

# Green Hospitals

*Success Stories of Environmentally-Responsible Health Care*

*How environmental programs save hospitals money, boost staff morale,  
prevent pollution and raise community profile*

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## Acknowledgements

The authors gratefully acknowledge the assistance of the health facilities featured in this publication.

Produced with the generous financial assistance of the:

- Ontario Ministry of the Environment
- Office on Sustainable Development, Health Canada
- TDCanada Trust Friends of the Environment Foundation

The Coalition also thanks its members, the Ontario Hospital Association and Health Care Without Harm

Additional copies of this report can be purchased from the Coalition for \$5.00 each (plus \$1.50 p & p), or downloaded in PDF format from [www.greenhealthcare.ca](http://www.greenhealthcare.ca)

Design and layout by Adrian Kostic and Benjamin Rivers

Printed on recycled paper by Alphatec Printing

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# Introduction

These are challenging times for the health of Canadians.

Our health care system is facing unprecedented pressures in the face of growing demands for its services. At the same time, Canadians face serious health risks from the ongoing and avoidable contamination of our air, water, soil and food.

Protecting the health of Canadians demands both high-quality, accessible health care and a clean environment. The Canadian Coalition for Green Health Care believes these challenges can and must be overcome together. We are pleased to present "Green Hospitals: Case Studies of Environmentally-Responsible Health Care" as a tool for health care professionals.

Health care represents approximately 10 percent of the Canadian economy and a much higher proportion of provincial government expenditures. The activities of the health sector require the use of large amounts of energy for heating, cooling and other purposes, including operating a sizeable vehicle fleet; the sector uses large amounts of both renewable and non-renewable resources, including many single-use and disposable products, while some of the health care sector's operations depend on the use of toxic substances; the sector produces large volumes of solid wastes, liquid effluents and air emissions, and either operates or sends significant amounts of waste to waste incinerators that are important sources of dioxins, mercury and other serious pollutants.

Thus while health care has an ethical duty to do no harm to human health, the reality is that as a significant economic sector its operations inadvertently cause harm to the environment and thus to human health. In short, health care has a significant ecological footprint, which has important implications for the health of this and future generations, both in Canada and around the world.

Following the Hippocratic principle of *primum non nocere* - first, do no harm - the health care system must reduce its ecological and human health impacts. Hospitals and other health care facilities should be the cleanest, greenest, healthiest facilities in their communities. Not only are there sound ethical and moral reasons why this should be so, there are also pragmatic health and economic reasons.

First, the health care sector should not add to the burden of disease that it will then have to treat. The environmental health of its patients, staff and surrounding community must thus be of concern

Second, environmentally-responsible management makes sound economic sense, both in the short term and in the long term

The ten case studies in this report were selected so as to represent many of the key aspects of an overall green health care strategy, as described in the accompanying report *Doing Less Harm*, which provides a more extensive and comprehensive discussion of the environmental impact of health care in Canada. These key aspects are:

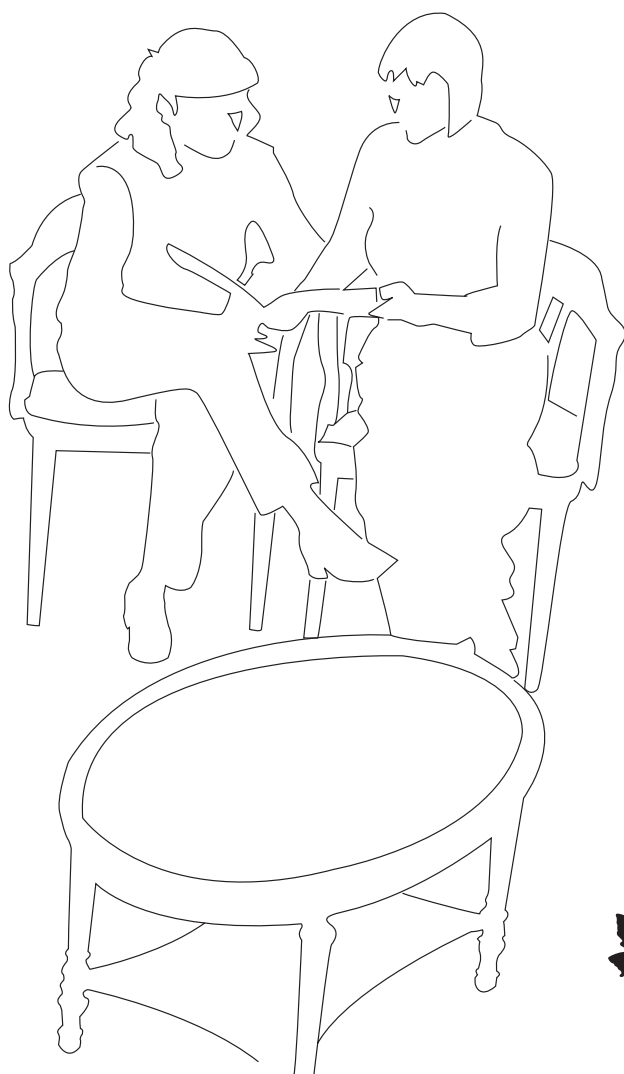
- Reduce energy use
- Reduce use of toxic materials
- Reduce emissions of key pollutants
- Reduce solid waste production
- Create healthy indoor environments
- Design green and healthy buildings
- Maintain green grounds and gardens
- Implement environmentally responsible purchasing
- Meet the legal requirements
- Secure the economic benefits
- Adopt a comprehensive, integrated strategy

For more information on how you can adopt a green health care strategy, visit [www.greenhealthcare.ca](http://www.greenhealthcare.ca).

# Success Story **1** *Reach Out to Your Community — and Improve Public Relations*

## *Environmental Health Clinic, Sunnybrook and Women's College Health Sciences Centre*

**T**HE ENVIRONMENTAL HEALTH CLINIC (EHC) *was initiated in 1996 in response to a lack of services for individuals whose health had been adversely affected by exposure to environmental contaminants, and a lack of awareness among health care professionals of how to address these needs.*



### ***The purposes of the EHC are to:***

- Educate our patients, the public and health care professionals about environmental health issues.
- Provide assessment, counselling and education for persons with environmental sensitivities and related conditions, chronic fatigue syndrome and fibromyalgia, and help them to find supportive health care.
- Gain a better understanding of the health care needs of those with environmental sensitivities, chronic fatigue syndrome and fibromyalgia through participation in clinical research.

Education is a key objective of the Clinic. Physicians are increasingly being asked by their patients to address concerns related to health and environmental pollutants in air, soil, food and water. However, patients repeatedly express dissatisfaction at physicians' lack of knowledge of environmental health issues.



***In response to these needs, the EHC implemented:***

- Community Development Fund The EHC allocates a small amount of its budget to provide not-for-profit partners additional resources and ongoing support for patients in their own communities. Funded projects have included an education program for pregnant women on sources of environmental contaminants in the home and safer alternatives, development of a web-site on environmental health issues, and educational tools for a province-wide awareness-raising initiative on environmental illnesses.
- Peer Presenter Program. To provide education and support to physicians, the EHC has partnered with the Ontario College of Family Physicians (OCFP) Continuing Medical Education Committee on a "Peer Presenter Program on Environment and Health." This approach provided training to 2-3 family physicians from each of the 6 provincial regions using a "train-the-trainer" model. The trained peer presenters are now disseminating the information to other physicians and the general public in their home regions.

***Environmental Benefits***

The Clinic's outreach activities have increased the number of initiatives throughout Ontario that promote reduced human exposure to environmental contaminants. They have also expanded the medical community's ability to lead community opinions toward more environmental protection.

***Economic Benefits***

By improving the awareness of public and professional audiences about health effects of environmental contaminants and how to minimize exposures, we expect to prevent

illnesses and decrease health care utilization costs. Our education program also encourages consumer demand for less toxic products, that would increase the market and accessibility for these products.

***Social Benefits***

The Clinic's efforts have enhanced the ability of our community partners and medical professionals to develop awareness of the health impact of environmental contaminants and to present practical solutions to reduce risks for the general public, health professionals, government, and industry. In addition, it has increased the visibility of the Environmental Health Clinic, the Ontario College of Family Physicians, and community partners as credible sources of environmental health information.

Other educational and health promotion activities that have been initiated include:

- Reinstated the hospital "green team" at the Sunnybrook and Women's College HSC with objectives and activities aimed at "hospital greening" by phasing out the use of mercury and PVC products, eliminating the non-essential incineration of medical waste, enhancing the "reduce, reuse and recycle" program, and improving air quality in the building and on the grounds through pesticide-free and scent-free practices.
- Worked with employers to develop and adopt scent-free and pesticide-free policies.
- Helped initiate Canadian and Ontario Coalitions on Green Health Care. Developed guidelines for reducing environmental and occupational carcinogens as partners of the Toronto Cancer Prevention Coalition. Served on an Advisory Committee for Toronto Public Health to construct a survey of parents'

education needs with respect to children's health and the environment.

- Participated in a cross-Canada Indoor Air Quality consultation and are members of the Indoor Air Quality Workgroup.
- \* Initiated an ongoing series of six medical rounds annually, accredited for family physicians by the College of Family Physicians of Canada through the University of Toronto Departments of Family and Community Medicine and Continuing Medical Education (CME). These "Environmental Health Clinic Reviews" have generated excellent discussions and interest (overall attendance has doubled every year).

The clinic is funded by the Ministry of Health and Long Term Care and is located at Sunnybrook and Women's College Health Sciences Centre, a University of Toronto teaching hospital.

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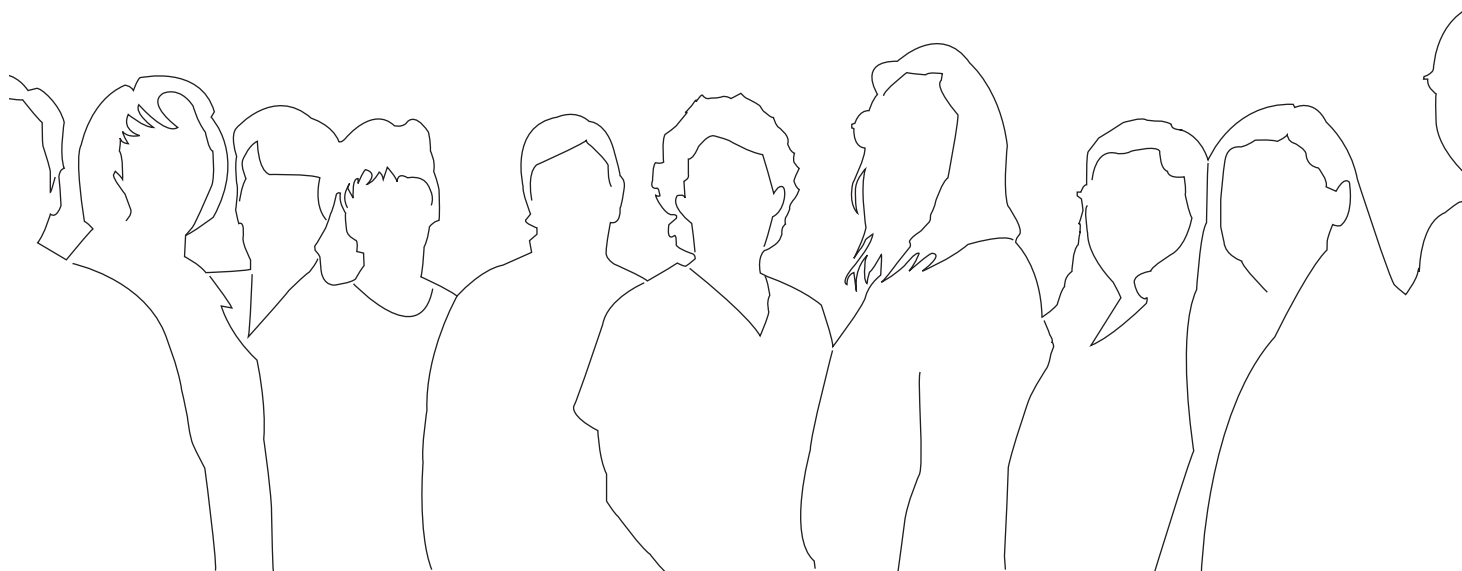
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# *Success Story 2 Be a Globally-Recognized Environmental Leader*

## *Cambridge Memorial Hospital, Cambridge, Ontario*

**O**N DECEMBER 19TH, 2000, CAMBRIDGE MEMORIAL HOSPITAL (CMH) became the first hospital in North America to receive ISO 14001 certification for its environmental management system (EMS).





An EMS seeks to improve the environmental performance of all departments and operations within the hospital. CMH created and maintains a group of primarily front line staff – its “Green Team” – to develop environmental plans, communicate and implement them. This group meets regularly to discuss trends in environmental issues, make recommendations to improve environmental performance, and provide leadership to the hospital. Objectives and targets for specific areas that impact the environment are set annually, and Action Plans are developed and implemented to fulfill these goals. As part of the continual improvement process, success is measured and monitored, and the results brought forward to management for review.

The procedures that develop an EMS are similar and integrate well with the steps each healthcare organization takes to assess its performance against the national standards set by the Canadian Council on Health Services Accreditation. The entire process from when the Green Team was created to when CMH was awarded with the ISO 14001 Registration took three years.

CMH’s environmental efforts were recognized with the 1999 and 2000 Recycling Council of Ontario (RCO’s) Outstanding Institution Award and prestigious Chairman’s Award for 2000. CMH has also been honoured with the 2000 Region of Waterloo Sustainability Award.

### **Environmental Benefits**

- In 2000/2001, CMH demonstrated continual improvement by achieving the following:
- 60 tonnes of white paper and 40 tonnes of corrugated cardboard diverted from disposal,
- 284% increase in recyclables collected

(paper, corrugated cardboard, cans, glass, scrap metal, grease, tubes, etc) in comparison to 1999 data,

- 20% reduction in amount of biomedical waste generated in comparison to 1998 data,
- 13 staff trained in mercury spill response and emergency procedures, 75 staff trained in Environmental Awareness Floor talks and 230 staff trained in EMS awareness and 222 involved in environmental orientation.

### **Economic Benefits**

CMH has achieved a 28% reduction in the total volume of waste generated over a seven-year period (1993-1999). Specific projects such as the biomedical waste reduction project implemented in 1999 achieved a \$5,000 savings. Shutdown at the on-site biomedical waste incinerator in May 1998 achieved a 5% reduction in energy usage.

### **Social Benefits**

CMH’s efforts have improved the hospital’s community image and have resulted in more environmentally-aware staff. The Green Team participates in planning and prioritizing environmental initiatives, delivering communication and planning special environmental days such as Health Living, Green Transportation and Garbage Free Lunch.

### **Additional Environmental Achievements**

- Intravenous Bag Recycling Program: 3.9 tonnes of polyvinyl chloride and 1.5 tonnes of high-density polyethylene have been diverted since the initiation of this program in 1996.
- Stewardship Initiatives: CMH’s supplier of office products takes back corrugated

containers. Similarly, its supplier of printer toner cartridges provides a take back program.

- Nickel-Cadmium (Ni-Cd) Battery Recycling: Since June 1999, CMH recycles Ni-Cd batteries collected from medical instruments, medical devices and maintenance equipment.
- Fluorescent Lamp Recycling: Since the end of 1999, CMH is diverting 20-40 fluorescent lamps per month from landfill, and has diverted 644 lamps to date.
- Minimized the use of Disposables in Operating Room: Operating staff replaced disposables such as table covers and drapes with reusable gore materials.
- Cambridge Memorial Hospital (CMH) is a 277-bed community hospital staffed by 1,100 employees. CMH overlooks the Grand River and neighbours a residential community and golf course.

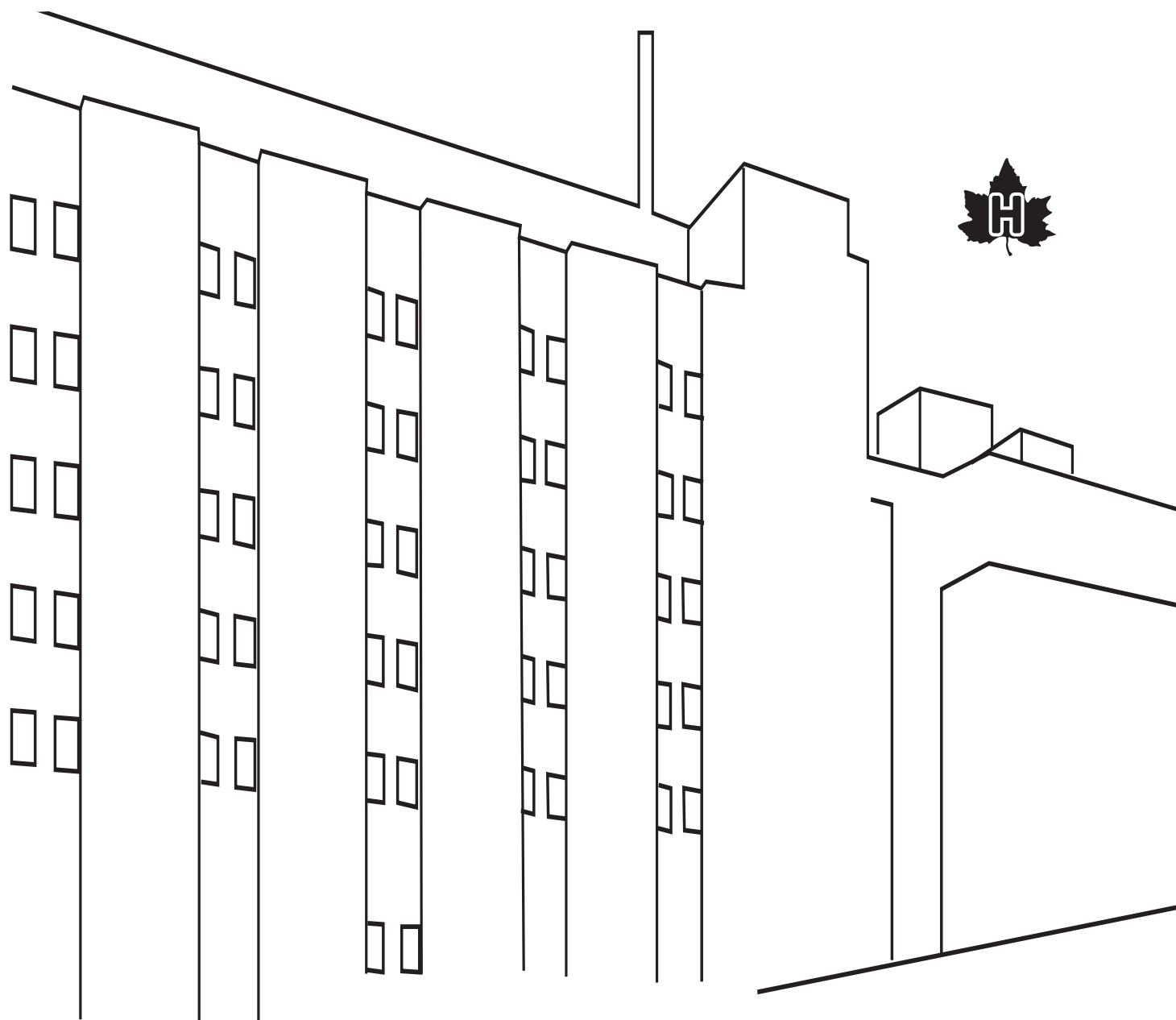
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# *Success Story 3* *Become Energy Efficient —* *Save Thousands Each Year*

*Hamilton Health Sciences, Hamilton, Ontario*





**H**AMILTON HEALTH SCIENCES (HHS) is committed to reducing total operating costs through the efficient use of energy and water in its facilities. HHS aims to achieve a 30% reduction in its 1998/1999 greenhouse gas emissions by 2004/2005 through the innovative application of energy management.

A pilot project, sponsored by the Energy Innovators Initiative of Natural Resources Canada, was undertaken at Hamilton General Hospital in 1998. The project consists of twelve measures designed to save electricity, natural gas, steam and water. The actions include energy efficient lighting, photo-cells, occupancy sensors, centrifugal pump efficiency improvement, improved Direct Digital Controls of heating, ventilating and air conditioning equipment, waste heat recovery, steam distribution efficiency improvement and sanitary water saving.

Full participation among HHS's staff is essential for the long-term success of the Energy Management Program. The project, therefore, also includes comprehensive training and an employee awareness program. The "switch off and save" program encourages staff to switch lights off when not required. The internal e-mail system is used to give tips on energy saving to all employees. Plans to replicate the pilot project at McMaster University Medical Centre (MUMC) and Chedoke General Hospital are underway.

#### **Environmental Benefits**

To date, the pilot project has resulted in energy savings of approximately 10% with the corresponding reduction in operating costs and harmful greenhouse gas emissions. With replication of the pilot project on the horizon, HHS projects a total greenhouse gas reduction of 11,838 tonnes of carbon dioxide (CO<sub>2</sub>) equivalent by 2004/2005 (this equals the pollution of over 280,000 car roundtrips between Toronto and Hamilton!)

#### **Economic Benefits**

Total cost of the pilot project was \$592,000 with hydro, natural gas & water savings estimated at \$200,000 per year (simple payback of 2.96 years) or \$715 per bed (based on 280 beds). On a larger scale, reducing air pollution from energy consumption benefits both the health of Ontario and Ontario's economy by avoiding lost productivity and increased health care costs, according to the Ontario Medical Association.

#### **Social Benefits**

HHS recognizes that, as a high-profile health care facility, it has a leadership role to play in climate change issues in the community. Staff and the public are made aware of the greenhouse gas reduction programs underway at HHS through periodic newsletters and press releases.

Hamilton Health Sciences is comprised of the McMaster University Medical Centre and the Chedoke General Hospital, Hamilton General and Henderson General Hospitals. HHS employs more than 8,000 full and part-time employees and 720 medical staff.

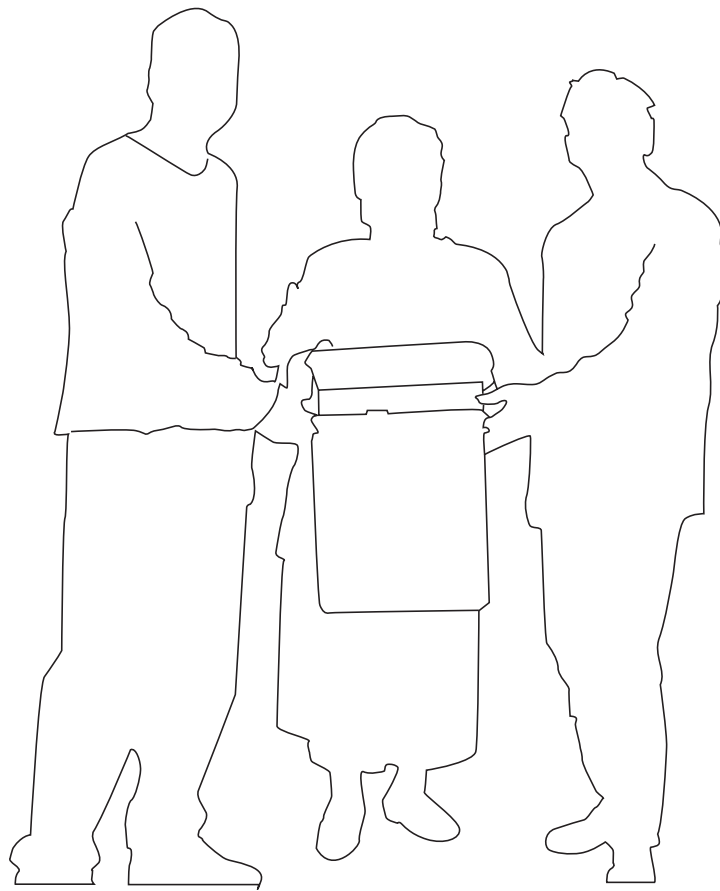
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# Success Story **4** *Save While Spending —*

## *Green Purchasing Saves Time, Money and Lives*

*The Hospital for Sick Children, Toronto, Ontario*



**T**HE HOSPITAL FOR SICK CHILDREN has developed an *Environmental Purchasing Statement of Principle*. This statement addresses life cycle, durability, recycled content, packaging and the reusability of products. This statement is included in all Requests For Proposals that the purchasing department initiates.

In early 2000, the Senior Management team at HSC made the decision to re-patriate its purchasing department. For a period of 5 years prior to this, HSC belonged to a purchasing group, consisting of 5 other facilities. The newly formed department consists of three buyers, three contract specialists and procurement support led by the director, Wayne Coros. The new purchasing team is extremely proactive and eager to ensure that HSC is getting the best value for their purchasing dollar and that the products it purchases meet high environmental standards.

HSC's Environmental Purchasing Statement of Principle requires that the following standards for products purchased should be met:

- Products are to meet the requirements of Environment Canada's Environmental Choice Program of over 50% recycled paper including 10% post consumer fiber;
- The vendor is to provide proof of responsible waste management and practices (i.e. methods of manufacturing);
- Products must make efficient use of energy and resources;
- Favour products that have a long service life and can be effectively repaired;
- Favour products that produce fewer polluting bi-products and minimize safety hazards during use and disposal;
- The intended use of a product or service will not be significantly affected;
- Products are made available at competitive prices.

The purchasing department also makes reference to the City of Toronto Sewer Use Bylaw and a list of subject pollutants that suppliers must identify if they are contained in any of their products.

### ***Environment Benefits***

Including its statement of principle in all RFP's lets suppliers know that HSC is serious about pollution prevention. Suppliers must demonstrate what effect their products will have on the environment. This sends a strong message to suppliers that they must look at these issues if they are going to remain competitive.

Having suppliers take more responsibility for issues like packaging and durability, cuts down on the volumes of waste generated by the hospital.

With the identification of any subject pollutants from the sewer use by-law, the purchasing department then works with suppliers and the Hospital's Manager of Waste Materials and Pollution Prevention to identify alternative products. Where an alternative product does not exist, a pollution prevention plan is developed by the consuming department to prevent the subject pollutant from being discharged into the sewer.

### ***Additional Environmental Achievements***

HSC is a recognized health care leader and innovator in environmental programs.

Its successes include:

- a groundbreaking waste management program that has reduced biomedical waste volumes by 80%, decreased waste to land-fill by at least 6%, and increased recycling by over 78%. Since 1992, HSC has reduced waste management costs from \$560,000 to \$107,000 for a savings of \$452,903;
- a public commitment to mercury reduction has replaced 40,000 lamps and reduced the use and purchase of mercury-containing processes and medical equipment. HSC is a signatory to Health Care Without Harm's Mercury-Free Medicine Pledge, and;

- a food composting program in cooperation with the Ontario Science Centre

The Hospital for Sick Children is a world-class pediatric health sciences centre, affiliated with the University of Toronto. HSC is one of the largest pediatric teaching and research centres in the world. With over 2 million square feet of space and 4,500 employees, an average of 10,000 people walk through its doors each day.

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# Success Story 5 *Trim Your “Waste-Line”*

## *Norfolk General Hospital & Norfolk Hospital Nursing Home, Simcoe, Ontario*

**N**ORFOLK GENERAL HOSPITAL & NORFOLK HOSPITAL NURSING HOME (NGH & NHHN) *have become environmental leaders and cut costs through their Waste Minimization Program.*

On average, 85% of a hospital's waste is non-hazardous and includes office and patient care wastes such as paper, packaging, food, disposable or single use products and outdated equipment. Recycling programs can significantly reduce waste volumes and costs.

To identify opportunities to reduce waste and costs, NGH&NHHN created a Waste Management Committee (later renamed the Environmental Committee) in 1991.

- A regional recycling program began recovering cans, glass, fine paper, newspaper, styrofoam and plastics;
- In 1992, confidential waste, and corrugated cardboard recycling began, resulting in a reduction of incinerator use by 48 hours per week;
- In October 1993, the incinerators were shut down;
- Subsequent additions to the program have included kitchen oil, laser printer toner cartridges, and collecting articles such as soup cauldrons, IV poles, and linens for developing countries.

The food-composting program was implemented in October 1994. The food waste from the Nutrition and Foodservices Departments' kitchen, as well as food waste returned on patient trays, is fed into a garburator along with paper napkins, paper towels, milk cartons, and cardboard. The waste is shredded and taken to a plant to be recycled into high-protein feed supplement for animals.

NGH&NHHN overcame geographical obstacles to achieve their success. Simcoe, located 100 kilometres south of London, Ontario, is not a major urban city centre. NGH&NHHN are often faced with no available service or elevated costs as a result of distance. In response, its strategy has been to network with its peers and stay abreast of different programs available to source out new programs and/or companies.

The facility had its efforts recognized by the Recycling Council of Ontario with an Honourable Mention Award in 1998 and 1999.

### ***Environmental Benefits***

NGH&NHHN, proud of its hospitals waste minimization efforts, is an advocate for the pollution prevention approach. With the two incinerators shut down in 1993, all associated emissions were eliminated. According to a 1990 Facility Emissions report, Environment Canada verified the following emissions from the two former NGH&NHHN incinerators: 74 kg of sulphur dioxide, 171 kg of nitrogen oxides, 1,733 kg of carbon monoxide, 84 kg of volatile organic compounds and 95 kg of particulate. Furthermore, the food-composting program avoids the problems associated with land filling such as odours, pests and vermin while controlling the spread of diseases and weeds from waste. NGH&NHHN remains committed to improving upon the existing 40% waste diversion rate.



### ***Economic Benefits***

With the expansion of the waste management program, the average cost per tonne of managed waste has been declining since 1996. Reduced overall fuel consumption was realized with the shutdown of the incinerators and the money saved has been used in aiding the hospital's waste management program. Based on an average fuel cost of \$0.30/M<sup>3</sup> the annual fuel savings attributed to not running the incinerators total approximately \$32,000.

### ***Additional Environmental Achievements***

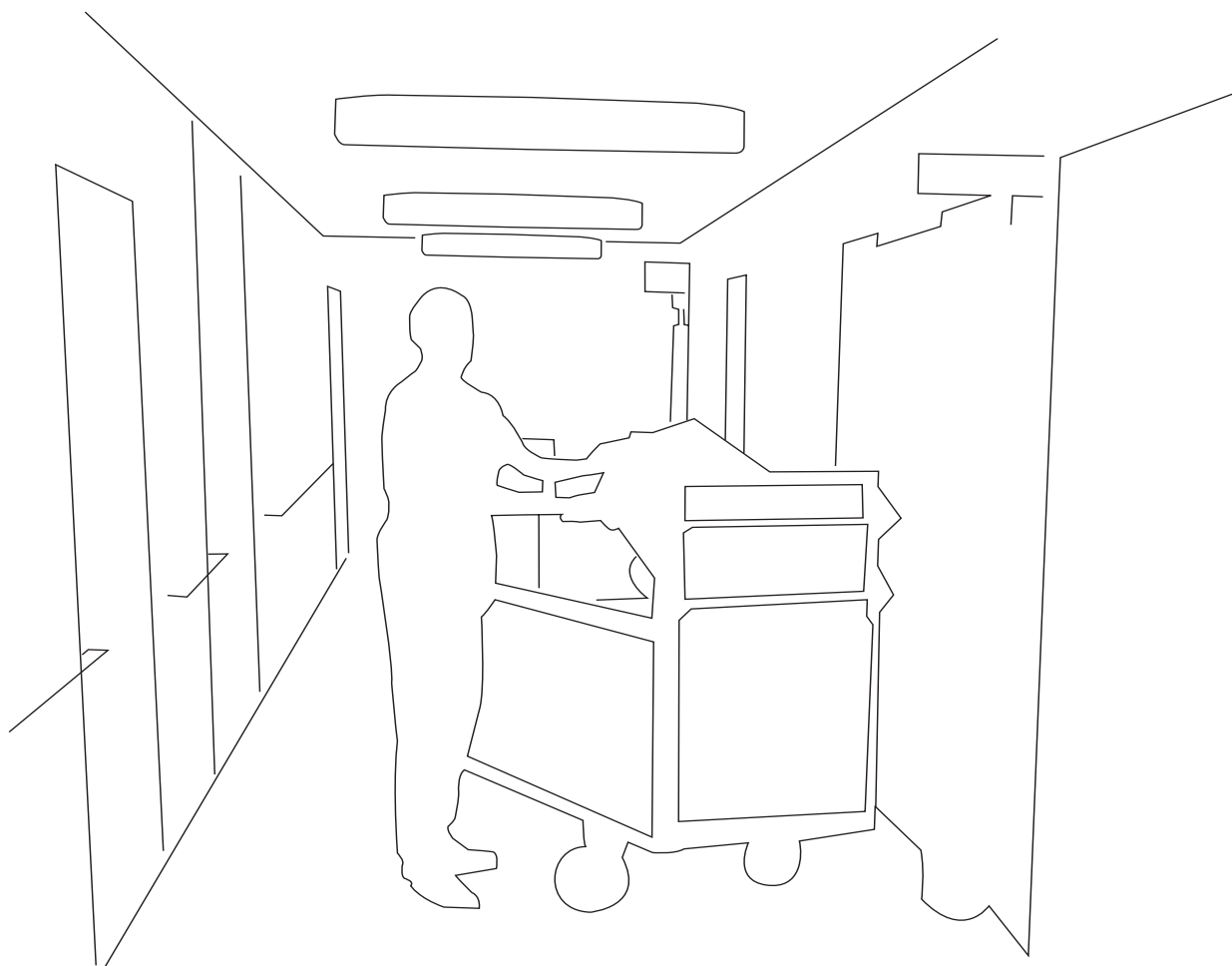
In 1995, NGH&NHNH received the Outstanding Achievement in Energy Management Award given by the Task Force on Energy Management in Health Care Facilities in Canada. Other initiatives include a new waterless Medical Air and Medical Vacuum system that reduces energy demand and eliminates the use of water.

Norfolk General Hospital and Norfolk Hospital Nursing Home (NGH&NHNH) consists of a 121-bed community hospital and an 80-bed nursing home.

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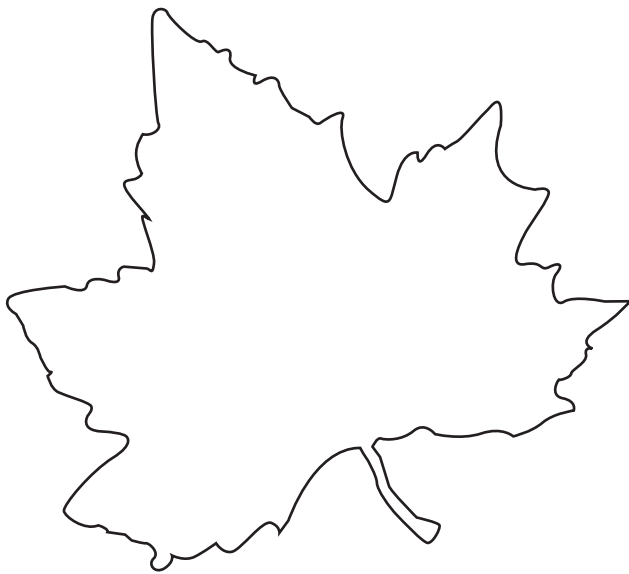
*The Canadian Coalition for Green Health Care understands that environmental programs...*



*<http://www.greenhealthcare.ca/>*



The Canadian Coalition for Green Health Care  
Coalition canadienne pour un système de santé vert



*...save hospitals money, boost staff morale, prevent pollution and raise community profile*



# Success Story 6 *Building a Healthier Hospital*

## *Northumberland Health Care Centre*

*Cobourg, Ontario*

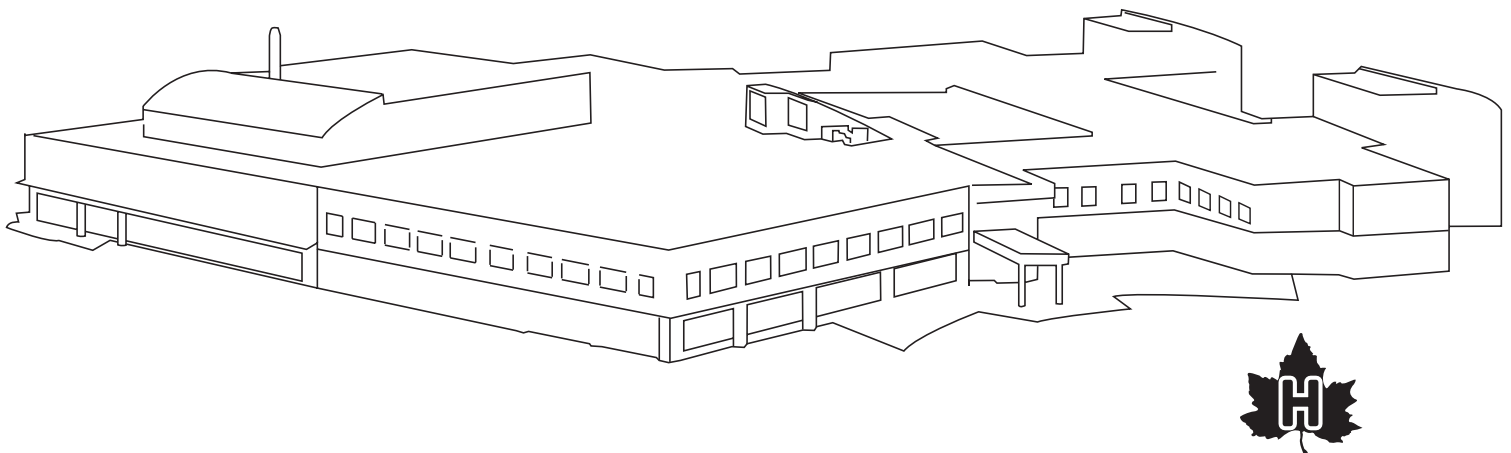
**T**HE NORTHUMBERLAND HEALTH CARE CORPORATION (NHCC) is currently in the planning process for a new, state-of-the-art hospital to be completed in mid-2003. Recognizing the opportunity to ensure improved quality of life for staff and quality care for patients in a safe and healthy environment, the joint Occupational Health, Environmental and Safety Committee has developed a plan to “green” the new hospital.

The core of this philosophy holds that, wherever possible, environmental consideration must be given when making purchasing and operational decisions. The four key elements of this environmental philosophy for the new hospital are:

- whole system thinking
- front-loaded design
- end-user consideration (staff and patients)
- team work.

Working with their architects (Murphy Hilgers Inc.) the Committee has identified a set of issues that are being addressed in the design of the new hospital. Some of these involve the hospital in the context of the community, some address issues of hospital design and construction, while others address issues of ongoing operation and maintenance.

- Issues within the context of the community include:
  - working with the Town of Cobourg to extend bus routes to include the new hospital, to reduce the need to use cars to access the hospital



- creating an integrated walkway/jogging path in the area surrounding the new site
- planting trees and shrubbery to provide shade in the summer, channel cool summer breezes and block cold winter winds
- landscaping with drought-resistant native plants and perennial ground covers
- absorbing rainwater run-off on site and in an adjacent retention pond.
- Issues involving design and construction include:
  - installing high levels of insulation (R20 roof, R18 walls) and double-glazed, sealed windows
  - maximizing sun exposure in winter months and sun blocking in summer months, utilizing "free" air-cooling and natural day-lighting, where possible, using renewable energy
  - avoiding structural "over-design" and using durable materials
  - designing to avoid moisture, mould and mildew problems
  - using building products and finishes made from recycled materials, particularly copper and steel in electrical and mechanical equipment
  - installing high-efficiency heating and cooling equipment, including low NOX, high-efficiency heating boilers and high-efficiency chiller units
  - selecting high-efficiency fluorescent lighting indoors with electronic ballasts, ambient sensors and local switches

- using high-efficiency metal halide lamps for exterior lighting, controlled via timers and photocells
- employing low-flush toilets and urinals and water-saver showers
- setting up a recycling program for construction wastes
- Operating issues that were considered include:
  - using environmentally-friendly refrigerant in hospital chillers
  - purchasing durable electrical and mechanical equipment
  - installing a central energy management control system to optimize energy use
  - selecting interior finishes that require low maintenance while being hard-wearing and attractive
  - purchasing 'Eco-logo' products, including latex paints and water-based adhesives, wherever possible
  - specifying formaldehyde-free medium density fibre board where appropriate
  - increasing environmental awareness among hospital and medical staff.

### ***Environmental Benefits***

NHHC aims to significantly reduce its "ecological footprint" by minimizing its resource consumption and pollution generation. The facility will serve as an example to other hospitals.

### ***Economic Benefits***

It is important to note that all of these initiatives are being undertaken within standard construction and operating budgets. NHHC expects considerable cost savings through exceptional energy and water efficiency.

### ***Social Benefits***

The heightened environmental awareness and the public commitment to excellence has benefited the hospital in terms of staff morale and community support.

### ***Additional Environmental Achievements***

NHHC has been addressing a number of other environmental issues, in particular the development of a policy restricting the use of pesticides, enhancement and education of staff regarding recycling programs and waste management, use of a "clean steam" system to reduce the amount of chemicals used in the boilers and other initiatives to reduce the number of chemicals used within the facility.

The Northumberland Health Care Centre (NHCC) is a 101 bed hospital providing quality care for patients who require medical, surgical, obstetrical, pediatric, ambulatory and emergency care. It also provides longer-term care for individuals requiring rehabilitation, complex and palliative care.

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# Success Story 7 *Reduce Your Biomedical Waste — Increase Compliance and Prevent Pollution*

## *The Ottawa Hospital, Ottawa, Ontario*

**T**HE OTTAWA HOSPITAL (TOH) *implemented a biomedical waste program that reduced costs, liability and environmental contamination.*

Studies of hospital waste streams in Ontario and across the United States illustrate, in general, that hospitals poorly separate their biomedical waste from the general waste stream. Furthermore, the infectious waste (requiring sterilization) and pathological waste (requiring incineration) are often unnecessarily mixed. This contamination and waste unnecessary treatment poses a serious health and safety liability, and adds avoidable costs and burden to the environment.

Since 1994, TOH's biomedical waste program has:

- eliminated the unnecessary on-site incineration of non-pathological biomedical waste;
- installed a state-of-the-art fluid management system;
- decommissioned its on-site incinerator
- planned the installation of two on-site "Hydroclave" alternative technology waste treatment systems

In April, 2001, a cost-benefit analysis was conducted to see if on-site incineration of pathological biomedical waste with aging equipment was cost effective. Without including labour costs, the analysis showed that sending the anatomical waste off-site was more cost-effective and environmentally beneficial. As a result, the incinerator was officially decommissioned in May 2001.

In the past year, TOH has improved its management of biomedical waste through the installation of an "Eductor" fluid management system. For the treatment of infectious biomedical waste, TOH replaced an ageing autoclave with

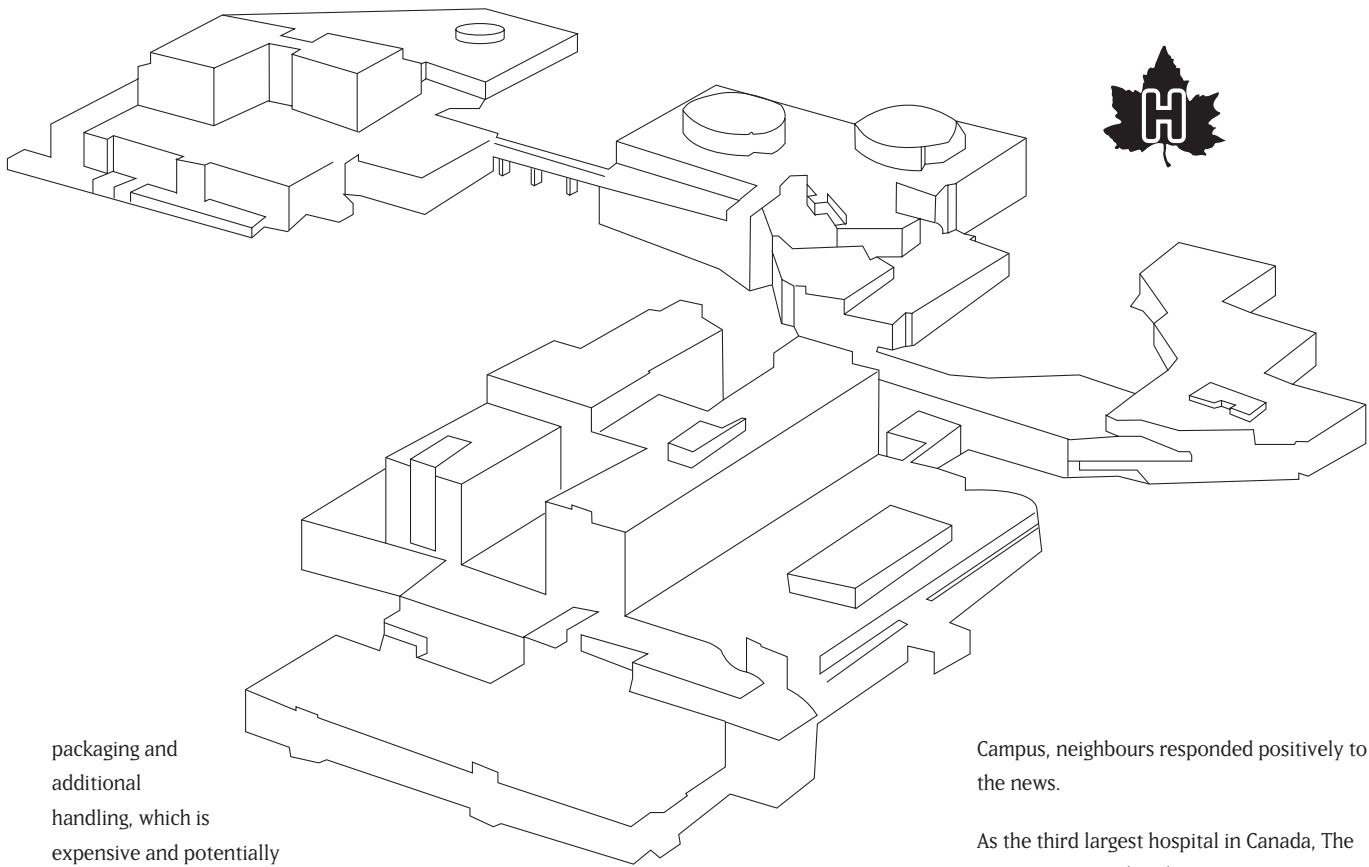
an alternative treatment technology — two H-15 "Hydroclave" systems, scheduled for installation in October, 2001.

The Eductor uses a closed-loop gravity-fed flush system to efficiently empty chest drainage units without risk of splashing or clogging. The chest drainage units are transported to the Eductor using specially designed transfer baskets and carts which hold the units upright. Once the units are emptied, they are categorized as domestic waste. Fluid is discharged to the sanitary sewer or packaged for off-site incineration, following infection control guidelines.

The Hydroclave consists of a barrel-shaped pressure vessel to decontaminate infectious waste. In contrast to an autoclave, the Hydroclave uses the moisture content of the waste to create the necessary steam used in the decontamination process, and its design minimizes sterilization times. Once the decontamination cycle is complete, all of the moisture inside the chamber is condensed with cold water and is discharged to the sanitary sewer, resulting in a dry, decontaminated, fragmented waste.

### ***Environmental Benefits***

Biomedical waste incinerators are Canada's second-largest source of toxic dioxin to our air, and release mercury and other heavy metals. Conversely, non-incineration methods of waste treatment do not pollute the atmosphere and the decontaminated waste can be disposed of at the local landfill. This prevents long distance trucking,



packaging and additional handling, which is expensive and potentially hazardous. The waste, wastewater and air emissions meet all regulatory requirements for decontamination, guaranteeing 99.99% sterility (6 log10 reduction in *B. Stearothermophilus*).

### **Economic Benefits**

The Eductor payback is less than one year when the costs of packaging, mass/volume of fluid for off-site disposal are considered. Reductions in packaging costs, utility consumption and off-site disposal costs make the payback of the two Hydroclave systems less than two years. Decommissioning the incinerator and using off-site disposal was cost equivalent (not including human resources). Packaging costs offset maintenance costs and off-site incineration offset utility consumption.

New federal Canada-Wide Standards have

established strict emission limits on toxic dioxin and mercury from medical waste incinerators by 2006. TOH will realize the benefits of compliance and reduced health and safety costs.

### **Social Benefits**

The Eductor Fluid Management system reduces occupational risks by eliminating splashing and spillage inside biomedical waste bags. This is a prime example of using engineering technologies for reduction of exposures to bloodborne pathogens under Occupational Health and Safety regulations.

The decision to decommission the incinerator at the Civic Campus was based primarily on promoting environmentally responsible healthcare and secondarily on a business case. Since a residential zone surrounds the Civic

Campus, neighbours responded positively to the news.

As the third largest hospital in Canada, The Ottawa Hospital (TOH) is one of the largest generators of biomedical waste in the country. TOH's objectives are to ensure safe, compliant and cost effective disposal practices for potentially infectious waste.

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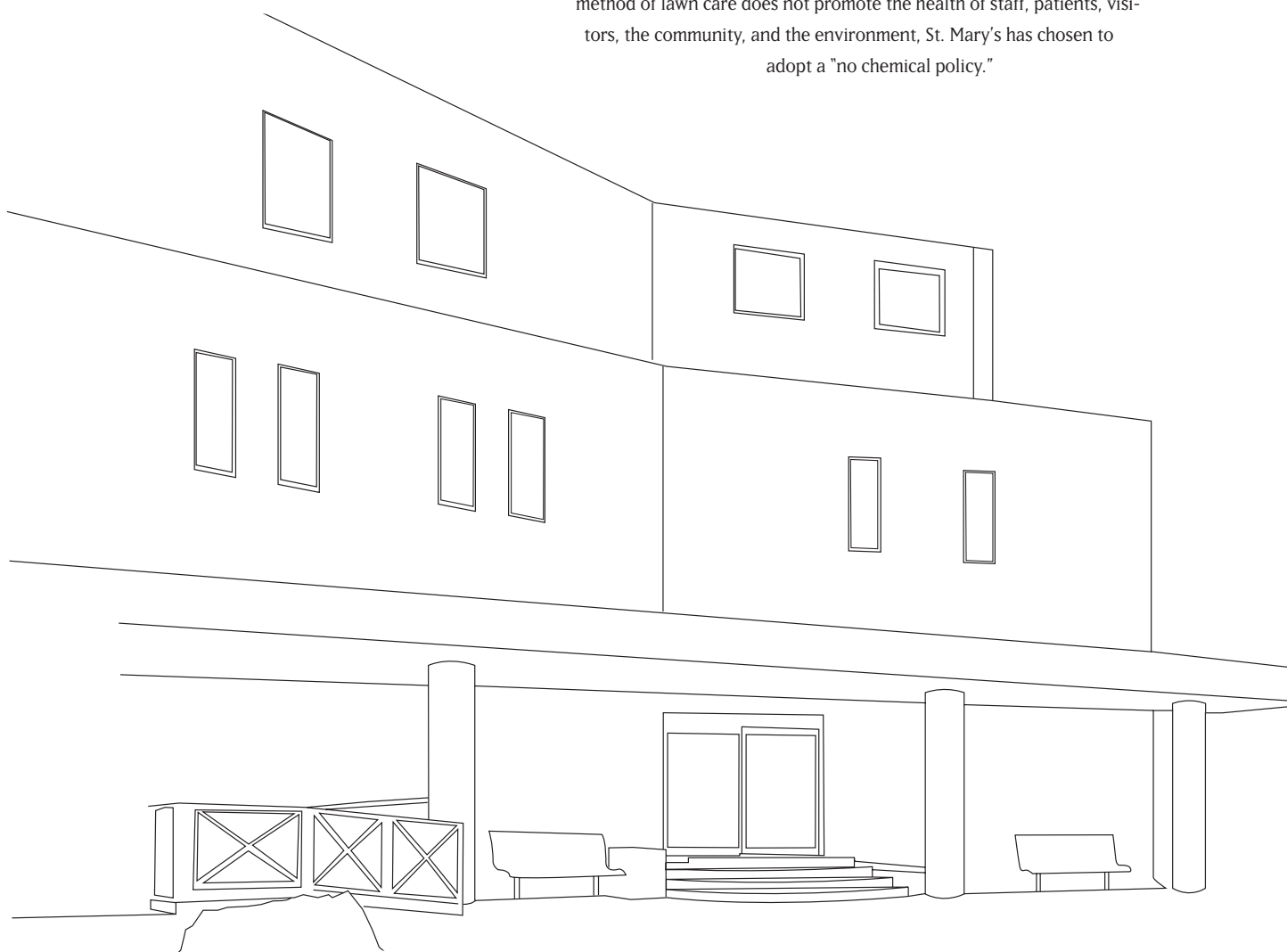
# Success Story 8 *Green Your Grounds*

## *St. Mary's General Hospital, Kitchener, Ontario*

**S**T. MARY'S is one of the first hospitals in Ontario to eliminate chemical use on hospital grounds.

Scientific studies have linked chemical pesticides to cancer , impaired development, reproductive and neurotoxic effects.

Reducing and eliminating chemical use in current landscaping practices was first set as an objective and target in 2000, under the hospital's Environmental Management System (EMS). In the past, St. Mary's had been managing pests (grubs, cinch bugs, etc) and weeds (crab grass, clover, etc.) through the application of pesticides and herbicides. As this method of lawn care does not promote the health of staff, patients, visitors, the community, and the environment, St. Mary's has chosen to adopt a "no chemical policy."



Since 2000, St. Mary's landscaping company has utilized natural pest and weed control methods such as aerating, re-seeded and fertilizing to achieve a thick, lush lawn. This was done despite many obstacles including varying weather conditions, construction, and evolving insect predators. Vegetation that was prone to attacks from insect predators was promptly identified and removed. Due to the on-going development of the hospital resulting in changes in landscape, St. Mary's retained the services of a recent graduate from the Landscape Architecture program at the University of Guelph, to design the landscape in line with the hospital's 5- year "Master Plan." Future landscape plans will incorporate the use of drought resistant, native plants, ground covers, and salt tolerant plants. If intervention is required, the hospital will look to microbiological methods of pest management (i.e. nematodes).

Waterloo Region has some of the highest readings of smog in Ontario. Therefore, St. Mary's has also been working with their landscaping company to ensure that lawn maintenance using gas-powered machinery is not performed on "Smog Days." This not only helps St. Mary's promote and encourage hospital staff to utilize "Spare the Air actions" set out by the Ministry of the Environment in their homes, but helps St. Mary's decrease their impact on air quality

### ***Environmental Benefits***

The hospital's "chemical free" grounds policy has:

- Reduced overall impact on local environment/landscape and ground water;
- Reduced air emissions affecting the health and safety of staff, visitors, and landscaping company staff during spray applications, and;
- Reduced air emissions from gas-powered grounds-keeping in the local community. The generation of approximately 900 grams of carbon monoxide and 36 grams of nitrogen oxides and total hydrocarbon were avoided by not cutting the grass on high smog days.

### ***Economic Benefits***

- Reduced liability of hospital towards access issues of sensitive/allergic patients, and;
- Reduced cost of chemical applications-offset by the increased cost of additional measures.

### ***Social Benefits***

- St. Mary's proactive promotion of environmental issues has significantly improved community and staff relations;
- Improved environmental education amongst staff has improved morale and the success of initiatives at the hospital and at home, and;

- St. Mary's General Hospital was recognized by Region of Waterloo (Winner of the Region's 2001 Environmental Sustainability Awards – Business Category) and by other community organizations.

St. Mary's General Hospital is an acute care facility with 900 employees and 168 beds. St. Mary's is only the second hospital in North America to formally develop and register their Environmental Management System to the ISO 14001 Standard in September 2001.

### ***For more information please contact:***

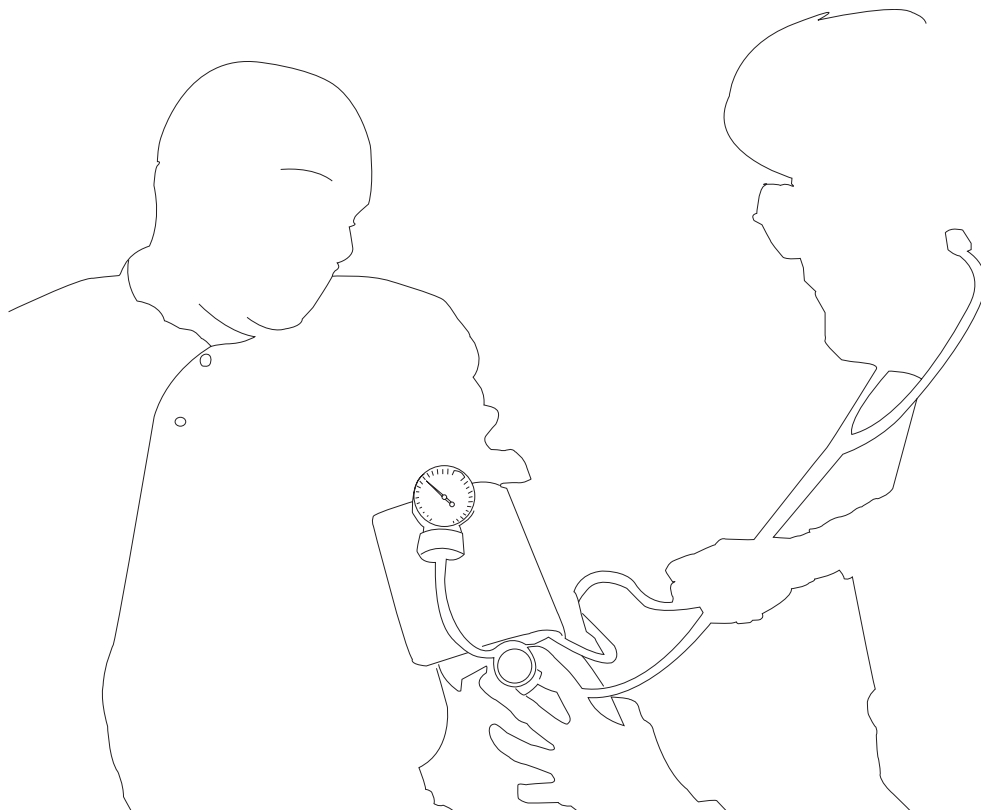
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# Success Story 9 *Reduce Toxic Mercury*

*University Health Network, Toronto, Ontario*

**T**HE USE OF MERCURY AND MERCURY-CONTAINING PRODUCTS has been ranked as the second most significant environmental aspect under the Hospital's Environmental Management System (EMS). In March 2000 the Mercury Management Task Group was formed to address this issue under the Mercury Management environmental program. On March 7, 2000, the University Health Network's (UHN) Operations Committee approved a Mercury Management Program for the Hospital





The program encourages employees to consider non-mercury alternatives when purchasing products. To date, mercury free substitutes are regularly purchased for three main products – thermometers, esophageal dilators and sphygmomanometers. Several other mercury-containing products and possible alternatives will be examined as the Mercury Management environmental program grows.

In addition to the Mercury Management Program, several other initiatives have been to limit uncontrolled releases of mercury to the environment are limited. These include:

- A Mercury Spill policy and training to ensure that mercury spills are cleaned up safely and in an environmentally-sensitive manner.
- A fluorescent bulbs recycling program started in May 2001 to recycle and recover mercury from old fluorescent bulbs. Approximately 1,100 fluorescent tubes were recycled in the first two months of the program.
- A battery recycling program also launched in May 2001 with approximately 300 kilograms of batteries being recycled as of July 2001.

### ***Environmental Benefits***

By phasing out the use of mercury and mercury containing products and by putting systems in place to ensure mercury wastes are handled properly, the UHN hopes to act as a leader in reducing the role humans play in releasing mercury into the environment.

Mercury is a bioaccumulative, acutely toxic chemical that poses a serious threat to human and environmental health, potentially causing harm to the brain, kidney, lungs and nervous system. Though mercury occurs naturally in soil, vegetation and the atmosphere, it is

estimated that human activities contribute approximately two-thirds of the current global mercury burden. Release of mercury into the environment occurs most often through discharge into storm and sanitary sewer systems, as well as the incineration of mercury containing products.

### ***Economic Benefits***

While some mercury-containing items may be cheaper than their mercury-free alternatives, the UHN's Mercury Management Program will save the "hidden" costs of mercury use. For example, UHN will save the costs of the disposal of mercury containing items, for which recycling or treatment as hazardous waste are extremely expensive. UHN will also avoid extra costs of training and equipment for the clean-up of mercury spills, and of compliance with the City of Toronto Sewer Use Bylaw.

### ***Social Benefits***

Key to UHN's EMS is the creation of a sustainable environmentally-sensitive culture at the hospital. Staff are shown how day-to-day operations at the Hospital affect the environment and their lives, and are encouraged to approach the Environmental Coordinator with any questions they may have on practicing environmentally friendly lifestyles at home. Links have also been made with the Community Advisory Committees at the UHN hospitals.

UHN is also quite active in the local hospital and business community, regularly sharing information with neighbouring hospitals and other office complexes. In addition to meeting regularly with a group of hospitals that use the same waste and recycling hauler, UHN recently became a member of the Canadian Coalition for Green Health Care.

### ***Additional Environmental Achievements***

The driving force behind UHN's environmental initiatives is its Environmental Management System (EMS). Coordinated by a full-time Environmental Coordinator successful initiatives include:

- An aggressive recycling program that has significantly increased diversion rates of bluebox materials and initiated take-back/refill programs for toner and ink cartridges, batteries, and ultrasound gel bottles;
- the establishment of a Biomedical Waste Task Group to reduce volumes and ensure safe and proper disposal;
- solvent recycling in histopathology at the Toronto General site which can recover 7,200 litres of alcohol and xylenes per year;
- Executive approval of UHN's Environmental Policy, which strives to meet or exceed environmental regulations, practice pollution prevention and continually improve and promote programs to reduce the environmental impacts of hospital activities on patients, staff and the community.

The University Health Network, affiliated with the University of Toronto, is comprised of three hospitals with a combined total of over 1,000 beds and approximately 8000 employees.

### ***For more information please contact:***

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# Success Story 10 *Improve Your Indoor Air Quality*

## *South Riverdale Community Health Centre*

*Toronto, Ontario*

**S**OUTH RIVERDALE COMMUNITY HEALTH CENTRE has a history of involvement in environmental health issues in its eastern Toronto community. Accordingly, when a new, custom-built 28,750 square foot building was constructed between 1996 and 1998, South Riverdale was committed to ensuring that good indoor air quality was a priority.

The Centre's board and staff worked closely with the architects (A.J.Diamond, Donald Schmitt and Company) and with an environmental consultant (Ed Lowans, of Lowans Stephen, Environmental Consultants) to ensure that this objective was met, while remaining within the budgetary guidelines of the Ministry of Health.

Key to the improvement of indoor air quality is ensuring that materials that may be a source of indoor air contaminants are either not used in the building or, if they are used, are sealed so as to prevent off-gassing. Staff input was also important in both the design and the decor of the building.

Key criteria for selecting building materials included:

- low emissions
- low toxicity
- no perfumes
- no unnecessary colourants
- no listed chemicals of concern
- recycled materials where possible
- high energy efficiency
- superior indoor air quality

Among the key indoor air quality initiatives were the following:

- locating fresh air intakes on the roof, well away from exhausts and ground level pollution
- additive-free, high efficiency intake air filters
- direct exhaust for sources of contamination such as medical labs and the kitchen
- separate ventilation to the outside for the elevator shaft to keep emissions from hydraulic oils outside the building
- steel studs for interior walls, since they do not off-gas or provide a source for biological contaminants.

Particular attention is paid to finishings, fittings and furniture that might contribute to indoor air contamination. This includes:

- zero or low-solvent-content paints and finishes
- low emission glues, tile mortars, grouts and caulking materials
- a non-off-gassing clear acrylic sealer for wood trim
- non-woven Tapison floor textiles rather than carpets, to avoid fibre and solvent emissions
- Marmoleum flooring sealed with water-borne acrylic
- wood chip panels for cabinetry with low formaldehyde glues

- mineral fibre ceiling tiles with zero or low emission resins
- solution-dyed fabrics without spray-on coatings
- zero or low off-gassing acrylic lacquer on all exposed wood surfaces
- enamel powder coating on metal surfaces
- biodegradable, natural-source-based cleaning and maintenance materials with low emissions, low toxicity and no perfumes.

Finally, construction and maintenance staff, occupants and clients receive information about the environmental features of the building and are encouraged to maintain high environmental standards within the building.

### ***Environmental Benefits***

The choice of low-toxicity, low-emission products contributes to a manufacturing sector that uses fewer chemicals and produces less pollution. In addition, SRCHC was designed to be an energy efficient building, which reduces greenhouse gases and airborne pollutants that adversely affect human health.

### ***Social Benefits***

Since the centre's new building opened in 1998, the high indoor air quality continues to be an attraction for patients, staff and visitors. Staff has found the building to be a healthy and pleasant place to work in and patients are still commenting that the building is "warm" and welcoming.

### ***Additional Environment Achievements***

SRCHC was designed to be an energy-efficient building, with large double-pane, insulated windows with argon gas fill, insulated and foamed in place frames. The Centre chose energy efficient fluorescent tubes with electronic ballasts and energy efficient appliances and office equipment. Several small high-efficiency natural gas boilers provide heating. SRCHC is currently developing a protocol for safe and environmentally friendly cleaning within the centre to minimize off-gassing and maintain indoor air quality and to provide a healthier environment for workers and clients.

SRCHC has also incorporated "green design" features to engage the community:

- planting deciduous trees on south side to shade the building in summer
- orienting doors and windows to provide connections to outdoor meeting spaces
- initiating a community design and planting process for the grounds around the building which will include low maintenance / drought-tolerant species, community education, composting, various demonstration gardens (fragrant, food, herbs, xeriscape, etc.)
- providing minimal parking which reduces storm run-off and encourages walking, cycling and transit
- designing places for resting, meeting and interacting with community.

South Riverdale Community Health Centre (SRCHC), established in the 1970s, has been involved in environmental health issues in its community, notably extensive lead pollution from a secondary lead smelter in the community. In recent years, SRCHC's Environmental Health Program has raised awareness around the connection between indoor air quality and health through workshops, popular theatre and the production of "Hidden Exposures," a resource guide on creating healthy indoor environments.

### ***For information please contact:***

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The Canadian Coalition for Green Health Care, formed in 2000, works with health care organizations and facilities, health care professionals, governments, non-governmental organizations and others to raise awareness and increase the capacity of health care organizations and their staff or members to become more environmentally-responsible.

The mission of the Canadian Coalition for Green Health Care is to minimize the adverse environmental and human health impact of Canada's health care system. Its core areas of focus include:

- energy conservation
- pollution prevention
- resource conservation and solid waste reduction
- good indoor air quality
- environmentally-responsible design and management, including both health facility accreditation and ISO 14001 certification.

**MEMBERS** (in alphabetical order -As of October 5, 2001)

Cambridge Memorial Hospital  
Canadian Association of Physicians for the Environment  
Canadian Centre for Pollution Prevention  
Canadian College of Health Services Executives  
Canadian Health Care Engineering Society  
Canadian Medical Association  
Canadian Nurses Association  
Canadian Public Health Association  
Canadian Society for Environmental Medicine  
College of Family Physicians of Canada  
Hospital for Sick Children  
Great Lakes United  
Ontario College of Family Physicians (Environmental Health Committee)  
Pollution Probe  
Toronto Environmental Alliance  
University Health Network  
University of Alberta Hospitals  
Winnipeg Regional Health Authority, Laboratory Medicine Program

For more information about joining the Canadian Coalition for Green Healthcare, visit our website at [www.greenhealthcare.ca](http://www.greenhealthcare.ca)