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&Stroke™



A fighting chance

2020 Spotlight on Women

When it comes to heart and brain health, women have been shortchanged.

But new research advances are closing the gap.

Women are not small men. There are real biological differences between the sexes, and not just the obvious ones. Women's hearts and arteries are smaller, for example, and plaque builds up in their blood vessels differently. However, two-thirds of clinical research into heart disease and stroke is based on men.¹

This research gap is costing lives. In fact, heart disease and stroke are the number one cause of premature death for women in Canada.²

At every stage — from diagnosis to treatment to recovery — women fare worse than men. Their symptoms often go unrecognized. Some treatments are less effective in women. And women take longer to get better and face higher rates of recurrence.

In 2018, Heart & Stroke launched a [campaign](#) to address this gap — and donors and volunteers embraced it. Their generosity led to the creation of a national research network focused on women's heart and brain health. Heart & Stroke funds are helping dozens of Canadian scientists tackle crucial questions for women's health (see p. 6). And today, all



2/3 of heart disease and stroke clinical research is based on men.

applications for Heart & Stroke [research grants](#) must include an analysis of sex and gender-related differences.

Now we're starting to see results.

By investing in research focused on women, we are gaining the knowledge to save more lives and create better outcomes. The momentum is building. These stories show how.

We are making big strides, but much remains to be done. **Women are still paying too high a price for gaps in research, prevention, diagnosis and treatment.**

— Anne Simard, Chief Mission and Research Officer, Heart & Stroke

Problem: Women do worse than men after valve surgery

Solution: A drug to slow or stop some valve disease



Jennifer Michaud

Jennifer Michaud was born with aortic stenosis — stiffness in the valve that controls the flow of oxygen-rich blood from the heart. But it didn't hold her back. She got a university degree, launched a career and immersed herself in Calgary's community theatre scene.

At the age of 29, things changed. Jennifer's heart would start racing for no reason, leaving her dizzy and breathless. Tests showed that her valve had deteriorated severely; surgery to replace it was the only option.

In many ways, Jennifer was lucky. Thanks to regular monitoring, her specialist caught the problem in time. But that's not the case for many women with aortic stenosis. The underlying causes and symptoms are different in men and women; lack of research means women are often under-diagnosed.

"Ninety-nine point nine per cent of the studies on this condition have been done only in males, or with a large preponderance of men or male animals," explains Dr. Marie-Annick Clavel, a cardiology researcher at Laval University.

Dr. Clavel has developed diagnostic guidelines that help clinicians recognize aortic stenosis in women. And detecting it is critical; if symptomatic severe cases go untreated, patients die.

Even when it is treated, women have worse outcomes than men. In fact, women are 25% more likely to die after aortic valve surgery.³

Jennifer is glad she and her husband didn't know that as they faced the choice between a mechanical or a biological valve replacement. With mechanical valves, patients have to take blood thinners for the rest of their lives. Biological valves are not as durable as mechanical valves.

Jennifer opted for the biological kind, like many women, even though she would likely need more surgeries. One factor in the decision: She and her husband wanted the option of having a family one day, but blood thinners make pregnancy very risky.

A week after starring in a Gilbert and Sullivan tribute, she underwent open-heart surgery.

Today Jennifer is back at work and back on the theatre stage. But the surgery that saved her life left her exhausted and in pain for many months. "I felt like I had been hit by a truck," she says. She does not look forward to going through it again when her new valve needs to be replaced.

Dr. Clavel's latest research could change stories like Jennifer's. She is looking at a drug that targets fibrosis, the most common cause of aortic stenosis in women. Results from a mouse study funded by Heart & Stroke are very promising. Now, she's planning a study in humans.

If it proves successful, women like Jennifer might be able to postpone surgery — or avoid it altogether. "That is really thrilling," says Jennifer.



The goal is to reduce the progression of aortic stenosis; to stop the progression if we're lucky; and to reverse the progression if we're amazingly lucky.

— Dr. Marie-Annick Clavel

Problem: A rare cardiac emergency is killing young women

Solution: Tools to help doctors recognize and treat it



Sudi Barre

Sudi Barre was in hospital with her newborn son, recovering from an emergency caesarean, when pain suddenly ripped through her back and arm. It was a heart attack that she would later learn was caused by spontaneous coronary artery dissection (SCAD). It's a frightening and potentially fatal condition where the heart's artery walls start tearing apart.

Implanting a stent only led to more heart attacks. When Sudi's heart function plummeted to just 3%, doctors implanted a mechanical pump. Sudi spent the next eight months in hospital, her chest criss-crossed with scars, too weak to hold her son. But she kept going for his sake.

"I wanted the gift of life and motherhood," she says. "I wanted the energy to run around with my baby when he started walking."

Eighty-eight per cent of SCAD patients are women,⁴ many young and otherwise healthy. In most cases, they have no traditional risk factors for heart disease and no warning signs. And when it happens, SCAD is often under-diagnosed because it can be difficult to detect on traditional angiograms.

"I've seen so many horror stories," says Dr. Jacqueline Saw, Canada's leading expert on SCAD. Young women are often turned away from emergency rooms, despite heart attack symptoms, because they're in their 30s or 40s. In other cases, like Sudi's, it's treated like a standard heart attack. But stents or blood thinners can actually increase the risk of further tearing.

Dr. Saw has developed a classification to analyze angiograms that will help doctors detect SCAD. She and her team at the University of British Columbia are also following more than a thousand patients, tracking everything from what triggered their heart attacks to the effectiveness of treatments. With support from Heart & Stroke, her team has identified genes that increase the risk of developing the condition.

Today, Sudi struggles with forgetfulness, and little things can make her irritated or upset. "I've just become an emotional mess," she says, laughing. However, she lives life with as much joy as she can muster. Surgeons have removed her mechanical pump, and her heart is functioning at 40%: enough to finally cuddle with her son.

As a heart health advocate, she's speaking up about her experience because she wants more healthcare professionals to recognize SCAD.

According to Dr. Saw, that day is close. Within the next five years, she expects to see genetic screening tools, much better rates of diagnosis by health professionals and better protocols for treating the disease. "We've come a long way," she says.



We were actually missing a lot of SCADs. We did not have the right tools for diagnosis in the past.

— Dr. Jacqueline Saw

Problem: Mental health impacts make a tough road harder

Solution: More awareness and screening to save women's lives



Karen Narraway

When Karen Narraway went to the cardiologist with a racing heart and pain in her left arm, tests showed nothing. Her doctor attributed those symptoms to anxiety. When chest pain took her to the ER six months later, the verdict was the same. But her chest pain continued to get worse. Finally, tests revealed six major blockages in her arteries requiring quadruple bypass surgery.

Karen's story doesn't surprise Dr. Paula Harvey, director of cardiovascular research at Women's College Hospital in Toronto. One study showed that women who mention stress along with physical symptoms of cardiac disease are much more likely to be diagnosed with anxiety than men reporting exactly the same thing.⁵ But delays in diagnosis can be fatal.

Meanwhile, many women are not screened for depression after a diagnosis of heart disease or stroke. That's another big oversight.

Depression strikes women with heart conditions nearly twice as often as men.⁶ It increases the risk of a heart attack.^{7,8} It increases the chances that an attack will be fatal.⁹ And for survivors, it slows recovery.

According to Dr. Harvey's research, nearly 40% of female patients experience depression after a cardiac event — and more than half of those have moderate or severe symptoms.¹⁰

Karen is a prime example. In the months after her bypass, she struggled with symptoms of post-traumatic stress disorder (PTSD). She felt exhausted and depressed and barely held things together at work. "I felt like my life had changed completely and abruptly," she explains. "Although everyone was kind and caring, no one really understood."

Guidelines used by healthcare providers — including the [Canadian Stroke Best Practices](#) led by Heart & Stroke — recommend that heart attack and stroke survivors be screened for depression. Thanks to significant efforts in implementation and monitoring, those recommendations are being followed in more healthcare settings.

However, in Dr. Harvey's study of women with heart disease, less than half of those with moderate or severe depression were getting treatment.

That needs to change, she says. She also sees a big need for more research into effective treatments.

And then there's the underlying question: Why is depression such a big risk factor for heart disease and stroke? Is it related to hormones? Neurotransmitters? Inflammation? Or does depression lead to other risk factors, like more smoking or a poor diet? Only through these answers can we start to address the disproportionate impact on women.

Despite the knowledge gaps, Dr. Harvey is upbeat. She points to a groundswell of new research on the connections between the brain and heart — from lab-bench experiments to large-scale epidemiological studies — that will lead to better screening, diagnosis and treatments.

"I think it's a pretty exciting time with so many different opportunities," she says. "We are definitely making significant progress."



It's really important that women are heard. There are a lot of things that remain unanswered and that need to be researched.

— Dr. Paula Harvey

More research that's moving the needle

Heart & Stroke researchers across Canada are increasing our understanding of women's heart and brain health.

Through research competitions focused on topics specific to women, 27 scientists will share a total of \$4.3 million over five years. Here are some of the 15 awardees already at work:

- **Dr. Nathalie Auger**, Centre Hospitalier de l'Université de Montréal: Studying how pregnancy complications can affect and predict women's risk of developing heart disease and stroke later.
 - **Dr. Thalia Field**, University of British Columbia: Investigating the impact of CVT (cerebral venous thrombosis) on young women. CVT is the second most common cause of stroke for women during pregnancy.
 - **Dr. Heather Foulds**, University of Saskatchewan: Shining a spotlight on social and cultural factors impacting the heart and brain health of Indigenous women.
 - **Dr. Kara Nerenberg**, Foothills Medical Centre, Calgary: Studying ways to improve heart and brain health of new mothers.
- General Heart & Stroke research funding — more than \$33 million in 2018 — also supports many studies that will provide critical clues to women's health. We've also changed our expectations: researchers must now consider sex and gender in all research projects, so the results apply to women as well as men. Here are a few funded researchers:
- **Dr. Susan Howlett**, Dalhousie University, Halifax: Examining the effect of frailty on the development of heart disease, to better understand sex differences in heart failure.

• **Dr. Jennifer Thompson**, University of Calgary: Investigating the risk of cardiovascular disease in children born to mothers with obesity or gestational diabetes.

• **Dr. Amy Yu**, University of Toronto: Investigating differences in disability and healthcare costs after stroke for men and women, and the potential causes of these differences.

Tackling biological and social differences

Heart & Stroke funds research that considers biological differences between men and women. For example, factors like pregnancy, menopause and hormonal changes affect women's risks and treatment options.

We also support research that addresses how women are diagnosed and treated differently because of gender-based factors. These include women's lower socio-economic status, the myth that heart disease is a "man's disease" and a tendency to dismiss women's symptoms as anxiety.

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Donors and volunteers step up

Since its launch in 2018, Heart & Stroke's women's campaign has caught the imagination of our donors and volunteers. Their gifts are increasing women-specific research on heart disease and stroke, and they're doing even more:



Ensuring women are **equitably represented** in the research we fund.



Funding a community of scientists to **improve expertise** in women's heart and brain health.



Expanding knowledge about women at **higher risk** of heart disease and stroke.

In addition, thousands of people in Canada have joined the #RedList to take action on women's health.

Donate today at heartandstroke.ca/donate

Heart & Stroke gratefully acknowledges the generous support of our Women's Initiative Founding Partners.



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Together, we're committed to saving women's lives by advancing women's heart and brain health in Canada.

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