

COMPREHENSIVE CARDIAC CARE  
A unique resource for British Columbians

# The Heart Centre

at St. Paul's Hospital



prevention  
reversal  
diagnosis

rehabilitation





transplant



treatment

surgery

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**Lynn Straatman**, General Cardiologist  
**Christopher Thompson**, Director — Echo  
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### Cardiovascular Surgery

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**Martha Mackay**, Cardiology  
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### Lipid Clinic

**Gregory Bondy**, Associate Director  
**Jiri Frohlich**, Director

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# Welcome to St. Paul's Heart Centre

In British Columbia, many family doctors and cardiologists refer their heart patients for specialized care to St. Paul's Hospital in downtown Vancouver. The Heart Centre at St. Paul's is known around the world for its work in the prevention of heart disease and for the care, treatment and support of people living with heart conditions. As a University of British Columbia teaching hospital, St. Paul's serves as a training facility for cardiac professionals and is a leader in heart disease research, both in the laboratory and in the clinic. In addition to treating patients with heart disease, the Heart Centre also focuses on prevention – helping patients stay well and out of hospital.

More than 100,000 British Columbians are living with chronic heart disease. Of these, more than 20,000 will be hospitalized each year. Several thousand more will seek treatment on an out-patient basis.



# The Heart Centre's Approach

Comprehensive Care, Teamwork, Applied Research

A unique resource in the province, the St. Paul's Heart Centre provides complete care for British Columbians with all kinds of heart disease. The services at St. Paul's include heart disease prevention and reversal, a variety of diagnostic services and of course, a full spectrum of treatment and care, including surgery, transplants and rehabilitation. The Heart Centre's health professionals work as a team, sharing information and forming care plans tailored to each patient. In addition, the Heart Centre's home in a large general hospital offers the support of a critical care department and emergency services. Thanks to the concentration of cardiac professionals — and their participation in world-class research — the Heart Centre has achieved many “firsts” in the treatment of heart disease, and is the only centre in the province to provide a number of complex procedures.

Working in affiliation with the cardiac programs at Vancouver Hospital, Children's and Women's Health Centre of British Columbia, within the Vancouver Coastal Health Authority, the St. Paul's Heart Centre is a resource for all British Columbians.



## Did **you** know?

The Heart Centre is supported by an exceptional Coronary Care Unit (CCU). This 11-bed ward receives patients through the St. Paul's emergency department and from other BC hospitals, all of whom are severely ill often requiring extraordinary interventions such as breathing assistance or mechanical support of their heart function. Once stabilized, these patients may move to other parts of the Heart Centre for continued treatment.

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# Healthy Heart Program

Prevention, it turns out, really is the best medicine. And thousands of British Columbians have avoided life-threatening heart problems — and a hospital stay — thanks to the efforts of St. Paul's innovative Healthy Heart Program. Because of its unparalleled spectrum of care, this busy clinic receives 13,000 — 15,000 patient visits each year.

## **Prevention and Risk Reduction**

BC's family physicians and heart specialists often refer patients with obesity, high cholesterol, high blood pressure, and other heart disease risk factors to St. Paul's Healthy Heart Program. Here patients undergo a detailed assessment by nurses, exercise specialists, dietitians, cardiologists, and other specialists. These experts develop a program that may include an exercise regime, a "stop smoking" program, dietary changes, stress management strategies, medication, and/or therapy. Changing life-long patterns is not easy, but these professionals are trained to work with each patient to develop a realistic, livable

program. Following diagnosis and initial treatment, patients receive ongoing support from their family physicians as well as the Healthy Heart team. The Healthy Heart Program, which includes the largest lipid clinic in western Canada, was founded in 1981 and continues to develop innovative ways for British Columbians to control their risks for heart disease.

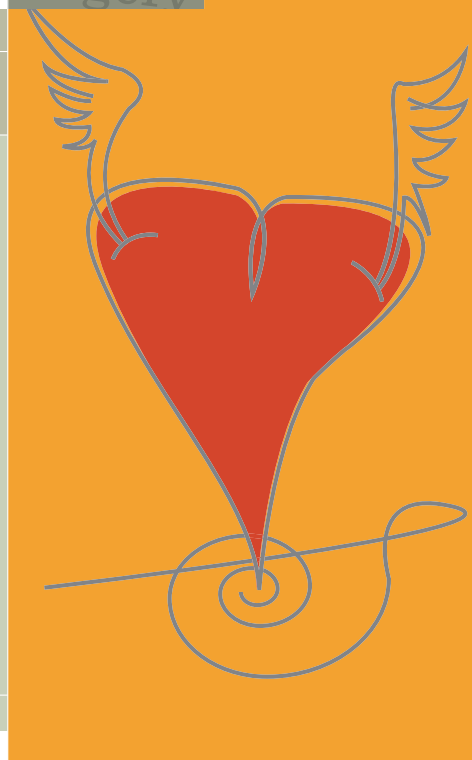
## **Rehabilitation**

The Healthy Heart Program's rehabilitation services specialize in helping the most complex heart patients — those coping with a recent heart attack, heart surgery, or with heart failure, as well as patients who

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## Did **you** know?

In a study involving 150 people, the atherosclerosis reversal clinic in the Healthy Heart Program showed that it is possible to not only slow the thickening or “hardening of the arteries” known as atherosclerosis, but to *reverse* it. After just two years, atherosclerosis in half of the patients had either stopped or the plaque had actually become thinner. Lifestyle changes including a low fat diet and daily exercise — as well as treatment of all known risk factors — helped these patients achieve these amazing results.



have undergone a heart transplant. The path back from these events can be difficult, but the Healthy Heart Program offers patients the most comprehensive approach in BC to aid in their recovery. These patients receive a complete medical evaluation followed by a program that includes dietary counselling, a personalized exercise program, as well as

group and individual support for depression and other post-event issues. Patients usually spend about four months in the “rehab” program, although this varies according to individual needs.

**Location:** Main Floor, Burrard Building

# Diagnostic Services

Before treatment begins, many patients need a detailed analysis of their heart's function. The Heart Centre's highly trained practitioners use state-of-the-art diagnostic equipment to determine how much a heart may be damaged or weakened.

## Echocardiography

This non-invasive procedure uses ultrasound waves reflected by the beating heart to make detailed pictures of the heart's structure and function. This test, performed in the Echo Lab, can identify problems such as congenital (from birth) heart defects, fluid around the heart, valve disease, and weakened heart muscles.

In addition to diagnosis, this technology can provide a "window" into the heart to guide and assist both open heart surgery and non-surgical procedures. Transesophageal echo (images from an ultrasound probe introduced into the throat) is often used to obtain particularly detailed pictures and ensure the best results for Heart Centre patients. The Echo Lab

performs more than 6,000 procedures each year.

## Electrodiagnostics

The electrodiagnostic laboratories perform electrocardiograms (ECG or EKG), Holter monitoring (24 hour recording of the heart rhythm), stress testing and, in partnership with the department of nuclear medicine, myocardial perfusion imaging (pictures of blood flow patterns using radioactive agents).

The ECG is the most common form of electrodiagnosis, with about 40,000 of these tests carried out each year at St. Paul's. From the ECG tracing, a cardiologist can determine a heart's rate and rhythm and whether there has been a prior heart attack or other forms of heart disease.

**Location:** Echo and ECG Labs, 2nd Floor,  
end of hall, Providence Wing

## Did **you** know?

Thanks to donations made to the St. Paul's Hospital Foundation, in 2002 The Heart Centre purchased western Canada's only 3-dimensional echo cardiography machine. This amazing technology can provide precise measurements of left-ventricular volume and heart muscle size. This can be important in planning treatment options; it can also assist surgeons during heart surgery.

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# Arrhythmia Services

Arrhythmia refers to any fast, slow or unusual heart rhythm caused by misfiring of the heart's electrical system. Arrhythmia can come and go, or can be constant, depending on the problem.

## Diagnosis and Treatment of Arrhythmia

Electrophysiology (EP) is the branch of medicine specializing in the evaluation and treatment of the heart's electrical system and rhythm. At the St. Paul's EP lab, which is one of only two in the province, three cardiologists are dedicated to the diagnosis and treatment of arrhythmia, seeing more than 500 patients each year. EP procedures are performed by putting electrodes through the veins into the heart itself. Using x-rays to guide them, cardiologists make a detailed study of the electrical activity from within the heart. When appropriate, they can treat the problem by applying energy to destroy the abnormal tissue (ablation) causing the arrhythmia. EP is one of the fastest growing areas in the field of heart disease.

## Devices to Restore the Heart Beat

Pacemakers or defibrillators are also commonly used to correct heart arrhythmia problems. The St. Paul's program is the largest in BC and because of its electrophysiology and surgical expertise, it frequently deals with the most challenging procedures. These include inserting pacemakers from both the right and left ventricles of the heart (biventricular pacing) as a treatment for advanced heart failure and implantable defibrillators. An implantable defibrillator is a device that can automatically deliver a shock and restore a normal rhythm to the heart when it detects a life-threatening abnormal rhythm. Each year the Heart Centre inserts about 400 pacemakers and 150 defibrillators. These numbers are expected to grow significantly as the technologies evolve over the next several years.

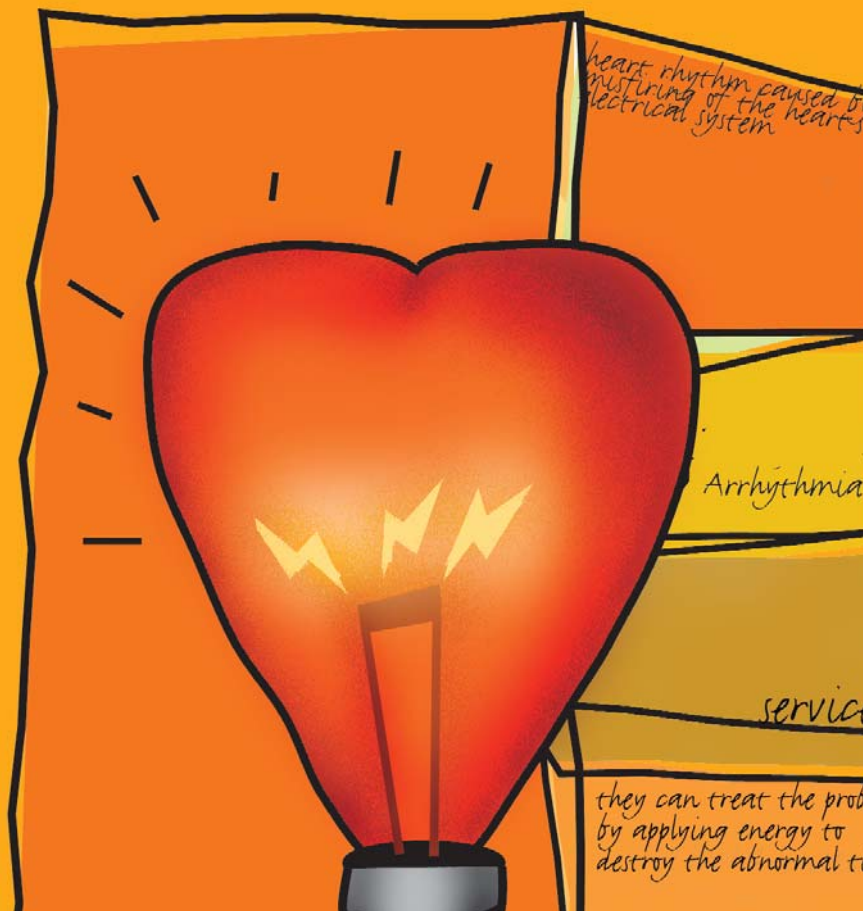
Location: EP Lab — 5th Floor, Providence Wing, adjacent to Catheterization Labs

## Did **you** know?

The electrophysiology program at St. Paul's is the only centre in western Canada to use a system called ESI mapping. This technology creates detailed maps of the pattern of electrical activity in the heart to precisely locate and treat abnormalities.

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## Did **you** know?

Cardiologists at St. Paul's Heart Centre can correct an abnormal opening between the two upper chambers of the heart in a one-hour out-patient procedure, using a newly developed device. Previously, patients with an "atrial septal" birth defect needed a three-hour open heart operation, followed by a five-day hospital stay.

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## Congenital Heart Disease Management (PACH Clinic)

The world-class Pacific Adult Congenital Heart Disease clinic cares for patients born with heart defects who have reached adulthood. An extraordinary provincial resource, it is the only adult congenital heart clinic in BC. It follows a model of collaborative care incorporating expertise from pediatric and adult cardiologists and surgeons, and a group of specialized and dedicated support staff.

The PACH clinic currently serves more than 1,000 British Columbians (about one sixth of all British Columbians with congenital heart disease) and grows year by year as research break-throughs allow more of these children to grow to adulthood. The PACH clinic is a member of the Canadian Adult Congenital Heart (CACH) Network formed in 1994 to pool the expertise of congenital heart disease professionals throughout Canada. All patients seen in the clinic are entered into a national registry of patients run by the CACH Network. This registry is used

to determine the effectiveness of treatments and to conduct research that furthers understanding of therapies for congenital heart problems.

In addition to providing invaluable care to these patients, the presence of the PACH clinic at St. Paul's has led to the development of extremely specialized expertise in many of the Heart Centre's programs such as electrophysiology, interventional cardiology, and heart surgery.

Location: Fifth Floor, C, Providence Wing

# Catheterization and Interventional Cardiology

## Catheters and Angiograms

Cardiac angiograms allow cardiologists to take pictures of the heart and its vessels as well as measure pressures in the heart chambers. They do this by inserting small catheters (hollow plastic tubes) through arteries and veins using x-ray guidance. During this test, dye is injected through the catheter and x-ray pictures of the coronary arteries are taken, providing a “road map” that helps doctors pinpoint any arterial blockages.

The St. Paul’s angiography team, which performs about 2,500 of these procedures each year, provides important diagnostic support to surgeons, as well as the congenital heart disease group and the advanced heart failure and transplant programs. Angiograms remain the most common cardiac catheterization procedure performed around the world.

## Interventional Cardiology

Historically, patients with severe coronary artery disease (narrowing of the heart’s arteries due to a build-up of plaque) were treated first with medication and then, if necessary, with coronary artery bypass surgery. Beginning in the early 1980s but particularly in the past decade, tremendous advances in “interventional cardiology” have allowed thousands of patients to be treated without open heart surgery. A variety of devices such as balloons, stents (small stainless steel mesh tubes) and other tools are used to open narrowed arteries and restore a good blood supply to the heart. This procedure is called percutaneous (through the skin) coronary intervention (PCI) or angioplasty.

For appropriate patients, PCI offers the advantage of being done under local anesthesia (patients are awake) and do not require large surgical incisions, which reduces discomfort,

speeds up recovery, and lessens costs. PCI is now the technique most commonly used to treat blockages and restore blood flow in the arteries of the heart. Applied both in elective and urgent situations including acute heart attacks, about 1,300 PCI procedures are performed at St. Paul's each year.

Many specialized forms of intervention are unique to St. Paul's, including balloon

valvuloplasty (opening narrowed heart valves) and the repair of congenital defects. Many patients undergoing angiograms and angioplasty are treated and discharged on the same day from the Cardiac Short Stay unit and Cardiac Interventional unit that support the catheterization labs.

**Location:** 5th Floor, Providence Wing

## Did **you** know?

Did you know that patients sometimes develop a renarrowing of the artery after stent surgery due to a build up of scar-like tissue? Though previously difficult to correct, this can now be treated by applying a local form of radiation from inside the artery (brachytherapy). St. Paul's was the second hospital in Canada to perform this technique in research trials and now uses it regularly as a clinical tool.



# Heart Failure Management

When the heart is unable to pump enough blood, fluid accumulates in the lungs and other parts of the body. This condition, known as heart failure or congestive heart failure, often develops over a period of years, or may result soon after damage to the heart muscle caused by a heart attack.

Heart failure can cause serious breathing problems, tiredness, swelling of legs and ankles, and frequent coughing. It is the fastest growing form of heart disease in North America. More than 7,500 people are hospitalized for heart failure each year in BC. The Heart Function Clinic at St. Paul's Heart Centre is unique in the province, offering care that is tailored to the condition and needs of each patient. Although most care is provided on an out-patient basis, patients with severe heart failure may be admitted to the cardiac ward for intermittent intravenous medications or the Coronary Care Unit where pressures in their heart can be carefully

monitored as their medications are adjusted. Usually people with heart failure can live much improved lives with proper medications, as well as diet and lifestyle changes. Patients who continue to deteriorate may become candidates for heart transplantation.

## Did **you** know?

The St. Paul's Heart Centre was one of the first places in Canada to implant a device that can bridge the gap between complete heart failure and the availability of a heart for transplant. Called a "ventricular assist" device, this technology has the potential to save lives in the face of critical organ shortages.



# Heart Surgery

Open heart surgery refers to an operation performed on the heart through an incision in the chest, usually while the bloodstream is diverted through a heart-lung machine. Heart surgery procedures include heart valve repairs and replacements, coronary artery bypass graft (CABG) surgeries, and heart transplants.

The St. Paul's Heart Centre surgery program is not only the largest in the province (about 1,000 surgeries a year) but takes on many of the most complex cases — particularly those that combine valve repair or replacement, coronary bypass surgery, advanced heart failure, complex arrhythmia, and congenital heart disease.

Open heart surgery is obviously a huge step for patients and their families. The surgical team is ably supported by the Cardiac Surgery Intensive Care Unit (CSICU) and the Heart Centre's cardiac ward housed on the 5th floor of the Providence wing. Following surgery, a team of nurses, psychologists and social workers

help patients and their families with the recovery process.

## **Valve Surgery**

Valve surgery is an operation in which one or more heart valves is repaired or replaced with an artificial valve constructed from animal tissue or carbon and stainless steel. Patients usually spend 5–7 days at St. Paul's followed by a recuperation period at home.

## **Coronary Artery Bypass Graft (CABG)**

This surgery continues to be an important treatment option for patients with extensive or complex blockages that cannot be treated in other ways. It involves using blood vessels

## Did **you** know?

A surgeon at St. Paul's Hospital helped develop a way to reduce surgery time by using tiny, gold-coated magnets to connect graft blood vessels to the coronary artery. This innovation eliminates hand stitching, which can shorten surgery time and reduce risk to patients.



from other places in the body to “bypass” the blockages in coronary arteries. As a result, blood flow is restored to the heart muscle. This commonly performed surgery requires a 5–7 day hospital stay. St. Paul’s has also been a provincial leader in providing minimally invasive surgery or bypass through small incisions, avoiding fully opening the chest cavity in patients that meet certain health requirements.

### Transplant Surgery

Patients who have a severely diseased or damaged heart may become candidates to receive a

healthy heart from an organ donor. Heart transplant patients can expect to spend 10 days to two weeks at St. Paul’s. Following surgery, these patients are closely monitored for infection and rejection of their new heart, and enter the Healthy Heart rehabilitation and recovery program. The St. Paul’s Heart Centre performs more than a dozen transplants each year.

Location: 3rd Floor, Providence Wing

# Heart Research

As a University of British Columbia (UBC) teaching hospital, the St. Paul's Heart Centre supports an active and growing research program. Research benefits patients in very direct ways — it may allow patients access to the most advanced procedures and new medications; it allows them to contribute to research that will benefit others; and it increases the likelihood that an experimental option may be available.

## Clinical Trials

A clinical trial is a scientific test of new medicines or treatments performed on humans. These studies are designed to find out if new medications or devices are safe and how well they work, often in comparison to commonly-used treatments and devices. Many patients in the Heart Centre are invited to participate in clinical trials and all eligible patients are carefully informed of the potential risks and benefits of each trial.

Providence Health Care's Research Ethics Committee reviews all clinical trial protocols conducted in the hospital, weighing a variety of ethical and legal considerations. Almost all Heart Centre doctors and many nurses participate in these research programs.

## Heart, Lung and Blood Vessel Research (The iCAPTUR<sup>4</sup>E Centre/MRL)

Behind the scenes at the Heart Centre a multi-million dollar research effort is working to find the genetic and environmental links to heart and lung disease. These researchers want to answer key questions such as how does pollution contribute to heart disease? What genetic link makes some people more likely to get heart disease? Why can some people smoke just a little and get heart disease, while others smoke much more and stay healthy? These researchers also maintain an invaluable data bank of tissue samples taken from diseased hearts and lungs. The iCAPTUR<sup>4</sup>E

## Did **you** know?

Cardiac research at the St. Paul's Heart Centre is funded by several provincial and federal government agencies as well as private sector partners. This research program is also supported by individual and corporate donors — some of them former patients interested in making a meaningful contribution to research.



Centre/MRL is headed by Drs. Bruce McManus and Peter Paré.

### **Atherosclerosis Specialty Laboratory (ASL)**

This research lab, housed within the Healthy Heart Program, looks at how blood chemistry and other indicators influence heart disease. Here, scientists and students study such issues as the relationship of HDL and LDL-cholesterol, how metabolic problems may be linked with anti-HIV drugs, and the role of certain enzymes in metabolism. All of these lab-based studies help us understand the root causes of heart disease. The ASL is directed by Dr. John Hill.

### **Centre for Health Evaluation and Outcomes Sciences (CHÉOS)**

Housed at St. Paul's Hospital, British Columbia's Cardiac Registries are the most comprehensive medical databases in Canada, containing over 88,000 patient records. The databases capture not only cardiac surgery information, but also pacemaker, angioplasty (PCI), and diagnostic catheterization procedures. Researchers affiliated with CHÉOS and the Heart Centre use these and other sources of data to better understand how current treatments are fairing, the impact of waiting lists and treatment access issues, and who in the population may be more likely to undergo these procedures. Working closely with Heart Centre researchers, CHÉOS' Dr. Karin Humphries is one of the lead researchers in this area. Dr. Michael Kiely heads up the Cardiac Registries team.

# Giving Back

## Supporting the Heart Centre at St. Paul's Hospital

Many corporations and foundations as well as patients and their families have chosen to support the Heart Centre, some with small donations, some with large. In fact, the Heart Centre was first established following a capital campaign in which hundreds of corporations and individuals participated by giving generously.

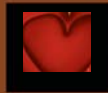
Many of the procedures and treatments now available at the Heart Centre didn't exist a decade ago. Thanks to the intensely creative cardiac

research going on at St. Paul's and around the world, the advances have been momentous. However, many of these novel therapies require extremely sophisticated — and expensive — technologies. That means hospitals have to work very hard to raise funds to buy the equipment and support the highly specialized needs of its cardiac programs.

When donors support the Heart Centre, they are contributing to the health of all British Columbians — men and women, those from urban and rural communities, young adults and older people alike.

For more information about how to give back to the Heart Centre at St. Paul's Hospital, please contact:

**St. Paul's Hospital Foundation**  
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**HEART CENTRE**  
AT ST. PAUL'S HOSPITAL

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