. Michael Sharma and his team are testing new drugs that act even faster and more effectively against a stroke to limit progression, giving more stroke victims a chance at life and, for many, a full recovery.

Treating the worst strokes, better

Strokes are devastating, but some are worse than others. Hemorrhagic strokes, which happen when blood vessels rupture and cause bleeding in the brain, are more likely to lead to death and severe disability, yet fewer researchers have ventured into understanding them. Dr. Ashkan Shoamanesh is one of those few, and he leads a Canada-wide research group aimed at exploring how to prevent hemorrhagic strokes and to better treat people who suffer from them.

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