

## The CIHR Institute

CIHR's Institute of Circulatory and Respiratory Health, under the leadership of Scientific Director Dr. Bruce McManus, supports research into the causes, prevention, screening, diagnosis, treatment, support systems, and palliation for heart disease, as well as a wide range of other conditions associated with the lungs, brain, blood and blood vessels. The Institute's research priorities include: the influence of sex and gender on the risk of cardiovascular and lung disease, the interaction of genes and environment in determining susceptibility to circulatory and respiratory disease, chronic disease management, palliative and end-of-life care, regenerative medicine, tobacco in relation to heart and lung diseases, inflammation and thrombosis, cellular and molecular imaging, resuscitation for sudden death in the community, the use of computational sciences and mathematics to improve our understanding of circulatory and respiratory diseases, and infectious causes of circulatory and respiratory health.

Through programs such as the Resuscitation Outcomes Consortium, which focuses on clinical trials in the areas of cardiac arrest and severe traumatic injury, the Institute of Circulatory and Respiratory Health works with partners across Canada and throughout the world to advance knowledge and practice in the area of heart disease.

## About the Canadian Institutes of Health Research

The Canadian Institutes of Health Research is the Government of Canada's agency for health research. Its objective is to excel, according to internationally accepted standards of scientific excellence, in the creation of new knowledge and its translation into improved health for Canadians, more effective health services and products and a strengthened Canadian health care system. Composed of 13 Institutes, CIHR provides leadership and support to close to 10,000 researchers and trainees in every province of Canada. For more information visit [www.cihr-irsc.gc.ca](http://www.cihr-irsc.gc.ca)

The Canadian Institutes of Health Research (CIHR) is the Government of Canada's agency for health research. Through CIHR, the Government of Canada invested approximately \$98.8 million in 2004-05 in research on cardiovascular diseases across Canada.

## The facts

- Cardiovascular disease is the leading cause of death in Canada and accounted for at least 33% of all deaths (34% among women, 32% among men) in 2002.
- Men are more likely to develop heart disease early in life; women tend to "catch up" around menopause. Women experiencing heart disease or stroke are often under-diagnosed or managed differently than men.
- For the fiscal year 2002-03, there were about 411,000 acute care hospitalizations, or more than 300,000 Canadians hospitalized.
- According to the 2003 Canadian Community Health Survey conducted among persons aged 12 years or more, five million Canadians say they are affected by heart disease, hypertension and stroke.
- Cardiovascular disease is the most costly disease affecting Canadians. In 1998, it was responsible for \$18.5 billion in expenditures, or 11.6% of the total cost of all illnesses in Canada. Of this, \$6.8 billion was in direct costs, particularly for hospital care, and \$11.7 billion was in indirect costs, most due to premature death.

## Research finding solutions to heart disease

- By studying 120 French Canadian families in the Saguenay-Lac-St.-Jean region of Quebec, CIHR-funded researcher Dr. Pavel Hamet has identified 46 chromosomal areas associated with hypertension and its consequences, including heart disease. His research provides the strongest evidence to date that there are many different forms of hypertension, and could lead to the development of tests to identify of the kind of hypertension a patient suffers from, thereby enabling physicians to tailor treatment to patients. About five million Canadians suffer from hypertension; medication is effective in about half of those affected.
- Quick treatment with clot-busting drugs can return patients to pre-stroke health – but only 1.4% of patients who suffer a blood-clot-induced stroke, the most common form of stroke, receive the drug, according to research led by CIHR-supported investigator Dr. Michael Hill at the University of Calgary. Part of the problem is administering the drug in time and performing a CT scan to diagnose the stroke. Physician education is also important. Emergency physicians have been reluctant to administer clot-busting drugs for fear of inducing bleeding in the brain. This study demonstrated that bleeding of this kind occurs in only 5% of cases.
- A simple injection of an inexpensive and rarely used drug dramatically reduces heart attack deaths and prevents the occurrence of a stroke in patients who previously have had a heart attack, according to research led by CIHR-funded researchers Drs. Shamir Mehta and Salim Yusuf of McMaster University. When given to heart attack victims within two hours of the start of symptoms, Reviparin, an anti-blood-clotting agent, reduces death rates by 30%. This is the first time in a decade that a single study has convincingly demonstrated that the intervention under investigation can reduce mortality rates. The trial, conducted in India,

China and Pakistan, also demonstrated that the drug can be used in developing countries and small rural or remote hospitals because of its low cost and ease of use.

- Stents, medical devices that are used to hold arteries open after angioplasty, are more effective when they are coated with drugs. This coating reduces the risk of restenosis, or re-closure of the artery – but they are also much more expensive, costing about \$2,900 each, compared to \$500 for a regular stent. A team led by CIHR-supported researcher Dr. Fiona Shrive at the University of Calgary has found that it is cost effective to use these stents in patients with diabetes and those over the age of 75, but not in the general population. Dr. Shrive and her team used a measure called quality-adjusted life year, or QALY, for their analysis. About 35,000 angioplasties are performed in Canada each year and almost all patients receive stents. Currently, there do not appear to be explicit clinical practice guidelines about when the drug-coated stents should be used.
- No matter where in the world you live, the same nine risk factors – including tobacco use, cholesterol and high blood pressure – appear to be responsible for 90% of all heart disease. The study of 30,000 people in 52 countries was carried out by CIHR-supported researcher Dr. Salim Yusuf of McMaster University and demonstrates that a global focus on the nine risk factors could prevent premature heart attacks.
- The offspring of rats fed a diet high in soy while pregnant have healthier hearts than those whose mothers' diets were lacking the isoflavones found in soy. According to a study led by CIHR-funded researcher Dr. Christian Deschepper of the Institut de recherches cliniques de Montréal, rats whose mothers did not have the soy diets progressed more rapidly towards heart failure. The isoflavones had no such beneficial cardiac effects when incorporated into the diet of rats after puberty, thereby illustrating the importance of maternal diet on heart health later in life.
- Up to 400 lives per year in Ontario could be saved if more heart attack and heart failure patients received drug therapy before they left hospital. This finding is part of a study, carried out with support from CIHR by Dr. Jack Tu of the Institute for Clinical Evaluative Sciences, that provides a “report card” on the state of cardiac care in Ontario hospitals.

## In the Pipeline ... Reducing the toll of diabetes on the heart

The burden and reach of cardiovascular complications of diabetes is growing rapidly. Aboriginal people, women, the elderly and even youth who suffer from type 2 diabetes are experiencing higher rates of heart disease. Yet knowledge about the biological mechanisms that cause cardiovascular disease in people with diabetes is lacking. As well, little is known about the interaction of diabetes with other risk factors for heart disease. CIHR's Institute of Circulatory and Respiratory Health is working with many partners, including other CIHR Institutes and the Heart and Stroke Foundation of Canada, to learn more about cardiovascular complications of diabetes and how to treat and manage affected Canadians more effectively.

## The Researchers ... Dr. Sonia Anand: Getting to the heart of the matter

As a clinician-scientist of East Indian descent who grew up in rural Nova Scotia, Dr. Sonia Anand has pursued an international health research topic that hits close to home – trying to improve our understanding of the risk factors for cardiovascular disease among different ethnic groups and genders. This information is critical because by 2020, cardiovascular disease will be the leading cause of death in the developing world.

Today, Dr. Anand is an Associate Professor of Medicine in the Faculty of Health Sciences at McMaster University and specializes in prevention and treatment of vascular diseases. She holds the Eli Lilly/May Cohen Chair in Women's Health Research and is also a recipient of the CIHR Clinician Scientist award.

In 2004 Dr. Anand initiated the Cardiovascular Research in Gender (CARING) program as a network to perform high-quality, gender-based research in cardiovascular disease. In addition to conducting research, the network trains researchers and promotes knowledge translation activities.

Dr. Anand was the lead investigator for the Study of Health Assessment and Risk Evaluation in Aboriginal People (SHARE-AP), which showed that Aboriginal people in Canada are twice as likely to have heart attacks and strokes compared to Canadians of European descent. In a spin-off pilot study, called SHARE-AP ACTION, Dr. Anand is working with Aboriginal health counsellors located at the Six Nations Reserve to develop a culturally sensitive, lifestyle-based program aimed at reducing the risk of obesity and cardiovascular disease among Aboriginal people. Results will be available in December 2005.

She is also currently interested in extending her research, in a study involving 25,000 people from 21 countries, to determine whether genetic determinants play a role in the development of abdominal obesity and diabetes among people from different ethnic groups.

According to Dr. Anand, observations made in population-based research inform public health policies that can lead to significant reductions in cardiovascular disease. “We know the causes of cardiovascular disease; we just need to determine effective ways to change people's behavior. This calls for a greater interaction between researchers and policy makers.”