



The Heart Truth™ spokesperson and HSF researcher Dr. Beth Abramson



HEART & STROKE FOUNDATION

Finding answers. For life.™

Insight

A HEART AND STROKE FOUNDATION RESEARCH NEWSLETTER

FALL 2010

Changing Lives through world-class research.

Canada is seeing a dramatic increase in physical inactivity, obesity, diabetes, and high blood pressure – conditions that lead to heart disease and stroke. Investing in world-class research has never been so important.

Over **900 Heart and Stroke Foundation (HSF) researchers and teams** across the country are working on prevention, treatment, and rehabilitation solutions so that Canadians can live longer, healthier lives. Thanks to our **valued funding partnerships**, we are leveraging research capacity to strengthen Canada's research community in **strategic areas** such as obesity, stroke, and resuscitation. And we **act on research findings** by linking them to health policy and practice. The results are impressive.

Between 1952 and 2003 the cardiovascular death rate in Canada declined by 70 per cent – largely due to a number of research advances in surgical procedures, drug therapies, and prevention efforts.

HEART&STROKE RESEARCH ACHIEVEMENTS

1962 – First Heart Unit. Foundation researchers established the first-ever specialized coronary unit for hospitalized heart attack patients. This unique and focused approach has been adopted as the gold standard for care in hospitals worldwide.

1964 – Blue Baby Surgery. HSF researcher Dr. William Mustard develops the first successful surgical procedure for correcting a congenital defect known as 'Blue Baby Syndrome.'

1968 – A Canadian First. The first heart transplant surgery, made possible as a result of research funded by the Heart and Stroke Foundation, is performed in Canada.

1968 – Preventing Stroke. HSF researcher Dr. Henry Barnett conducts the first clinical trial for the use of ASA as prevention for stroke.

1980 – Blood Pressure Hormone. A Foundation-funded researcher made a world-changing discovery when he found that the heart produces a hormone that helps to regulate blood pressure.

1987 – Keeping Survivors Alive. The Foundation funds clinical trials that lead to the world's first implantable pacemaker procedure.

1997 – Gene Library. Over 84,000 DNA sequences related to heart disease and stroke are mapped with major contributions from Foundation-funded researchers.

1999 – Busting Clots. The Foundation funds research, education, and advocacy that lead to the use of the clot-busting drug t-PA, which, if accessed quickly, can erase the effects of a stroke.

2000 – Study Gives HOPE. The Foundation-supported Heart Outcome Prevention Evaluation (HOPE) Study confirms that ACE inhibitors significantly reduce the rates of heart attack and stroke.

2004 – Identifying Risk. The Foundation funds part of the INTERHEART study, which shows that nine modifiable risk factors account for 90 per cent of heart attacks worldwide.

2010 – Stroke Risk Factors. Co-funded by HSF, the international INTERSTROKE study identified 10 modifiable risk factors that account for 90 per cent of strokes, with high blood pressure posing the greatest risk.



HSFC Lecturer Dr. Robert Côté

HSFC Lecturer: time to connect the dots in vascular health

Diabetes. Macular degeneration. Alzheimer's disease. Chronic kidney disease. Heart attack. Stroke.

What do they have in common? These are all vascular diseases, which could be considered Canada's biggest health problem. All of us will feel the impact in our lifetime. The most common vascular disease, atherosclerosis or

hardening of the arteries, accounts for more than a third of deaths in Canada each year, with costs to our economy in excess of \$20 billion.

And things are likely to get worse. Canadians are becoming less fit and more overweight and obese. We'll see more diabetes, more high blood pressure, more abnormal cholesterol levels in the blood – all resulting in more heart attacks and strokes.

One specific challenge, says Heart and Stroke Foundation of Canada (HSFC) Lecturer Dr. Robert Côté, is the link between dementia and vascular disease of the brain, which is related to stroke. "The brain is a vascular organ, as much as the heart, if not more."

Vascular disease in general, and stroke in particular, will keep growing, he says.

continued

Research Superstars

Committed to attracting and retaining exceptional researchers while increasing research capacity in Canada, the Heart and Stroke Foundation partners with research institutions to fund large-scale, multi-year Research Chairs and Professorships to foster life-saving research and advance breakthroughs.

Through leadership, mentorship, capacity-building, collaboration, and research excellence, these dedicated research superstars have a front row seat in driving our thriving world-class heart and stroke research community.

"Nothing is too small to know, and nothing is too big to attempt."

William Van Horne



Dr. Heather M. Arthur

Dr. Heather M. Arthur

Heart and Stroke Foundation of Ontario/Michael G. DeGroot Chair in Cardiovascular Nursing

TAKING NURSES TO THE FOREFRONT OF RESEARCH

Nurses are integral to patient care and practice. Since becoming Canada's first nurse to hold an Endowed Chair in cardiovascular disease in 2003, Dr. Heather Arthur – the chief scientific officer at Hamilton Health Sciences – has taken nurses from the frontlines to the forefront of CVD research. By attracting and supporting post-doctoral fellows, she's seeding the next generation of nurse scientists – expanding their training and transforming prevention strategies and patient care at a rate significantly faster than ever before.

"The recognition that nurses are important, valued research players is significant. The opportunities that the Chair allow me in terms of developing the next generation of nurse scientists are huge. It's unbelievable what the creation of this Research Chair has done for our community."

Did you know?

Dr. Arthur – a former board member of the Heart and Stroke Foundation of Ontario – co-founded Hamilton Health Sciences' Cardiac and Vascular Nursing Science Unit, a leading program which engages nurses in scientific inquiry across the research spectrum in an up-close and personal way.



Dr. Harald Becher

Dr. Harald Becher

Heart and Stroke Foundation of Alberta, NWT & Nunavut Chair in Cardiovascular Research

BRAIN GAIN

Like a ripple effect in a pond, internationally recognized star researcher Dr. Harald Becher is attracting other leading cardiologists and scientists to put Alberta on the map as a hotbed of top-edge heart disease research. Lured from Oxford University, this heavy-hitter is building a world-class research hub dedicated to changing the way cardiovascular care happens in Alberta – and around the world.

"We have the capacity to shift entire systems of care through our translational research – this Research Chair has given us the rarefied opportunity to influence healthcare and improve life expectancy and quality of life. It's the beginning of a movement."

Did you know?

A world renowned expert in the use of advanced ultrasound imaging techniques for diagnosing heart

disease, Dr. Becher pioneered contrast echocardiography and made essential contributions to the development of other innovative diagnostic techniques such as colour Doppler echocardiography, stress echocardiography, and led the way in transforming patient management with the use of new ultrasound imaging techniques.

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Each of these diseases is a significant health burden, affecting millions of Canadians, but it is the increasing prevalence of dementia, especially as our population ages, which is most alarming. Recent reports estimate that the number of Canadians with dementia will increase from the current half million to over 1.1 million by 2038, resulting in costs to the Canadian economy of \$153 billion per year.

"We urgently need to link researchers of these different diseases," says Dr. Côté. "By connecting the dots and

developing a comprehensive approach that will help us understand more about the causal links between the various vascular diseases, this knowledge could inform health policies and practice."

The Canadian Heart Health Strategy – supported by the Heart and Stroke Foundation – recommends investment in the creation of a multi-site research centre in vascular health to focus on small blood vessel disease.

This investment would be an opportunity for Canada to lead international research while protecting the health of Canadians.

Heart and Stroke Foundation of Canada Lecturer Dr. Robert Côté is a professor of neurology at McGill University and a senior physician at the Montreal General Hospital.

Heart and Stroke Foundation Research Chairs and Professorships

Dr. Sonia Anand, McMaster University
Heart and Stroke Foundation of Ontario / Michael G. DeGroot Chair in Population Health Research

Dr. Heather Arthur, McMaster University
Heart and Stroke Foundation of Ontario / Michael G. DeGroot Chair in Cardiovascular Nursing

Dr. Harald Becher, University of Alberta
Heart and Stroke Foundation of Alberta, NWT & Nunavut Chair in Cardiovascular Research

Dr. Ken Butcher, University of Alberta
Heart and Stroke Foundation of Alberta, NWT & Nunavut Professorship in Stroke Research

Dr. Jafna Cox, Dalhousie University / Queen Elizabeth II Health Sciences Centre
Heart and Stroke Foundation of Nova Scotia Endowed Chair in Cardiovascular Outcomes Research

Dr. Henry Duff, University of Calgary
Heart and Stroke Foundation of Alberta, NWT & Nunavut Chair in Cardiovascular Research

Dr. Michael Hill, University of Calgary
Heart and Stroke Foundation of Alberta, NWT & Nunavut Professorship in Stroke Research

Dr. Fred Keeley, Hospital for Sick Children
Heart and Stroke Foundation of Ontario / Robert M. Freedom Chair in Cardiovascular Science at the Hospital for Sick Children

Dr. Scott Lear, St. Paul's / Simon Fraser University
The Pfizer / Heart and Stroke Foundation of BC & Yukon Chair at St. Paul's Hospital in Cardiovascular Prevention Research

Dr. Kim Raine, University of Alberta
Heart and Stroke Foundation of Canada and CIHR Institute of Population and Public Health Applied Public Health Chair

Dr. Philip Teal, University of British Columbia
The Sauder Family / Heart and Stroke Foundation of BC & Yukon Professorship in Clinical Stroke Research

Dr. Yu Tian Wang, University of British Columbia
The Heart and Stroke Foundation of BC & Yukon Chair in Stroke Research

Dr. Jeffrey Weitz, Hamilton Civic Hospitals Research Centre
Heart and Stroke Foundation of Ontario / J. Fraser Mustard Chair in Cardiovascular Research at McMaster University

Dr. Salim Yusuf, McMaster University
Heart and Stroke Foundation of Ontario Chair in Cardiovascular Disease at McMaster University

Dr. Jafna Cox



Dr. Jafna Cox

Heart and Stroke Foundation of Nova Scotia
Endowed Chair in Cardiovascular Outcomes Research

MAPPING THE FUTURE OF PATIENT CARE

Dr. Jafna Cox is expanding the field of outcomes research in ways that will have a profound effect on patient care in the future. By facilitating provincial collaborations like ANCHOR – A Novel Approach to Cardiovascular Health by Optimizing Risk Management – Dr. Cox and his team are seeking ways to address cardiovascular risk in primary care before it manifests as disease.

"In the future, I'd like to see a shift from a historically downstream focus on acute care to an upstream one with a greater emphasis on disease development and its prevention. There has to be a cultural sea change in the way that we bring up our kids and in the way we educate them."

Did you know?

Under the ICONS study (Improving Cardiovascular Outcomes in Nova Scotia), undertaken with active HSF input, Dr. Cox and his team investigated treatment patterns and their impact on clinical outcomes in order to inform and allow disease management. The Nova Scotia Department of Health evolved ICONS into a provincial program (renamed Cardiovascular Health Nova Scotia) which they now fund and manage.

Dr. Scott Lear

The Pfizer/Heart and Stroke Foundation of BC & Yukon Chair at St. Paul's Hospital in Cardiovascular Prevention Research

FORGING STRATEGIC PARTNERSHIPS

Dr. Lear and his team are building heart disease prevention capacity in Canada by increasing the scope and scale of research by investigating who, how, and why people get heart disease. Under his leadership, the Chair is facilitating vital networking with health authorities and clinical and community partners. They are putting evidence into the hands of people who can use it – ultimately influencing heart disease prevention and management policies.

"The Chair opens doors that I wouldn't have been able to open before. When individuals and organizations learn of the Chair and its directives it makes it easier for us to work together on prevention. It has been an excellent avenue to enhance the application of proven research."

Did you know?

Dr. Lear and his team are involved in the Virtual Cardiac Rehab Program, a Heart and Stroke Foundation study that uses the Internet to support patients in managing their conditions. The tool reaches those who don't have access to hospital-based cardiac rehab programs or heart failure clinics as well as those who are less likely to attend a cardiac rehab program.

Did you know?

As a highly-rated New Investigator in stroke, Dr. Butcher was the recipient of the 2007/08 HSFC Henry J.M. Barnett Scholarship – one of the Foundation's most prestigious awards – for his work in using an innovative imaging technique to study the effects of blood pressure lowering on blood flow in the brain after a stroke.

Dr. Ken Butcher

Heart and Stroke Foundation of Alberta,
NWT & Nunavut Professorship in Stroke Research

STRIKING OUT STROKE

Dr. Ken Butcher's research is expanding what we know about stroke. His Professorship sparked a full-time innovative research program which is transforming how we treat stroke. Results are exemplary: his team has developed a unique research protocol known as the

penumbral imaging program – a potentially paradigm-shifting approach to the assessment and treatment of stroke and transient ischemic attack (TIA) patients.

"My ultimate aim of a reduction in the disability caused by stroke drives me to seek novel methods of treating my own patients and ultimately transforming the way we think about stroke, leading to changes in practice patterns."



Dr. Ken Butcher

Research Superstars



Dr. Kim Raine

Dr. Kim Raine

Heart and Stroke Foundation of Canada and CIHR
Institute of Population and Public Health Applied
Public Health Chair

LINKAGES TO IMPROVED HEALTH

Dr. Kim Raine is creating change. Building on existing programs and partnerships with communities, health practitioners, and government, she's fast-tracking the results from her obesity intervention research to improve the health of Canadians. Her team works on understanding and countering the culture of inactivity and over-eating and then linking the findings to community health programs. Bringing research results home, faster.

"We move beyond investigating what interventions work best. We are connecting with public health decision-makers who can then apply new findings to our public health system. It means facilitating change in the real world."

Did you know?

Dr. Raine's research program Promoting Optimal Weights through Ecological Research (POWER) began with a new emerging team grant funded by CIHR and the Heart and Stroke Foundation. She is an avid marathoner and triathlete.



Dr. Salim Yusuf

Dr. Salim Yusuf

Heart and Stroke Foundation of Ontario Chair in
Cardiovascular Disease at McMaster University

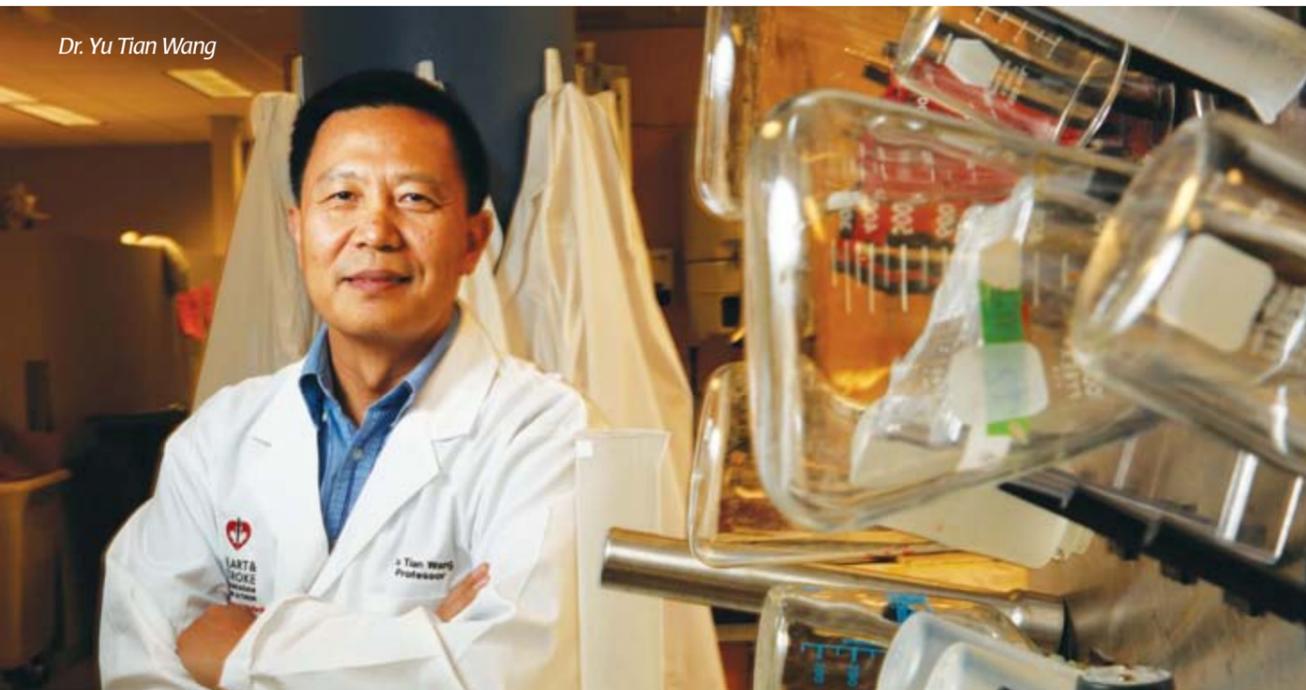
GLOBAL IMPACT

Working on an unparalleled scale, Dr. Salim Yusuf is bringing Canada to the world. Leading an international research program which has studied over a million people, he has linked over 1,500 centres in 83 countries on all continents to understand how societal changes affect individual health behaviours and how both of these affect health. Researchers from across disciplines are creating new networks and leveraging opportunities and resources to revolutionize how we prevent heart disease and stroke.

"I am driven by the belief that we can reduce the rate of heart disease globally by 50 per cent within the next 25 years."

Did you know?

As the lead of the landmark INTERHEART and INTERSTROKE studies – which established the modifiable risk factors for heart attacks as well as for stroke – Dr. Yusuf and his team have set the stage for global preventative strategies which have the potential to avert the majority of premature deaths from heart disease and stroke around the world.



Dr. Yu Tian Wang

Dr. Yu Tian Wang

The Heart and Stroke Foundation
of BC & Yukon Chair in Stroke Research

STROKE OF GENIUS

As one of the world's leading stroke researchers, Dr. Yu Tian Wang has built a competitive research team of talented trainees and scientists whom he has recruited from around the globe. His enhanced ability to increase the quality of team scientists and the scope of their research programs have made significant progress in our understanding of how stroke produces brain damage and the development of novel arsenals to fight against brain damage following a stroke.

"With the rapid and continuous increase in our understanding of molecular mechanisms by which stroke insults cause brain damage, I believe that within the next 10 years we will experience major breakthroughs in new therapies to reduce stroke-related brain damage and disability."

Did you know?

Dr. Wang and colleagues developed a compound composed of a short chain of amino acids (known as a peptide) that blocks the interaction between receptors during a stroke. This saves over 90 per cent of the brain tissue that can otherwise die in a stroke in laboratory settings.

HSF research results, Changing lives

By Don Campbell, Saskatoon

Twenty three years ago I was, like many perfectionists, focused on my work. I put in long, long hours and I have to admit I wasn't the best person to work with.

I had no family history of heart disease – and my doctor told me my blood pressure was that of a young man. Perhaps that's why I couldn't believe it when the freight train known as a heart attack hit me as I drove back to work late one night.

I'm a former professional athlete in two sports and I can tell you, the pain of broken bones is nothing compared to the pain of a heart attack.

So why do I consider myself so lucky?

Well, I was lucky to get to emergency help within a few minutes of my attack. Mostly, however, it is because I was immediately given a drug treatment that cleared the blocked artery in my heart and prevented permanent heart damage. Six months later I underwent triple bypass surgery. I made big changes to my lifestyle and today I feel better than ever.

I know that if I had waited to get to the hospital, or if the clot-busting drug wasn't around, I may not be here today. I am so thankful that research into heart disease uncovered this and many other treatments that are preventing death and disability from heart disease and stroke.

To all of the Heart and Stroke Foundation researchers working to improve and save lives, thank you from the bottom of my much healthier heart!

Every seven minutes in Canada, someone dies from heart disease or stroke. Over 1.6 million survivors – and their families and caregivers – are living with the devastating after-effects. That's why the Heart and Stroke Foundation's goal is to lead in eliminating heart disease and stroke and reducing their impact. It fosters our commitment to health education, drives our research in prevention, treatment and rehabilitation, and shapes our advocacy work.

Marvelling at the brain's complexity

Dr. Majid H. Mohajerani has his B.Sc. and M.Sc. in electronic engineering and once envisioned working in instrumentation, building circuits to control different systems. Instead, he ended up in an even more rewarding – yet he feels related – career.

"The brain," he says, "is the most complex system in the world. It's the most fascinating area of science that someone can work in."

His path to becoming a researcher started when he took a master's course in artificial intelligence. Learning about how to re-engineer brain functions into machine language stirred his interest in studying the brain itself.

Later, he earned a PhD in neuroscience, and in 2007 joined the lab of Dr. Tim Murphy in the department of psychiatry at the University of British Columbia.

As a post-doctoral researcher, Dr. Mohajerani is exploring how molecular, cellular, and synaptic mechanisms lead to the recovery of affected regions of the brain for stroke survivors. In essence, he says, what type of 're-organizing' is occurring to guide recovery?

Dr. Mohajerani is the recipient of the 2010 HSFC Henry J.M. Barnett Scholarship, which the Foundation awards annually to a highly rated New Investigator working in the area of stroke.

He calls the Barnett Scholarship a career boost. It means that he'll be able to work more independently and, he hopes, exchange more ideas with scientists all over the world.



HSF researcher Dr. Majid H. Mohajerani

Investigator Comes Up ACEs

Forget the scientific terms for a moment; ACE2 offers what star Heart and Stroke Foundation researcher Dr. Gavin Oudit calls “the double whammy.”

ACE2 – angiotensin-converting enzyme 2 – not only breaks down a peptide that contributes to heart disease, vascular disease, and lung and kidney disease. It also generates a peptide with heart- and kidney-protective effects.

A clinician-scientist at the Mazankowski Alberta Heart Institute and an assistant professor at the University of Alberta, Dr. Oudit is working on clinical development of human recombinant ACE2, a human synthetic form of the enzyme, as a potential therapy.

The most comparable biologic is insulin, he says. Human recombinant insulin is synthetic insulin made by recombinant protein technology and is used by individuals with diabetes. Considering the prevalence of lung, cardiovascular, and kidney disease, the ultimate therapy of recombinant ACE2 could be even more consequential.

Dr. Oudit is a bit of a double whammy himself as the 2010 recipient of two prestigious awards: the HSFC McDonald Scholarship – the Heart and Stroke Foundation of Canada’s top award for New Investigators –

HSF researcher Dr. Gavin Oudit



and the HSFC Distinguished Clinician Scientist, which is presented in partnership with the CIHR Institute of Circulatory and Respiratory Health to the Foundation’s highest-ranked clinician in the New Investigator competition.

He received his first paying research job via the Heart and Stroke Foundation, a 1994 summer studentship

after his first year of medical school. “The Distinguished Clinician Scientist is our most eminent award,” says HSFC director of research Linda Piazza. “We are very proud to have supported Dr. Oudit throughout his career.”

Dr. Oudit calls his latest Foundation recognition humbling. “It’s an endorsement,” he says, “that this sort of work can be accomplished in Canada.”

Ottawa Heart Institute photo



HSF researcher Dr. Rob Beanlands

Peering into peer review

As a young investigator back in 1993, Dr. Rob Beanlands submitted a research proposal to the Heart and Stroke Foundation. It was rejected – but in the end it was a positive experience: “The reviewers gave me concrete, useful feedback.” With their advice, he redefined and improved the study, and landed a grant the next time around.

Dr. Beanlands is now a Heart and Stroke Foundation Career Investigator and a peer reviewer himself, serving on one of the Foundation’s Scientific Review Committees (SRC).

“You’re striving to meet a standard of excellence,” says Dr. Beanlands, director of the National Cardiac PET Centre, University of Ottawa Heart Institute and outgoing scientific chair of the Canadian Cardiovascular Congress. “If a proposal doesn’t make the cut it’s not that the idea isn’t good or the methods aren’t well validated. But there are ways to raise it from good to excellent.”

Every research project submitted for HSF funding – over 400 grants-in-aid and about 300 personnel awards each year – undergoes a rigorous peer review to ensure that the Foundation funds research of the highest calibre. The process engages over 1,000 researchers and includes over 160 SRC members, including scientists and lay reviewers, who participate on one of 12 specialized committees ranging from cellular biochemistry to population health.

In the past, as an internal reviewer, Dr. Beanlands examined about 10 grant proposals a year for the Foundation. As co-chair of one of the HSFC scientific review committees, he will oversee the review process for 50 grants. He looks for four things: originality, sound methodology, feasibility, and research that will ultimately have a measurable impact on the Foundation’s mission.

“This is what will advance knowledge and hopefully, affect patient care and outcomes,” he says.

Dr. Beanlands learned something about the integrity of the peer review process from his father, Donald, now retired, who was also a Heart and Stroke Foundation reviewer (and head of cardiology at the Ottawa Heart Institute).

“The investigators put in lots of hard work, so you need to be constructive,” says Dr. Beanlands.

“That’s something my father passed on to me.”

Scientific peer review is the cornerstone of the Foundation’s research enterprise. Last year the Heart and Stroke Foundation invested over \$66 million into research.

FIND OUT MORE

Researchers are invited to sign up for our monthly **research e-newsletter** at research@hsf.ca to get regular updates from the Heart and Stroke Foundation.

Visit hsf.ca/research regularly for **funding opportunities**, competition results, and research program information.

HSF patient resources include our website heartandstroke.ca, which includes the latest

information on heart disease, stroke, and healthy living; heart-healthy recipes; and online self-management tools.

Canadians can ask questions about heart disease and stroke and order free HSF resources and brochures by calling the **Heart&Stroke InfoLine** (1-888-HSF-INFO).

Our mission is for life.

The Heart and Stroke Foundation, a volunteer-based health charity, leads in eliminating heart disease and stroke and reducing their impact through the advancement of research and its application, the promotion of healthy living, and advocacy.